



Aalborg Universitet

AALBORG UNIVERSITY  
DENMARK

## Maritime cleantech entrepreneurship in Frederikshavn, Denmark

*Exploring the role of intermediaries on information and competence provision*

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*Published in:*  
32nd International Geographical Congress

*Publication date:*  
2012

*Document Version*  
Early version, also known as pre-print

[Link to publication from Aalborg University](#)

### *Citation for published version (APA):*

Hermann, R. R., Lunde-Christensen, J. C., Riisgaard, H., & Remmen, A. (2012). Maritime cleantech entrepreneurship in Frederikshavn, Denmark: Exploring the role of intermediaries on information and competence provision. In *32nd International Geographical Congress: Book of Abstracts* (pp. 639)

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32<sup>nd</sup>

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**Imprint**

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The logo is a circular emblem. The top half is white and contains a dark grey silhouette of two pointed structures, resembling a church spire or a stylized 'M'. The bottom half is dark grey and contains the text 'IGC' in yellow, 'COLOGNE 2012' in white, and 'DOWN TO EARTH' in white.

IGC  
COLOGNE 2012  
DOWN TO EARTH

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# C08.01

# Applied Geography



## C08.01-01 - Launch of the Applied Geography Commission's 3rd Edited Book - Applied Geography and Spatial Analysis: Addressing Real World Issues

*Chair: Robert J. Stimson, Kingsley E. Haynes, Edward Elgar*

### **Introducing the book**

*Robert Stimson (University of Melbourne)*

### **Brief presentations by a selection of chapter authors**

*Graham Clarke (University of Leeds)*

*John Lombard (Old Dominion University)*

*Robert Baker (University of New England)*

*Maria Lucinda Fonseca (University of Lisbon)*

*Eliahu Stern (Ben-Gurion University)*

*Pablo Osses McIntyre*





## C08.01-02 - Sessions on Applied Geography Topics 1

*Chair: Kingsley Haynes, Robert Stimson*

**The role of culture on the management of immigrant-related diversity:  
Lisbon in comparative perspective**

*Maria Lucinda Fonseca (University of Lisbon), Alina Esteves (Centre for  
Geographical Studies)*

**Estimating small area visitor expenditure for grocery store location planning**

*Andy Newing (School of Geography), Graham Clarke (University of Leeds),  
Martin Clarke (University of Leeds)*

**Demographic sustainability as a base for rural development policy**

*Eliahu Stern (Ben-Gurion University)*



## C08.01-03 - Sessions on Applied Geography Topics 2

*Chair: Kingsley Haynes, Robert Stimson*

**Next step: on the validation of the Q index to identify optimal locations for economic activities**

*Stephane Joost (EPFL)*

**Socioeconomic segregation and travel time: New criteria's for decision-makers in social housing location, for the areas of expansion at the Metropolitan Area of Santiago de Chile (AMS)**

*Pablo Osses McIntyre*

**Ageing - an increasing process in western societies: The case of Portugal**

*Diogo Abreu (Centro Estudos Geográficos)*

**Global animal husbandry and its impact on the environment**

*Sergey Govorushko (Pacific Geographical Institute)*



# C08.02

## Arid Lands, Humankind, and Environment

## C08.02-01 - Human-Nature Interaction in Arid Lands and their Margins 1

*Chair: Olaf Bubbenzer, Mahmoud Ashour*

### **Influence and causes of discharge variability of the Tarim River, Xinjiang China, and related effects on the lower Tarim-Ecosystem**

*Andreas Ginau (University Frankfurt a. M.), Christian Opp (University of Marburg), Sun Zhandong (Chinese Academy of Sciences), Ümüt Halik (University of Eichstätt-Ingolstadt / Xinjiang University)*

The study site is located within the 'Riparian Ecosystem' along the lower reaches of the Tarim River (Xinjiang, China). The Tarim itself is the longest inland river in China. It is an important source for plants and trees within the flood plains of the Taklamakan Desert, thus forming a 'green corridor' within the desert surrounding the Tarim River. Irrigated farmland expansion and construction of water reservoirs along the Tarim River have caused permanent water deficit problems within the lower reaches of the Tarim River since the 1950s and increased the mineralization of the river water. This development reached its climax with the desiccation of the Taitema Lake and severe degradation of the 'Riparian Ecosystem'. All these developments led to the initiation of the 'emergency ecological water transfer project'. The objective of this project is to ensure a constant water supply to the lower reaches of the Tarim River by the transfer of water from the Bosten Lake catchment and Tarim's upper and middle reaches. The processes and trends of the vegetation change during the period of intermittent water transfer have been ruled out by Sun et al. (2010) on the basis of remote sensing data (SINDVI). Their results show that with the transfer of water the 'Riparian ecosystem' is revitalizing. Yet vegetation changes are assumed to depend mostly on factors directly controlling the groundwater level, which are the distance to the river, river behavior such as its volume and ebbing frequency and the height of the groundwater table. The composition and properties of soils and sediments underlying this ecosystem might be another important factor that on the one hand supports the ecosystem especially its forest, and on the other hand counterbalances negative effects caused by the frequent ebbing of the Tarim River. We like to present preliminary results of our 2010 and 2011 studies. Soil profiles along two transects within the study region have been analyzed in the field and laboratory. Results comprise grain size measurements, pore size distribution, organic content and data from XRD-measurements on the soil's mineral composition. These parameters allow conclusions about water storage and water transfer features of the studied soils and sediments as well as their ability to support and protect the 'Riparian Ecosystem' of the lower Tarim area.

### **Carbon Dynamics of Apocynum along the Tarim River, Xinjiang, Northwest China**

*Rouzi Aihemaitijiang (University of Greifswald), Niels Thevs (University of Greifswald)*

Due to vast land reclamation along the Tarim River in Xinjiang, Northwest China to grow cotton, native plant species are facing a severe competition for water which is essential to survival. This paper explores possibility of *Apocynum Pictum* is an alternative plant to substitute cotton which is hypothesized as much more water saving and economically profitable to expand in the area to preserve natural populous *euphratica* forest. Finding out overall carbon output of the plant is essential to prove this hypothesis. There for above and below ground biomass of *Apocynum pictum* in two locations and two transect sites for each location along the Tarim River are measured respectively. In this paper, Point center square method is used for sampling the above ground biomass to measure height, crown diameter and fresh weight of the plant on site, later air and oven dry methods is utilized to measure air dry and oven dry weight of stem and leaf of *Apocynum pictum*. Subsequently lab analysis made to measure C, N content of the samples. In the mean time, below ground biomass of *Apocynum*, ground water level and electric conductivity are also measured. Finally overall carbon output for per hectare is calculated and allometry formula is obtained which shows carbon dynamics of *Apocynum* and its relation with environmental parameters such as ground water level and soil salinity. Key Words: *Apocynum*, Tarim River, Carbon Dynamics, Allometry

### **The Study of Relationship between Environmental Change and Catholic Mission beyond the Great Wall in Northern China(1865-1952)**

*Xiaohong Zhang (Fudan University)*

The Great Wall of China locates on the transition belt from subhumid region to arid/semiarid region, so that it had been as the boundary between farm area and nomadic area in northern China over 2000 years. However, in middle of 18th century, the farming land began to cross the Great Wall and entered the nomadic region before. Then the farming-pastoral boundary started moving northward and westward substantially and resulted in environmental change happened along the Great Wall belt. In the historical process, the Congregation of the Immaculate Heart of Mary (CICM), a congregation had preached in Inner Mongolia since 1865, played an important role. Based on the date from local archival, Christian documents and investigation, the research aims to study how the Catholics influenced the local environment beyond the Great Wall and what the relationship between religion mission and environmental change was. Since the congregation entered Inner Mongolia, they obtained land from Mongolian and lent land and farm facilities to Han Chinese people in order to convert them and to maintain the mission well. As a result of intensive land management by the Catholic mission, the arid/semiarid landscape, formerly used as grazing lands, was changed to more intensive

agricultural use. The study shows that the Catholic Church became a strong force in pushing the farming-pastoral boundary northward and westward in late Qing Dynasty because of its authoritarian religious organisation.

### **Human-Nature Interaction in the Eastern Pamirs of Tajikistan - The nexus of natural resources, pasture use, and energy consumption**

*Kim André Vanselow (University of Erlangen), Tobias Kraudzun (Universität Berlin)*

This paper deals with the relations between the natural resources, the grazing practices, and the energy demand in the Eastern Pamirs of Tajikistan. The study area is a high plateau with elevations between 3,500 m asl and more than 5,000 m asl. The orographic environment and its altitudinal location cause low temperatures throughout the whole year, with an annual average of only minus 1° C in the valleys. Furthermore, this region is characterized by a distinct aridity with precipitation values partly below 100 mm per year, caused by high mountain ranges which shield the plateau from the precipitation of the Westerlies and the Indian summer monsoon. Hence, the Eastern Pamirs can be described as a cold high mountain desert that is characterized mostly by scattered, slow growing vegetation. Based on these natural preconditions, pastoralism with extensive livestock herding is a prime adapted land use strategy under the region's harsh environment. Therefore, the Soviet administration allocated the production of meat as the main region's task and installed collective (kolkhozy) and state farms (sovkhozy). Here, a well-balanced and sustainable utilization of all pastures of the Eastern Pamirs was fostered by imports of fuel and forage resources, and an elaborate management plan, usually with four seasonal pasture camps. However, the dissolution of the Soviet Union and the independence of Tajikistan resulted in significant structural changes for the Eastern Pamirs. Most notably, the end of the Soviet subsidy system stopped the provisioning of the region from outside. Without the external inputs of the Soviet economy, bridging long distances between the seasonal pastures poses a major problem to most smallholders. Furthermore, the limited supply and high cost of imported fossil fuels induced the increased use of dwarf shrubs - mainly teresken (*Krascheninnikovia ceratoides*) - as a substitute energy resource. However, they are also important forage plants, particularly in winter when fodder resources are scarce. The aim of this paper is to provide a well-founded overview of the pasture and firewood resources and the spatiotemporal variability of the actual pasture use with the associated livestock numbers, in order to make assertions on overuse in particular areas. It could be shown that the mono-seasonal pasture utilization of the Soviet state farms contrasts with a distinct multi-seasonal present-day use. Consequently, pastures close to villages are used all year round, particularly in winter, and are heavily overgrazed. Grazing pressure on summer pastures is much less than on winter pastures. However, also several distant summer pastures show high livestock numbers, which indicates that they are not underused, as it is argued in other studies. Furthermore, it could be demonstrated that the actual

degradation of dwarf shrub vegetation is still far from the numbers mentioned in reports and literature.

## C08.02-02 - Human-Nature Interaction in Arid Lands and their Margins 2

*Chair: Olaf Bubbenzer, Mahmoud Ashour*

### Transformation of livestock grazing and land degradation in the Kyrgyz Pamir

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Transhumance of livestock animals has been a long tradition in the Pamir since the former Soviet era. After the independence from the Soviet Union in 1991, the countries such as the Kyrgyz Republic are believed to have severe land degradation. This study first examined the degree of land degradation on grazing slopes in the Alai valley, southern Kyrgyz. The study area is characterized by heavy dependency on transhumance. The degree of land degradation was examined by the method of Howard and Higgins (1987): a relationship between slope angle and the average height of grazing steps on slopes indicates the degree of grazing intensity. About half of the examined slopes indicate overgrazing, but the rest has grazing space for more livestock. The onset of the land degradation was examined by interview surveys (N=21 families residing near the main road). All families realized the land degradation on the slopes, and many residents feel that the grazing slopes are getting drier although we do not have any supportive evidence. They notice that many of the soil-erosion scars had occurred before the 1991 independence. This suggests that the land degradation in the area is related to the transhumance in the former Soviet era, but not to that after the 1991 independence. Interview surveys also showed that some families began to use the grazing slopes in summer seasons after the independence, especially after 2000. Such additional land use might cause future land degradation, showing a necessity of continuous monitoring.

### Dynamiques des terres humides du domaine semi-aride en Tunisie

*Gammar Amor (Université de Manouba), Karray Mohamed Raouf (FSHS Tunis), Chaouach Mondher (FLAH Manouba), Majbri Abdellatif, Mahjoub Mohamed Raouf*

Cette contribution présente les types d'édifices humides du domaine semi-aride de la Tunisie et discute de leur conservation et de leurs dynamiques récentes. La sécheresse estivale et la configuration du relief du domaine semi-aride de la Tunisie favorisent la formation des milieux humides. Les terres humides les plus vastes se trouvent dans les bassins intérieurs et les plaines ouvertes sur la mer à l'est du pays. En montagne et sur

les piémonts, les terres humides ont une répartition ponctuelle, mais leur conservation est meilleure. Alors que la partie humide du pays se distingue par ses lacs et mares acides, la partie semi-aride présente des sebkhas, des lagunes, des merjas et garas non ou légèrement salées. Les exemples analysés ici montrent l'ampleur des destructions des terres humides par le drainage systématique des aires inondables et marécageuses au profit de l'agriculture (plaines de Grombalia, de Goubellat...). Ils montrent aussi d'autres dynamiques récentes directement et indirectement dues à de puissantes formes d'interventions humaines. Le défrichement des bassins versants, les aménagements hydrauliques, les déversements et bouleversements liés aux villes aboutissent à une suralimentation des basses terres et se traduisent par la régénération des édifices humides (El Gouréa?), leur résistance et leur extension malgré le drainage (Delta de la Mejerda, Sebkha d'Essijoumi'), le transfert des terres marécageuses vers l'aval (Sebkha de Slimène)... mais souvent avec des problèmes de pollution et d'artificialisation des milieux et des risques d'inondation des rives. Dans ce domaine semi-aride de la Tunisie, les actions de conservation des terres humides paraissent assez tardives par rapport aux mutations rurales et urbaines responsables des destructions et d'une forte anthropisation des milieux. Cependant, la diversité des dynamiques offre des chances réelles pour espérer la restauration des sites majeurs et retrouver des sites en bon état ou en voie de régénération qui représentent une grande valeur pour la conservation de la biodiversité.

### Land degradation - Balancing ecosystems services and stakeholders use of agro-forestry systems in North of Cameroon

*Burghard Meyer (Institute Geography Leipzig), Ernest Fongwa (Brandenburg University), Tsi Evaristus (University of Dschang)*

Land degradation (LD) and desertification are among the greatest world challenging problems, especially in the Sahel region with droughts and high yearly variability of rain. Desertification is defined according to UNCCD as land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities. ES are the benefits that humans obtain from the ecological functions of the natural ecosystems (MEA, 2005). They need to be maintained and preserved in order to balance environmental processes and functions by adaptive and mitigation land management measures. The talk methodically links scientific objectives of interdisciplinary investigations by using new integrative entrances to the LD problem in the Sahel of Cameroon. This is when combining the modelling of ES as social categories and market management schemes for agro-forestry (AF) and the management of sustainable wildlife in three main objectives dealing with AF by investigations: on Landscape Degradation by the widening the systematic knowledge about LD by exploring the landscape system, the multi-functionality of land uses by indicators, the carrying capacity of main ES as linkage from landscape functions to ES and to investigate their linkages to AF protective measures. on Modeling Ecosystem Services by a) the exploitation of the relationship between ES and LD for adaptive management support systems for dry landscapes; b)

the encouragement of stakeholder participation for balancing ES by introduction of business development schemes and by modelling of ES using innovative techniques and c) by the provision of motive schemes to support stakeholder participation in preserving ES and by development of a market management scheme through community-based financial participation. on Sustainable Wildlife and Agro-forestry by the (1) the exploration of insights into the wildlife in terms of ES; (2) the investigation on impacts of wildlife in land use systems and AF also by running field plot experiments. The planting of native tree species contributes to management of sustainable wildlife also by zone planning based on land functions. This is when modelling the optimal adaptation of selected wildlife to natural resources use, which is endangered by landscape degradation. The talk is primarily linked to the scientific methods development and LD problems in terms of ES, landscape functions and wildlife management. It applies thematically wide investigations about AF systems by market orientated management of ES and wildlife in the local farming and nomadic systems. The expected results should be seen as management support systems for policy improvement, which aim at providing strategies towards rehabilitation of degraded landscapes, and the protection of abiotic and biotic resources.

### **Environmental change and vegetation succession along an ephemeral river, the Kuiseb River in the Namib Desert**

*Kazuharu Mizuno (Kyoto University)*

The Namib Desert is located along the western coast of Namibia and is affected by the cold Benguela Current. Forests line the course of the Kuiseb River, an ephemeral river in the Namib Desert, and several areas of these forests are characterized by high concentrations of tree death. We sought to clarify the relationship between recent environmental changes and such tree deaths in the region. The reason behind extensive tree deaths along the Kuiseb River has been investigated near Gobabeb since 2001. In Gobabeb, although the annual rainfall is only 27 mm, fog-water precipitation is 31 mm. Tree deaths were concentrated on river banks where sands from dunes had been thickly redeposited by flooding. *Acacia erioloba* was abundant in these areas. Although *Faidherbia albida* germinated more commonly than *Acacia erioloba* on the river banks, the former was less likely to survive than the latter. In an effort to explain the deaths of so many mature *Acacia erioloba*, the environmental conditions were analyzed. *Acacia erioloba* extends its main roots deep into the moist, fine-grained soil layer immediately after germinating and absorbs water through lateral roots there. When these seedlings become mature trees, they are likely to extend a great number of lateral roots in the shallow depth and absorb water seeping into the shallow layer of land. Fog often arises in the morning around Gobabeb, and the shallow roots absorb water brought by the fog. Flooding occurred frequently until the early 1970s but has become less common since then. The groundwater level also dropped due to the decrease in flooding. Although successive floods used to bring and deposit fine-grained materials from the upper reaches of the river, such materials are becoming scarcer. It is reasonable to conclude

that the cause of extensive tree death was a lack of water caused by this lack of deposition of fine materials and the attendant drop in the groundwater level, both of which made it difficult for the shallow tree roots to absorb water at depth. The findings and considerations so far in this study have implications for human activities in this area. The livelihood of the Topnaar people is highly dependent on the fragile forests along the Kuiseb River. Forests provide shade, firewood, and building materials to the people, and food to livestock. If flooding continues to decrease, it is likely that trees deaths will increase, which will negatively affect the livelihood of the local people.

## C08.02-03 - Human-Nature Interaction in Arid Lands and their Margins 3

*Chair: Olaf Bubenzer, Mahmoud Ashour*

### Water management contradictions and social crisis in the oasis of Tafilalet (Morocco)

*Thierry Ruf (IRD)*

The history of the Moroccan oases is marked by political breaks and climate change. The oasis of Tafilalet was the front door of the Islam in Morocco and the city of Sijilmasa was one of the most important of Africa for the Middle Ages. The current royal dynasty was born in the plain of Tafilalet. Irrigated by two Saharan rivers, Ziz and Gheris, the plain was considered for a long time as small western Mesopotamia. It lived on important but irregular contributions of water. Resistant in the colonization, the plain was also rebel towards the central power after the independence of the country. But an exceptional floods ravaged it and it had to enter in a new era: it depends now on a big dam, which is built very far from the plain and from the new town of colonial creation, Errachidia. The communication is centered on the history of the public actors and the rural society in the management of water resources that are regulated by the dam. We also study the resources that are escaping the powers of the water engineers : those resulting from floods of side rivers or from Gheris river (which has no dam) and the resources that are coming from draining galleries, khetaras (qanats : they are always flowing in spite of years of droughts between 1975 and 2005. What is interesting in this region, is the phenomenon of massive return of rains since 2005 that led to fill completely the dam of Ziz and to renew watertables. It reactivates tens of khetaras dried up in the previous years. The relationships between the actors become complex with the return of the water : in front of the objective of the new expansion of irrigated zones with modernist models, there are peasants' resistances.

### Traditional water use at the desert margin – water harvesting strategies on the Karak Plateau, Jordan, with special regard to old cisterns

*Barbara Brilmayer Bakti (Heidelberg University), Olaf Bubenzer (Heidelberg University), Arwa Hamaideh (University of Jordan)*

Jordan is one of the ten poorest countries in the world regarding its water resources. During its long settlement history dating back to Neolithic times, various adaption strategies for water use and management evolved. These come into focus again today as water scarcity increases due to high population growth rates, changes in lifestyle and climate change. One of these traditional strategies of water use that has been practiced in the eastern Mediterranean and the Middle East since ancient times, is the collection

and storage of surface run-off generated during the wet winter season in anthropogenic underground holes in the rock (cisterns). Thereby the surplus of the winter months is used to improve scarce water resources during the dry and hot summer months. The collected water can usually be used for all purposes including drinking water supply because of its good quality. Therefore, the old cisterns on the agriculturally important Karak Plateau, which are very likely to be of ancient age (Nabatean, Roman, Byzantine), represented the first benchmark for studying the surface water resources of the area and their potential for sustainable use. The Karak Plateau, situated at 800 - 1200 m above sea level east of the Dead Sea, reflects the transitional character of the whole country of Jordan on a small scale, lying between the Mediterranean in the west and the deserts in the east. With the smooth transition between its central parts influenced by a Mediterranean climate to the desert located immediately east of it, the Karak Plateau can be characterized a desert margin. In addition to mappings and ground checks, especially remote sensing techniques were applied to study the land cover and existing cisterns on the northeastern part of the plateau in an area of approximately 200 km<sup>2</sup>. A very high resolution satellite image (GeoEye-1) was implied in conjunction with object-based remote sensing software (Feature Analyst®) to extract the roof tops of modern settlements, which could be used as run-off collection areas for the ancient cisterns. The data of hydrologically relevant parameters such as climate, land use, geology, soil and relief were integrated into a data base for subsequent GIS analyses which completed the study of the local surface water resources and environmental conditions. Land use classification and analysis of soil properties were performed implying the satellite image, a high resolution DEM, ground checks, and a small-scale soil survey including soil sample analyses in order to evaluate spatial variances in surface run-off generation under recent climate conditions. Based on these results, recommendations can be made for the siting and construction of microcatchments with which surface run-off can be collected and stored in cisterns or reservoirs or used directly for agricultural purposes.

### Water processes in arid and semi-arid Central Asia: IWRM implementation in Uzbekistan and Kazakhstan

*Andrea Zinzani (University of Verona/University of Fribourg)*

Water processes in arid and semi-arid Central Asia: IWRM implementation in Uzbekistan and Kazakhstan The importance of water resources management in drylands cannot be overestimated, be it from a social, political, environmental or economical point of view. Since the Dublin's declaration in 1992, the international 'wisdom' seeks to mainstream the IWRM (Integrated Water Resources Management) approach. In this context, a paramount role is attributed to irrigated agriculture, representing by far the most water consuming human activity. It is therefore very relevant to inquire what is happening today in arid and semi-arid regions considering irrigation features and their relations with land tenure. This paper aims to discuss these issues on the example of post-Soviet Central Asia, one of the regions in the world where irrigation is of crucial importance to state



economies and people's livelihoods. The collapse of USSR and the subsequent decentralisation and decollectivization processes strongly affected water management and irrigation dynamics. At the end of the 90's, Central Asian countries were induced by the World Bank and other Organizations to adopt the IWRM international norms in order to improve their water management conditions. But due to specific economic, social and political conditions, the countries' implementation of IWRM showed differing trajectories. The question therefore arises whether we can speak of a distinctly 'national path' to IWRM in Central Asia? In the present paper, this question is discussed on the example of water management and irrigation transfer in Uzbekistan and Kazakhstan.. The two countries expose some similarities(e.g., reliance on allochtonous rivers originating in the Tian-Shan mountains, climatic conditions, agricultural crops, recent historical background), but they also considerably differ in terms of state endowment of natural resources and socio-political processes during the post-Soviet period. Data used for this paper stem from field work in the middle Zeravshan valley (Uzbekistan) and the Arys valley (Kazakhstan) in 2011. The paper analyses National IWRM programmes in order to inquire the two countries' official IWRM policies as well as their actual implementation at the local level in irrigated agriculture.

### **Anthropogeneous influence on water ecosystems**

*Arsen Grigorian (YSU)*

Ecosystem is loose concept and is one of the bases of modern ecology. At last years is a serious problem the appreciation of anthropogeneous changes of hydrological regime of water ecosystems and control of water ecosystems' state depending on sharp increasing of sweet water requirement and intensive change of natural landscapes. At present, the hydrological regime of water ecosystems in the most densely populated regions of planet determines not only by natural changes of meteorological elements, but also by different anthropogeneous factors. At that, the role of lasts in each year becomes more considerable. The quantitative and qualitative appreciation of economic activity influence becomes complicated that in each basin or river part are observed different anthropogeneous factors at the same time which have some influence on water and thermal regimes. By practical point one of the main aspects of anthropogeneous influence on water ecosystem is change of water quality. The entrance of formed runoff water into water objects in urban populated area makes thermal pollution, which is spread on all over the river runoff. Now should be pay an attantion to issues of changes discovering and appreciation of water ecosystems generated because of anthropogeneous effects on water ecosystems. The influence of anthropogeneous factors on water ecosystems is expressed by two directions: 1. change the characteristics of hydrological regime of water ecosystems 2. change the quality of natural waters. Changes generated by influence of anthropogeneous factors on water ecosystems and theirs discovering are very important for sanitary state protection of water ecosystems. On water ecosystems of the Republic of Armenia influences the

following anthropogeneous factors: building of reservoirs and other water technical objects entrance of agricultural, industrial, communal-domestic runoff water into the water ecosystems. The building of reservoirs and water technical other objects are change not only hydrological, but also thermal regime of water ecosystems. Theirs building influences on microclimate, water fauna and flora of water ecosystems of coastal zone, are generate preliminary conditions of fish-breeding breach and are affect on fish industry. The irrigation, industrial and communal-domestic water supply are influence on water contant of rivers, in consequence of it is being observed breach of water and thermal regimes. Thermal pollution of water ecosystems became serious problem at last decannials. Thermal pollutant are thermal and nuclear electric stations', industrial, communal-domestic runoff water. They breach biological regime of ecosystems, increase microbes, in summer increases the evaporation, suffers damage ground fauna, becomes poor the kind of plants and animals, decreases their development and biological productivity and etc.

## C08.02-04 - Human-Nature Interaction in Arid Lands and their Margins 4

*Chair: Olaf Bubenzner, Mahmoud Ashour*

### Study of archaeological features in the Samarkand region, Uzbekistan using satellite imagery

*Noboru Ogata (Kyoto University)*

This presentation offers the result of examination about the location and form of archaeological sites in the Samarkand region, Uzbekistan. Samarkand occupied important position in the Silk Road region throughout the historical ages. Using CORONA intelligence satellite photographs - acquired in the 1960's and declassified in 1995, we detected a number of archaeological features. These features mostly take form of mounds and fort ruins, but are various in size and shape. Typically, mounds and fort ruins are found along the boundary of arable land (oasis) and arid zone (desert). In August 2000, we traveled around the region to identify the detected archaeological features. A local archaeologist who guided us told us that most of these features are settlement ruins. Since 2000, higher resolution satellite imagery has been available. But we can observe that CORONA imagery of lower resolution offers more useful information about the original situations of the archaeological sites. Most of the archaeological sites have been influenced by agricultural development in the recent decades. Through comparing the CORONA photo taken on October 20, 1964, and QuickBird image taken on June 28, 2010, we can observe that Chimqurgon Tepa near Shakhrisabz is affected by the construction of a dam. Moreover, CORONA photos offer availability of stereoscopic pairs. However, CORONA photos are geometrically so distorted that we have difficulty in stereoscopic view. I used QuickBird image as the template to rectify the CORONA photos to enable stereoscopic views. Through the stereoscopic observation, I made morphological overview of Kok Tepa, the most important archaeological site in the region, to find that the site has complex structure consisting of higher and lower levels. As for Chimqurgon Tepa, we can observe that it is a ruin of a huge fortification with double enclosure. The outer enclosure (moat) uses cliff of the fluvial terrace for the north side and small wadi for the west side. East side of the moat is apparently artificial. I conclude that CORONA imagery of the 1960's offer valuable source for studying archaeo-geography of settlements, forts and tombs.

### Aeolian sediments and human impact on the landscape in central and southern Mongolia

*Frank Lehmkuhl (RWTH Aachen), Jörg Grunert (Department of Geography), Alexandra Hilgers (University of Cologne), Daniela Hülle (University of Cologne), Christian Stolz (Universität Flensburg)*

Aeolian sediments including paleosols preserve valuable information on Holocene environmental change. These archives were used to reconstruct the landscape history in the upper Orkhon Valley close to the former capital Kharkhorin, Central Mongolia. For comparison, aeolian and lacustrine records were investigated in the Gobi desert, southern Mongolia. By using luminescence and radiocarbon dating, phases of landscape change, indicated by soil formation and sedimentation, could be identified in the upper Orkhon Valley at around 6.5-6 ka. Since 3 ka, especially within the last two millennia of Historical Time (300 B.C. - present), a more intensified human occupation in the Upper Orkhon Valley occurred in this region. This included a more densely grazing of cattle to supply the growing population demands of the Uighurs and Mongols. This overgrazing caused an increase in erosion and the formation and deepening of fluvial gullies, together with soil deflation and subsequent deposition of aeolian sediments. Human activity, in addition to climate, has been dominant in driving landscape evolution of this region since the late Holocene. Contrary to the Orkhon the South Khangay rivers in the second study area drain to the WNW - ESE running endorheic depression zone of the Gobi Lakes with arid climatic conditions. Lake sediments at different heights above the modern levels provide evidence of higher lake level stands indicating more humid periods and dated mainly to early and mid Holocene periods. Since 3 ka the climate became significantly arid well detectable by fossilized lake deposits indicating continuous lake regressions. The modern lake status dated to 1960 has been well documented by Russian topographic maps. Since then, a dramatically drop of the level of the Orog Nuur and several other lakes in the northern Gobi occurred which should not be misinterpreted as consequence of the global climate warming. It is clearly due to human interventions into the hydrology by creating irrigation projects during the socialist period and, after that, by the quick growing of the now private nomadic herds since 1991. Although the irrigation projects have been mostly abandoned, meanwhile the overgrazing has become a severe problem visible in the field by the widespread reactivation of normally fixed dunes. Concerning the nomadic economy, this has catastrophic consequences for the herds as documented by more than 5 millions of died animals during the winter 2009/10. Today the exclusively man-made desertification all over the country has become a national problem. Mongolian politicians interpreted it as a consequence of the global climate change which has been caused by the industrialized nations. Therefore they claim financial satisfaction to restore the deserted steppe environments.

## From archaeological patterns to superimposed large-scale climate mechanisms

*Bertil Mächtle (Universität Heidelberg)*

Geoarchaeological studies offer new scientific questions for the participating disciplines and new insights are emerging, namely in Archaeology. Likewise also Geography is enriched, discovering archaeological archives as a new proxy for past environmental changes. Based on this added value of interdisciplinarity, this study points out the close link between environmental change and cultural dynamics for the last two millenia in southern Peru, and forms a new hypothesis for the dynamics of large-scale circulation mechanisms in the context of climatic oscillations, which affected both man and environment. The findings show that pre-Columbian prosperity, land-use and adaption measures were closely tied to an adequate land-use potential, which shifted several times between the desert margin along the Peruvian coast and the cold and more humid Andean highlands to the east as well as meridional between the Titicaca region and the Palpa-Ayacucho region further north. These spatial dynamics are obvious in the archaeological records, and this insight was the nucleus to hypothesize about the climatic mechanisms behind: Meridional shifts in the mean position of the Intertropical Convergence Zone (ITCZ) and the Bolivian High (BH) seem to offer a conclusive explanation for the archaeological pattern. Evidence of these shifts can be found in several proxy data from cushion peatlands near Palpa, lake Titicaca sediments or marine records off Peru as well as in more distant geoarchives as the Cariaco basin record, Galapagos lake sediments and corals from the western Pacific warm pool. The occurrence of contemporaneous changes points to (global) coupled climate mechanisms behind, which controlled pre-Columbian dynamics in southern Peru. The same pattern of the ITCZ-BH can be found also for the early-mid Holocene, which shows that the controlling mechanisms are not incidentally or bounded by the specific conditions of the last two millenia.

## C08.02-05 - Human-Nature Interaction in Arid Lands and their Margins 5

*Chair: Olaf Bubbenzer, Mahmoud Ashour*

### Holocene palaeoenvironmental changes in the Central Sahara

*Jens Brauneck (Universität Würzburg), Roland Baumhauer (Universität Würzburg)*

Surveys by the Universities of Würzburg and Berlin, starting in the 1970's have revealed the existence of palaeolakes in remote areas in Niger. Initial research has shown that the sediments found are suitable for reconstructing its late quaternary palaeoenvironment. The aim of the interdisciplinary research project 'LIMNOSAHARA' was and still is to review existing evidence and to fill stratigraphic gaps within the Holocene palaeoenvironmental history of the Central Sahara. For this purpose, two expeditions in 2005 and 2006 headed to the north-eastern parts of Niger to investigate the remains of palaeolakes. At the sebkha of Seggedim, a core of 15 meters length could be extracted which revealed a composition of high-resolution sections. Radiocarbon dates set the beginning of the lacustrine stage at about 10,600 cal BP, with an exceptionally stable freshwater regime to about 6,600 cal BP. There, a major change in the sedimentation regime of the basin is recorded in the core, indicating a change from freshwater to sebkha conditions. The results obtained from the core are compared with lacustrine sediments from outside the depression, situated further to the north. Within the plateau landscape of Djado, Mangueni and Tchigai, two sites containing lacustrine deposits were investigated for palaeoenvironmental reconstruction. Depending on the geographical setting, these sediment archives were of shorter existence than the lake, but reveal additional information about the palaeoenvironmental changes from Early to Mid Holocene. In the Enneri Achelouma, lacustrine pools developed around 9,500 cal BP, initiated by former landsliding that had dammed up the valley. Contemporaneously, lacustrine conditions existed in the Fabergé basin. The investigated archives at both sites evidence only short time lacustrine sedimentation during Early Holocene. Contrary to the palaeoenvironmental archives at Seeterrassental and Fabergé, the information obtained from the freshwater lake sediments at the Seggedim depression showed no noticeable signs of climatic variation until Mid Holocene. Evidence of frequent fires found in the investigated archives raises the question of their cause. Despite the irregularities in the radiocarbon record, the dates from translocated and redeposited charcoal pieces at Seggedim can be narrowed down to a tight time span of 1,200 cal years, during which the regular burnings appear to have occurred. Beside the theory of natural fires caused by lightning, the intentional burning of reed beds may be an alternative explanation, at least for the Seggedim depression. This method is still a regular procedure among traditional Sahelian herdsman, in order to provide access to water for their animals when

the pond is enclosed by vegetation. Whether the fires originated in manmade fire or in lightning cannot be determined.



# C08.03

## Biogeography and Biodiversity

## C08.03-01 - Climate Change and Land Use Effects on Species, Communities and Ecosystems 1: Indian Subcontinent and the Himalayas

*Chair: Udo Schickhoff, R.B. Singh*

### Anthropogenic Biomes: Regional Response to Global Climate Change Modeling

*R.B. Singh (University of Delhi)*

Humans have achieved ecological dominance through series of long and precedent steps and have fundamentally altered local as well as global patterns of biodiversity and ecosystem processes. As of now the existing systems for representing these global patterns, including biome classifications, either ignore humans altogether or simplify human influence. This paper is an attempt to analyse the anthropogenic biomes (anthromes). Anthropogenic biomes may also be termed "anthromes" to distinguish them from conventional biome systems, or "human biomes" (a simpler but less precise term). Anthropogenic biomes offer a new way forward by acknowledging human influence on global ecosystems and moving towards models and investigations of the terrestrial biosphere that integrate human and ecological systems. Indian anthropogenic transformation of terrestrial biomes patterns were assessed at 5 resolution by comparing potential natural vegetation maps with anthrome maps at century intervals from 1700, 1800, 1900, 2000 and 2010 using a rule-based anthrome classification, overlay analysis and other geographic information system (GIS) software tools. Anthrome classification adopted on the basis of study done by Netherlands Assessment Agency (NAA) and Maryland Centre. The model applied to gridded global data acquired by GTAP and Hadley Center (NASA) data provided by McGill University since 1700 for human population density, agricultural and urban land use. The study would present the first characterization of terrestrial biomes based on global and regional patterns of sustained, direct human interaction with Indian ecosystems. Eighteen "anthropogenic biomes" were identified through empirical analysis of regional population, land use, and land cover. In 1700, nearly half of the terrestrial biosphere was wild, without human settlements or substantial land use. Most of the remainder was in a semi natural state (45 per cent) having only minor use for agriculture and settlements. By 2000, the opposite was true, with the majority of the biosphere in agricultural and settled anthromes, less than 20 per cent semi natural and only a quarter left wild. More than 75 per cent of Earth's land showed evidence of alteration as a result of human habitation and land use, with less than a quarter remaining as wild lands, supporting just 11 per cent of terrestrial net primary production. Keywords: Anthropogenic biomes; land use change; feature-based mapping and modelling; long-term ecological change; GIS; India.

### The Permafrost Transect - Effects of Climate Change and Land Use on Permafrost and Carbon Dynamics in Soils along a Climate Gradient across the Tibetan Plateau

*Thomas Scholten (University of Tübingen), Dirk Wagner (Alfred Wegener Institute), Michael Schlöter (Helmholtz Zentrum München), Peter Kühn (University of Tübingen), Corina Dörfer (University of Tübingen), Julien Ollivier (Helmholtz Zentrum München), Sizhong Yang (Alfred Wegener Institute)*

Our work focuses on the impact of climate change and human activities on the sensitive permafrost-affected geoecosystems on the Tibetan Plateau. We assume that permafrost dynamics are largely controlled by precipitation and temperature as well as land use changes and have a central impact on soil degradation, soil microbial activities and consequently on carbon sequestration, and greenhouse gas emissions. Our geoecosystem-based approach will determine carbon dynamics and greenhouse gas fluxes on three different spatial scales, namely landscape, plot and pedon. Soil temperature, soil moisture, and soil redox potential are main drivers along the 1,500 km transect at altitudes between 4,600 and 5,100 m ASL. The allocation of 10 study sites along the permafrost transect includes different monsoon dynamics and thus, distinct temperature and moisture regimes. Our research is divided into (i) permafrost dynamics, pedogenesis and soil organic carbon stocks, variability and turnover, and (ii) formation of methane and carbon dioxide (methanogenesis and methane oxidation). The presentation will show results from the 2009 and 2011 expeditions integrating an indicator-based interpretation across scales from molecular biology to plot and landscape scale. Feedback mechanisms and the resultant risk potential related to material fluxes and greenhouse gas emission are of particular interest in the scope of a warming Earth.

### Land Degradation and Changing Ecosystem in Central Aravalli Hilly Range: A Case Study of Tonk District, Rajasthan, India

*Rama Prasad (University of Rajasthan)*

### Himalayan forest-cover changes over the past two centuries: a review of spatial and temporal aspects

*Udo Schickhoff (University of Hamburg)*

Historical forest-cover changes are often not sufficiently taken into consideration when discussing forest degradation and de-forestation in the Himalayas. This paper examines the historical dimension of forest-cover changes using case studies of particular localities and regions and summarizes the emerging picture for the entire Himalayan mountain system. Historical patterns of forest conversion and deforestation are related to present-day rate of forest changes. In many Himalayan valleys potential forest areas have decreased by c. 50 %. The historical transformation processes from forests into farm-

and rangelands can be differentiated into several periods with varying degrees of intensity. It turns out that landscape alteration processes are heavily dependent on the general socio-economic conditions. Until the beginning of the 19th century Himalayan valleys were very thinly populated. Substantial changes in the distribution of forests and agricultural lands occurred in many valleys in the first decades of British rule in the 19th century. The protective influence of the Forest Department, founded in 1864, considerably slowed down these transformation processes. Up to the turn of the century the scenery of the present-day cultural landscape has been created in its basic patterns. This holds also true for Nepal where the present-day forest to non-forest ratio in most of the middle and high mountain regions has not substantially changed during the 20th century. However, the Terai lowlands as well as some mountain regions such as the Northern Areas of Pakistan showed a considerable decrease in forest areas in the past decades. About one-third of all Himalayan districts have experienced a significant decline of forest areas in recent decades. Negative structural alterations within the forest stands and along the forest margins rather than large-scale deforestation characterize recent changes in Himalayan forest condition.

## C08.03-02 - Climate Change and Land Use Effects on Species, Communities and Ecosystems 2

*Chair: Udo Schickhoff, R.B. Singh*

### The priority for the European mountain biodiversity conservation in Russia

*Tishkov Arkady (Russian Academy of Sciences), Elena Belonovskaya (Russian Academy of Sciences), Elena Belonovskaya (Russian Academy of Sciences), Elena Belonovskaya (Russian Academy of Sciences), Elena Belonovskaya (Russian Academy of Sciences)*

The priority for the European mountain biodiversity conservation in Russia The mountains occupy nearly 50 % of the territory of Russia. Due to the palaeogeographical factors, geographical position, massiveness and dominating heights mountains are characterized with a high biodiversity at all levels: specific, ecosystem, landscape. For example, the Caucasian flora in total consists of 6350 vascular plants' species and only 433 of them are spread on the abutting plains and don't rise above the level of low mountain belt. More than 75 % of terrestrial animals inhabits the mountain ecosystems and there are nearly 50 % of the former USSR fauna in the Greater Caucasus. The degree of endemics is higher in the mountains than on the plains. Mountains of the middle latitude with moderately warm climate are characterized with high level of species richness and endemism. In the Greater Caucasus 1600 plant species, which introduce 25.2 % of the total amount of species, are usually identified as endemics. 13.5 % of endemics are revealed in the mountains of the Southern and Central Sibiria. The mountains are characterized by increased ecosystems diversity per unit of area, high nature borders saturation and biotic complexes patchiness. The complexity of altitudinal zonality structure in many respects depends on the combination of warm and moistening. For example, on the Greater Caucasus 8 types and 7 variants of altitudinal zonality could be differentiated. Due to high environmental instability and biotic systems vulnerability great amount of rare and endangered plant and animal species, mentioned in the Red data books of Russia are met in the mountains. Among these 533 plant species there are 282 mountain ones and among 415 animal species - 95. Nowadays there are only preliminary data about quantity of the rare plant communities in the mountains of the former USSR. Meanwhile only 100 mountain communities of various ranks, chosen by various criteria, are called rare and endangered. Favourable environments, high diversity of high-yield ecosystems have been attractive for man during all time. Thus, human economic activity remains an important factor, which influences on the trend and intensity of changes in primary mountain ecosystems. Nearly 70 % of the whole mountains area of Russia is occupied by transformed ecosystems. The high degree of mountain species endemism, great amount of the rare and endangered species and ecosystems strengthen the value of mountain regions for territorial biodiversity conservation and increase their nature-conservative status. For increasing of the Russian mountain territories biodiversity

conservation efficiency, besides the realization of the principle of the ubiquity of the environmental conservation it is necessary develop the adequate protected areas ecological network as a part of Pan-European ecological network (the Emerald network).

### Spatial-Temporal Variability of Apple Orchards in Response to Environmental Change in Himachal Pradesh (INDIA)

*Inder Jeet (University of Jammu)*

In Himachal Pradesh agro-climatic conditions are suitable for the cultivation of variety of fruit crops. The development of fruit crops has greatly fulfilled the needs and objectives of socio-economic growth in the state. Among various fruits grown in the state apple dominate in area as well as production. Himachal Pradesh is the second largest producer of apple in India. But due to environmental change some areas are experiencing decline in the productivity of apple in the state. The area undertaken for present study is Kotgarh village in Shimla district of Himachal Pradesh, which also experienced the impact of environmental change on apple orchards with reference to space and time. The diffusion of delicious apple in the state has been started from Kotgarh in earlier 20th century, as first time the delicious varieties of apple were introduced by Samuel Nicholas Stokes in 1918 in this village. The present study is an attempt to analyze the changes in the growth of apple orchards in terms of space and time in response to changing environment. The study will be based on primary as well as secondary data. One time Kotgarh was known for best quality apple in the country but now apple have become uneconomical, nonviable, less profitable and even unproductive in such a short period. Over the years, fruit growers in the study area have observed significant variations in climate. This awareness of climate change is based mainly on the associated impacts on the apple crop especially on blossoming, fruit setting, yield and increased incidences of pests and diseases. Over all the climate is described as being much warmer and people perceive a definite reduction in snowfall over time. Not only has the actual amount of snowfall decreased but changes in timing of snowfall have also been noticed. Snowfall in December and January has become rare and the period of snowfall now extends through the months of February-March. As a result to maintain an apple orchard has been become an uphill task. New trees simply don't survive and older ones are dying fast and the farmers have switched over to other fruits and vegetables. Key Words: Environmental Change, Spatial, Temporal

### Distribution of aloe vera in semi-arid region (Khetri), Rajasthan

*Dharmender Chauhan (University of Rajasthan)*

The present paper discusses the distributional potentiality of natural vegetation i.e. Aloe Vera. The area under investigation is semi-arid region (Khetri), popularly known as historical heritage, geographical and cultural zone in Rajasthan. Besides this zone has unique combination of beautiful ecosystems via; riverine ecosystem, sandy plain



ecosystem, sand dunes ecosystem and stony and rocky ecosystem. It is located in the South-eastern part of Jhunjhunu district, Rajasthan with geographical extension between 27° 40' 24" to 28° 17' 12" N latitude & 75° 39' 59" to 76° 12' 59" E longitude. The district consists of three seasonal rivers- Basai, Kantli & Chandravati. All these rivers fall under the pattern of internal drainage system of the district. The area is facing the problem of excess of fluoride contents in the water which has average volume of 7.5 ppm & people are suffering from the disease of Fluorosis at many places in the study area. The plant covers a vast area of Tropical America, West Indies, Egypt, Netherlands, Southern Mediterranean region, Cape Verde, Islands, and Canary Islands etc. In India it has specific distribution covering Madhya Pradesh, Rajasthan i.e. in western and central India. The plant belongs to the family - 'Liliaceae'. It is known Ganwarpatha, Grithkumari, Ghigwar, Barbados Aloe etc. locally. It falls under the group of 'Under Shrubs' There is no abundant locality of phytogeographic distribution in the region. Although it's favorable habitat is stony & rocky (hilly patches of the area). Surrounding these patches a wide distribution of gravel formation with compact soil is found at many places which makes favorable eco-climatic conditions for its growth. Being a phyto-geographer, the best efforts have been made in this research paper to conserve and analyze decreasing natural vegetation in Rajasthan. Further, one can visualize the results of the efforts made by Department of Forest and public awareness, the forest land through implementation of successful afforestation and plantation programmes. The results suggest taking up immediate steps to adopt the improved forest management technologies with people's participation to minimize the effects of decreasing natural vegetation in the region. Further the results of the study can be utilized by the planners, bio-scientists, botanists, phytogeographers, naturalists and policy makers to evolve suitable forest management and strategies to the bio-conditions of the region.



# C08.04

# Climatology

## C08.04-01 - Applied Climatology in the 21st Century

*Chair: Ana Monteiro*

### How well do meteorological indices explain forest fire occurrence in Germany?

*Anne Holsten (Potsdam Institute for Climate Impact Research), Anto Raphael Dominic (Potsdam Institute for Climate Impact Research), Luis Costa (Potsdam Institute for Climate Impact Research), Jürgen P. Kropp (Potsdam Institute for Climate Impact Research)*

Meteorological forest fire risk indices have been developed to forecast the risk of fire occurrence and aid forest managers to take suitable preventive measures. We evaluate five meteorological fire risk indices and relevant meteorological variables for their predictive capacity against monthly fire statistics for German states between 1993 and 2010. The indices with best explanatory power were, in increasing order, the German modified M-68, the Canadian Fire Weather Index and Angström. However, mean relative humidity stands out as the best overall predictor for most of the states for the recorded number of fires, especially for the most fire prone states. For the same time period, we investigated correlations for daily fires for the state of Brandenburg. In this case, the performance of fire indices and relative humidity were more similar than at the monthly level. Climate projections under different temperature and moisture conditions consistently indicate a monthly decrease in relative humidity until 2060, particularly in the summer months. Future monthly values of M-68 denote also a considerable increase of fire risk in the summer. The increase in fire risk at the beginning and end of the fire season points to a possible extension of the current fire season. Our results reveal that mean relative humidity is sufficient to describe observed fire occurrences in Germany at both monthly and daily scales. Correlation coefficients were robust at state, country, monthly and daily analysis. Due to its predictive power and simplicity of calculation, relative humidity is a valid, if not better, alternative to the investigated fire indices in describing climate fire conditions in Germany.

### Characteristics of a thermal belt on a mountain slope observed by a Terra/ASTER thermal infrared image in the western region of Kanto plain

*Shohei Konno (Tokyo University)*

Kanto plain is the largest stretch of flat land in Japan, with the north and west sides surrounded by mountain ranges of 1000-2000 m height. During clear and calm winter nights, a thermal belt is formed on the mid-slope of mountain ranges in accordance with the development of temperature inversion on the flat area and cold drainage flow from the mountain slopes. As the night temperature drop on a thermal belt is smaller than that on the plains, mid-slope of the mountain ranges are used for pomiculture, especially to grow

mandarin oranges. Therefore, study of thermal belts is one of the most important subjects in the field of agricultural meteorology. The recent advancements in remote sensing technology have enabled the acquisition of high-resolution information on surface temperature, which is also utilized for the investigation of thermal belts. In this study, through the analysis of a thermal infrared image derived from Terra/ASTER satellite on a clear and calm night (December 27, 2010) by overlaying a digital elevation model, vegetation map, and distribution of vegetation index (normalized difference vegetation index, NDVI), the characteristics of the thermal belt on the Kanto mountain ranges, west of the Kanto plain, were investigated in terms of topographical relief, tree species, and amount of vegetation coverage. These characteristics have not been addressed in previous studies. The resolutions of the thermal infrared image, digital elevation model, vegetation map, and distribution of vegetation index were 90, 10, 100, and 250 m, respectively, and hence, these datasets were converted into grid data of 100 m for the analysis. In addition, the relationship between the thermal belt and location of mandarin orange orchards was investigated by overlaying the thermal infrared image on the location map of mandarin orange orchards. All these analyses were conducted using ArcGIS, which is comprehensive software for designing, analyzing, and managing geographical information datasets. A clear thermal belt was formed on the mid-mountain slope at 200-400 m altitude. The surface temperature at the geomorphological ridge area in the thermal belt was 2-4 °C and 8-10 °C higher than those at the valley and flat areas, respectively. In contrast, tree species and the amount of vegetation coverage had no significant relation with surface temperature. Since the surface temperature derived from the thermal infrared image corresponded with the measured temperature, the surface temperature distribution is considered to be strongly influenced by in situ air temperature. Furthermore, the location of mandarin orange orchards corresponded fairly well with high temperature areas of the thermal belt, indicating that local residents utilize the thermal belt areas for mandarin orange cultivation.

### Health and climate - good motivation to implement urban sustainable planning policies

*Ana Monteiro (Porto University)*

The promotion of sustainable urban planning policies have always enormous obstacles partially because they mean, for citizens, losing some "well being". Nowadays, scientists need to help society and decision makers to make an effort to review the two concepts - city and sustainability. It is urgent to discuss how they might, at least, seem incompatible. Since cities came into existence, they have managed to survive because societies have been able to withdraw from the ecosystem a vast amount of products at a much faster rate than they can be replaced due to scientific and technological advancements. The city implies accommodating a diversity of groups of people and activities in a very restricted space. Within the current paradigm focused on well-being, the demands of the modern city go far beyond the acceptable boundaries of its

ecological footprint, requiring substantial modifications to the biogeophysical structure. Therefore, unless our concept of city is radically changed, bringing these two ideas together will prove a difficult task, since one is anchored in profit rates and the other is based on respect for the rhythms of ecosystems. Health and climate demonstrate a good opportunity to motivate people to rethink their patterns of "well being" and to transform what they understand as a "loss" into a "profit". If we manage, like we have done at Porto, to show that there are close relationships among asthma crisis, climate context and atmospheric pollution, we will be able, for instance, to help the implementation of pedestrianization areas.

### **Spatial and temporal dynamics of duration of growing periods for crops in a thermally extreme climate: the case of the Russian Far East**

*Elena Grigorieva (Russian Academy of Sciences), Chris de Freitas (University of Auckland)*

Plants have adapted to grow best above certain temperatures. Typically, in general assessments of thermal impact on crops, 0, 5, 10 and 15°C are taken as threshold temperatures due to their close relationship with the onset of various stages in crop development. The research examines the duration of period between thresholds as an agro-climate indicators as applied in a thermally extreme climate of the southern part of the Russian Far East and looks into spatial and temporal patterns in these data. The regions examined are Khabarovsk Krai, Primorsky Krai and Jewish Autonomous Region (JAR) using mean daily climate data for the period 1966 to 2005. In the shoulder seasons of spring and autumn, daily mean temperatures can rise above the threshold for a few days then fall again. To circumnavigate false starts or endings to the period with temperatures above the threshold chosen, the following approach is used. The start of the period is taken as the first day (in spring) after which the sum of positive temperature sums (between daily temperature and the base threshold) is higher than the sum of negative temperature differences. In the same fashion, the end of the period is the last day (in autumn) on which the sum of negative temperature differences is higher than the sum of positive sums using daily data for each of the four base temperature thresholds. The results show that growing season (GS) using the 10°C threshold increases from north to south of the study area, as might be expected, but the mean GS varies considerably from one location to another. Marginal thermal conditions are observed in the north, and both in the elevated areas and in the coastal regions. Three geographic regions are identified. The Northern region has a GS less than 130 days and is located north-west of Khabarovsk Krai. The main crops grow here are oats and soybean. The Central region is located at the southern part of Khabarovsk Krai, at JAR and the northern part of Primorsky Krai, where the GS is 130-145 days. The main crops here are wheat, soybean, oats, potatoes and etc. The Southern region has a GS of more than 150 days and is located in the south-western part of Primorsky Krai. This is the best region for agriculture in that a range of heat-demanding crops can be successfully cultivated, even

rice. The length of the spring and autumn transition seasons are examined using the threshold of 15°C and 0°C, respectively. The longest transition season is near the ocean in the coastal region of Primorsky Krai, while the shortest is in the continental interior of Khabarovsk Krai and JAR. Generally the spring transition period is longer. The continental part of Khabarovsk Krai region has the longest summer season (period above 15°C threshold). Year-to-year fluctuations of GS vary greatly from the period-mean values, with greatest variation in coastal areas. Overall, the results indicate no significant temporal trends in GS in any part of the study region.

## C08.04-02 - Climate change and variability in different spatial and temporal scales 1

*Chair: Professor Nigel Tapper*

### Warm water events in the southern Atlantic - Benguela Niños

*Karin Lutz (University of Augsburg), Joachim Rathmann (University of Augsburg), Jacobelt Jucundus (University of Augsburg)*

In correspondence to the Pacific counterpart El Niño, anomalous warm water events in the upwelling regions of the Atlantic Benguela Current are called Benguela Niños (BNs). An increase of sea surface temperatures (SSTs) off the coast of Angola has remarkable effects on regional rainfall patterns and on the west coast ecosystem and fisheries. Although BNs have already been studied in detail based on data for short periods in recent years, long-term studies are still lacking. This contribution is based on long-term data sets and focuses on regional influences of BNs on precipitation and also on regional and global interactions in terms of teleconnections. It is based on monthly observational data since 1870, including HadISST1.1 (1°x1° spatial resolution) and HadSLP2 (5°x5°) from the UK Hadley Centre as well as gridded precipitation data (CRU TS3.0) from the Climatic Research Unit (Norwich, UK) and daily station data for precipitation from the Global Historical Climatology Network (GHCN). All data were high-pass filtered to remove trends. Rotated s-mode Principal Component Analysis (PCA) was applied to derive coherent centres of SST and SLP variability and to define regions of similar rainfall variability. Time coefficients from the SST PCA and additionally Angola/Benguela region SST mean values were used to define a particular BN-index (BI). Based on this BI, composite analysis is used to study relationships between SST anomalies in the Benguela current and precipitation in Southern Africa as well as between SSTs and sea level pressure (SLP). To study the influence of Atlantic Ocean SSTs on precipitation in Southern Africa in more detail, the PCA time coefficients for SST and precipitation were used in bivariate correlation analyses and in Canonical Correlation Analyses (CCA). To study interactions on regional and global scales, the previously defined Benguela Index was related to the South Atlantic atmospheric and oceanic centres of variability (represented by their PCA time coefficients) and to different teleconnection indices (e.g. Trans Polar Index (TPI), Antarctic Oscillation (AAO), Southern Oscillation (SOI)).

### Climate extremes or weather extremes? Little Ice Age megafloods in the Namib Desert, Namibia, climate oscillations and solar irradiance

*Klaus Heine (Universität Regensburg), Jörg Völkel (Universität München)*

The purpose of our paper is to review recent advances that have been made in the study of palaeofloods in the Namib Desert and the developments associated with

reconstructions of climate features from sedimentary archives. Global environments are known to have varied over the past millennia, but the spatial patterns have remained poorly defined. We used palaeoflood sediments to reconstruct rainfall patterns over the last 500 years (Little Ice Age, ca. AD 1350 - 1850). The Little Ice Age is found to show palaeofloods that exceeded those of the millennium prior to the Little Ice Age in the northern Namib Desert and the Orange River catchment, but which fell well below post-Little Ice Age levels. The magnitude of the palaeofloods decreases from North to South. The most extreme palaeoflood events occurred during the relative cool phase of the Little Ice Age, the so-called Maunder Minimum (ca. AD 1640 - 1710). Our data show that the palaeofloods were extreme but short-lived flood events (hours, days) which originated in westward shifts of the Tropical-Temperate-Troughs (TTTs) between the southwestern Indian Ocean and the southeast Atlantic Ocean. Precipitation events in connection with TTTs over southern Africa result in certain patterns of anomalous low-level moisture transport. The synoptic scale TTT events are often controlled by large-scale planetary circulation patterns. Even in the 'high-sun' (summer) rainfall areas of the southern hemisphere, the westerlies are important for the development of rain-bearing disturbances, which take on a 'hybrid' character and combine features of tropical and mid-latitude systems. Tropical and extra-tropical dynamics are involved in producing these TTT cloud bands over southern Africa. These atmospheric dynamics influence the regional occurrence of the TTTs and, hence, the distribution of rainfall in the Namib Desert. The TTTs make only a small contribution to wet and dry months (and years). Thus, studies of rainfall variability over months or years do not detect these TTTs, even though they may be a major cause of the flashfloods observed in the sedimentary record. The data presented emphasize the value of palaeoflood records (slackwater deposits) as an indicator of past weather patterns. Correlations are apparent between marine and terrestrial records, indicating the relationship between the Benguela upwelling system and regional weather patterns. We conclude that the patterns of hydrological change recorded in the Namibian slackwater deposits imply dynamical responses of rainfall to solar irradiance forcing changes involving Benguela El Niño oscillation; these hydrological changes can be correlated with records from many other places. We present weather phenomena that must not be confounded with climate changes. During the Little Ice Age, the shifts of the TTTs correlate with a weakening of the solar irradiance during the Wolf, Spörer and Maunder Minima.

### East African rainfall and vegetation dynamics in response to a changing El Nino

*Tim Appelhans (University of Marburg)*

In recent years, a number of studies have presented evidence that toward the end of the 20th century El Niño events exhibit a significant change in both spatial location of maximum SSTs and tropical-midlatitude teleconnections. Classical El Niño events, characterised by warm SST anomalies in the eastern Pacific, are considered to be the

most important cyclic climatic feature on interannual time scales and have been shown to influence regional climates worldwide. However, over the last two decades, maximum Pacific SST anomalies have been more frequently observed in the central Pacific. These anomalies are generally flanked by cooler SSTs towards the east and west and it has been shown that the nature of associated teleconnection patterns differs from those associated with classical El Niño events. Furthermore, a continued frequency increase in these central Pacific El Niño events has been projected for the 21st century. Here, we investigate whether changes in response patterns to such a shift in El Niño can be observed over tropical East Africa. There is a wealth of studies in the international literature that establish clear links between climatic and ecological dynamics of the eastern African equatorial region and El Niño. It has been shown that Indian Ocean SST dynamics are closely linked to SST dynamics of the equatorial Pacific. Furthermore, precipitation and vegetation dynamics in the region respond clearly to El Niño (and La Niña) events. Therefore, it can be expected that a change in the inherent characteristics of El Niño will affect climatic and ecological responses in equatorial East Africa. In a novel approach we investigate whether such effects are observable and quantifiable. Space-time characteristics, such as classical correlation, principal components, decadal and seasonal trends and empirical orthogonal teleconnections of Indian Ocean SSTs, precipitation and vegetation greenness at various spatial resolutions are investigated over a period of 30 years (1980 - 2010). To identify potential changes over time within this period (whether continuous or abrupt), a moving-average-like approach is applied. Starting with the first observation datum, we analyse ten years of monthly observations of the aforementioned parameters in a fixed spatial domain. We repeat this analysis successively by moving the ten year window forward in time through the complete 30 year time period. The window is moved forward at annual steps so that the analysis is carried out for 21 successive time intervals (1980 - 1989, 1981 - 1990, 1982 - 1991, ...). Each instance of the moving window application produces a standardised set of results. Statistics of these results (e.g. the slope of slopes of the OLS trends) are investigated as to whether a change over time can be characterised qualitatively and quantitatively.

### **Southern Hemisphere regional climate variability during the Holocene: evidence from New Zealand rivers**

*Jane Richardson (Massey University), Ian Fuller (Massey University), Mark Macklin (Aberystwyth University), Katherine Holt (Massey University), Nicola Litchfield (GNS)*

New Zealand, located in the Southern Hemisphere westerly circulation zone, is influenced by both the El Niño Southern Oscillation (ENSO) and the Southern Annular Mode (SAM), and its rivers exhibit sensitivity to hydrological changes in response to these oscillatory climate systems. In this paper we present a probability-based reconstruction of Holocene river activity at a national and regional scale derived from the meta-analysis of 401 14C samples obtained from fluvial units representing river activity and flooding in New

Zealand. Probability-based records of Holocene river activity, compiled for the North and South Island, show that episodes of river activity in the two regions have exhibited a predominantly out-of-phase relationship. During the Holocene, 12 multi-centennial length episodes of river activity were identified in northern New Zealand (North Island), and 11 periods of river activity were detected in the southern New Zealand (South Island) record. These records of river behaviour are compared with independent hydro-climate proxy data representing regional, tropical and polar influences on Southern Hemisphere climate. It is proposed that variability in atmospheric circulation is the major driver of New Zealand river activity. In southern New Zealand episodes of increased Holocene river activity were driven by enhanced westerly atmospheric circulation associated with the negative phase of the Southern Annular Mode (SAM). In contrast, river activity and flooding in northern New Zealand is thought to have coincided with increased meridional atmospheric circulation coinciding with the positive mode of SAM and by La Niña phases of the Southern Oscillation.

## C08.04-03 - Climate change and variability in different spatial and temporal scales 2

*Chair: Professor Nigel Tapper*

### **Variability of temperatures and precipitations during an early phase of the Little Ice Age in central Spain**

*Teresa Bullon (University de Madrid)*

This study presents the results of a historic reconstruction based upon documentary sources of temperatures, precipitations and floods during the period 1550-1610 in Central Spain. According to the evidences that have been founded as well as the references of previous researches, in this period occurred a climatic crisis that is known as an early phase of the Little Ice Age. Although this cold oscillation in Spain has not been totally defined, the data presented in this paper may help to identify its timeframe, the characteristics of the thermal decline, the precipitation - drought sequences associated to it, and the related environmental consequences. In order to carry out this research, we consulted a large number of historical documents that are stored in many different Spanish archives. These documents belong to the institutions that administered the study area during the time period. We used data from primary sources, contemporaries to the events, rather than compilations or secondary references. We arranged the data according to the intensity and significance of the meteorological phenomena described and, subsequently, we assigned ordinal indexes to these values. The severity of intense extreme cold was more pronounced in the years 1550-1610 than they are today. On the other hand, in accordance with this temperature changes, precipitation or drought regimes gave rise to a contrasted interannual concentration of flood events in the rivers belonging to the basins headed in the mountains of the study area, and, in general, to a decrease in the harvest productions due to a fall in spring precipitations. Temperatures and precipitations suffered changes independently. The interconnection between them produced several temporal sequences, with cold-humid or cold-dry periods. This climatic variability helps to understand better how a natural climatic oscillation happens, and explains the reaction of environment and society to these changes.

### **Temperature and rainfall oscillations and trends in Israel since 1975 and their environmental implications**

*Hadas Saaroni (Tel Aviv University), Baruch Ziv (University of Israel), Pinhas Alpert (Tel Aviv University), Roee Pargament (Tel Aviv University)*

The research analyses temperature and precipitation data from Israel, attempting to identify trends and oscillations occurring since the beginning of the continuous present global warming, in the mid 1970's. In order to point at dynamic forcing which can explain

climate variations, we explored changes in the occurrence of the regional synoptic types, based on the semi-objective synoptic classification of Alpert et al (2004) and variations in the dominant large-scale atmospheric oscillations. The results indicate a significant rise in the yearly temperature all over Israel, being most noticeable in the hot months, June-October. The temperature rises also in the winter months, in contrast to the cooling trend observed until the mid 1990's. In the coastal region and the flat areas the rise of the minimum temperature was higher than that of the maximum, whereas in the mountains the rise in the maximum temperature was higher. The rapid warming of the summer nights in the coastal plain, which is heavily populated, means an increase in the nocturnal heat stress, with its implied health and other environmental effects. This nocturnal warming may be explained, at least partly, by the Urban Heat Island. Moreover, the heat spells in Israel has become more frequent and longer in duration. At the same time, a decrease in the number of nights with frost potential was noted, but long frost events still occur. The rain regime in Israel is characterized by high inter-annual variations, which makes it hard to identify long term trends in a period of few decades. This study indicates that the region undergoes variations, in a decadal scale, being associated with variations in the occurrence of Cyprus lows, the regional rain producing system, and in the large-scale oscillations, the Nino 3\_4, the East Atlantic-Western Russia and the North Sea-Caspian Sea Pattern. The large-scale oscillations are responsible, both directly and indirectly (through the Cyprus lows), for rainfall increase between the end of the 1970's and the beginning of the 1990's and a decrease since the mid 1990s. This decrease is accompanied by shortening of the rainy season and lengthening of the dry spells separating between rain events. In addition, the 200mm and 300mm aridity lines shifted northward, so that the area characterized by Mediterranean climate became smaller, while the arid area grew larger. Based on the Köppen climate classification, a rise in annual temperatures means an increase in the values defining the borders of arid region. This implies that the rising temperatures, observed and predicted, results in actual movement of aridity lines northward and westward more than that are based on changes in rainfall alone. However, the recent decrease of the rainfall is, at least in part, a reflection of regional natural climatic variations.

### **Climate Change During the Last Glacial and Early Holocene: Causes and Consequences Viewed from the Eastern Mediterranean**

*Ulrich Müller (Goethe-Universität), Jörg Pross (Universität Frankfurt a.M.), Ulrich Kotthoff (University of Hamburg)*

Climate change during the last glacial and early Holocene was by factor 10 larger and faster than what has been measured since 1850 AD (NGRIP members 2004). Such extreme amplitudes of climate response help to identify underlying mechanisms like orbital forcing, abrupt mode shifts of Atlantic meridional overturning circulation (AMOC), Dansgaard-Oeschger (D-O) events, and atmospheric circulation changes. We present a continuous, high-resolution pollen record (>500 samples) of climate and environmental

change in the eastern Mediterranean during the last glacial to early Holocene interval (73 to 7 kyr BP) based on a new core from the famous site Tenaghi Philippon (e.g. Tzedakis et al. 2006) in NE-Greece. The chronology of the record is based on 20 AMS  $^{14}\text{C}$  dates and two tephra age markers. All age data yield a consistent age-depth model. The Tenaghi Philippon pollen record shows a general dominance of dry steppe biomes in the eastern Mediterranean during the last glacial. This dominance was interrupted by a series of interstadials characterized by a short-term expansion of tree populations. The early Holocene interval shows the spread and subsequent prevalence of Mediterranean forest but also a row of drastic climate set-backs. The pollen data indicate eastern Mediterranean climate was generally much dryer during the last glacial than during the Holocene. The short-term expansion of tree populations during interstadials was most likely facilitated by interim increases of precipitation that interrupted the otherwise arid environments of the eastern Mediterranean during the last glacial. Our record shows a one-to-one match with the D-O climate variability known from Greenland  $\delta^{18}\text{O}$  ice-core records. Greenland interstadials were linked with expansion of tree populations in the eastern Mediterranean whereas Greenland stadials were linked with aridity. We argue this is because the resumption of the AMOC and the associated strong increase North Atlantic sea-surface temperature at the onset of Greenland interstadials facilitated an enhanced moisture load of the westerlies on their track into Europe. The similarity to Greenland was highest during the early Holocene, including the 8.2 kyr BP event (Pross et al. 2009) and the interval of classic Dansgaard-Oeschger variability during early to mid MIS 3 (Müller et al. 2011). This suggests that high obliquity intervals are well suited to direct consequences of abrupt AMOC mode shifts to the eastern Mediterranean; probably via intensity changes of the Siberian High. References: Müller, U.C., Pross, J., Tzedakis, P.C. et al. 2011. *Quat. Sci. Rev.* 30, 273-279 North Greenland Ice Core Project members 2004. *Nature* 431, 147-151 Pross, J., Kotthoff, U., Müller, U.C., et al. 2009. *Geology* 37, 887-890 Tzedakis, P.C., Hooghiemstra, H., Pälike, H., 2006. *Quat. Sci. Rev.* 25, 3416-3430

### Climate Change and Variability in the North Atlantic Region

*Alexander Polonsky (Marine Hydrophysical Institute)*

This is a brief review of the works devoted to the investigation of the regional manifestations of global warming, Atlantic Multidecadal Oscillation (i.e., of the quasiperiodic natural variations of the ocean-atmosphere system in the North Atlantic with typical time scales of 50-100 yrs.) and thermohaline catastrophe (i.e., shutting down of thermohaline circulation in the North Atlantic). The typical scale of the Atlantic Multidecadal Oscillation is determined by an adjustment of meridional oceanic circulation in the North Atlantic to the changes of the surface conditions there. The analyzed oscillation affects various climatic characteristics: air temperature, river discharge in the European and North-American regions, the number and intensity of tropical cyclones in the Atlantic Ocean, and the parameters of mid-latitude cyclones and anticyclones in the

Atlantic-European region. The main mechanism by which the Atlantic Multidecadal Oscillation affects the climatic characteristics of the regions neighboring with the North Atlantic is the atmospheric response to the thermal anomalies in the ocean leading to a shift of the centers of atmospheric action and to the changes in the intensity and predominant directions of propagation of atmospheric cyclones and anticyclones. By using the results of long-term instrumental observations carried out in Eastern Europe and the data array of reconstructed temperature in the Alpine region, it is shown that the Atlantic Multidecadal Oscillation accounts for a significant proportion of low-frequency variations of temperature in Europe. This fact confirms the potential predictability of the regional atmospheric manifestations of the Atlantic Multidecadal Oscillation on the decadal-scale. The rate of quasi-periodical regional warming/cooling of surface air temperature due to Atlantic Multidecadal Oscillation can exceed the regional temperature rising due to global warming. In particular, the fast warming of the North Atlantic region during the last three to four decades of 20th century is due to coincidence of human-induced trend and transition from negative to positive phase of the Atlantic Multidecadal Oscillation. Realization of thermohaline catastrophe for the recent climatic epoch is unlikely because of circulation stability to imposed typical thermohaline fluctuations due to possible surface changes in the North Atlantic.



## C08.04-04 - Climate change and variability in different spatial and temporal scales 3

*Chair: Professor Nigel Tapper*

### Vanishing winters - trends in soil frost dynamics and snow cover in Germany

*Juergen Kreyling (University of Bayreuth), Hugh Henry (University of Western Ontario)*

Current climate models are very capable of projecting trends in mean winter temperature. However, other ecologically relevant parameters, such as snow cover and soil frost dynamics are less well investigated. Changes in these parameters are expected to have strong ecological implications, especially in the temperate zone, where the question arises if snow and soil frost will occur at all with any regularity at some point in the future. We explored trends in days with snow on the ground (snowdays), minimum soil temperature (MST), and number of soil freeze thaw cycles (FTC, i.e. changes in sign from negative to positive at any pair of consecutive soil temperature records at -5 cm) at 177 German weather stations. Future trends were explored by statistical modelling based on climatic and topographic predictors. Snowdays decreased uniformly at a rate of 0.5 days per year. This trend is projected to continue to a point where significant parts of Germany will no longer exhibit snow cover regularly in the future. MST has already been increased and is projected to do so in the future, mainly in southern Germany. FTC have been decreasing uniformly in the recent past. No evidence for increased FTC or decreased MST with decreasing insulation due to missing snow cover was found. FTC are projected to decrease over-proportionally in the north-east where frequencies in the past were higher. Ecological implications of the strong decrease in occurrence and magnitude of the studied climate parameters include changes in nutrient cycling, productivity and survival. Ecological research is clearly needed, as the effects of diminished winters on ecosystems are not well understood. Kreyling J, Henry HAL (2011) Vanishing winters in Germany: soil frost dynamics and snow cover trends, and ecological implications.

### Spatial and temporal shifts in climatic regions in Slovakia

*Marian Melo (University in Bratislava), Milan Lapin (University in Bratislava), Hana Kapolkova (University in Bratislava), Jozef Pecho (Academy of Sciences of the Czech Republic), Anna Kruzicova (University in Bratislava)*

Spatial and temporal shifts in climatic regions in Slovakia Melo Marian 1, Lapin Milan 1, Kapolkova Hana 2, Pecho Jozef 3, 4, Kruzicova Anna 2 1 Comenius University Bratislava, Faculty of Mathematics, Physics and Informatics, Mlynska dolina, 842 48 Bratislava, Slovakia 2 Comenius University Bratislava, Faculty of Natural Sciences, Mlynska dolina,

842 15 Bratislava, Slovakia 3 Institute of Atmospheric Physics, Academy of Sciences of the Czech Republic, Bocni II, 1401, 141 31 Prague, Czech Republic 4 Technical University of Liberec, Faculty of Science, Humanities and Education, Voronezska 1329/13, 460 01 Liberec 1, Czech Republic The paper deals with the evaluation of territorial and temporal climate change in Slovakia. Our aim is to specify climate regions and sub-regions using the Köppen and the Konec climatic classification schemes and to identify the shifts in their boundaries in Slovakia during the 20th century and at the beginning of the 21st century. Generally, the Köppen's classification is very appropriate for illustrating climatic conditions of larger regions. Analyses based on the Konec's method (developed for the Central Europe) are among the most frequently used climatic classifications in Slovakia. Climatic characteristics calculated only from 30-year or longer periods are representative for the given site or region. In case of climate change and variability analysis also 11-year or longer moving averages can be used. Temporal climate trends based on the Konec's moisture index during the 20th century and at the beginning of the 21st century show that the climate in Slovakia has varied relatively substantially during this time. Climate has become warmer and more arid in the southern part of Slovakia, particularly in the Danubian Lowland, while the northern part (the Orava Region) has become warmer and more humid (in terms of precipitation totals). According to these classifications, certain territorial shifts in climatic regions and sub-regions towards the higher altitudes and to the north were registered in Slovakia during this period as well. (Acknowledgement. The Science and Technology Agency (Slovakia) under contract No. APVV-0015-10 supported this study.)

### Recent trends in temperature over Oltenia Plain, Romania

*Alina Vladut (Universitatea din Craiova)*

The study of regional temperature trends gains in importance as global warming is not linear either in time or in space. Temperature patterns have registered clear changes over southern Romania both in terms of mean values (mean, mean maximum, and mean minimum temperatures) and extreme events over the past five decades. The upward trend, both at annual and seasonal level, is supported by deviations (most of them positive in the last 20 years), linear regression, and 5-year, 8-year, and 10-year running averages. Generally, the mean temperature increased with 0.2-0.7°C from one decade to another. The slope of the 20-year increasing trend has consistently been steeper than that recorded over the 1961-1990 period. Comparing the last two decades, the temperature increase reached 0.30-0.50°C within most of the analysed region. There was also noticed a differentiated temperature increase per seasons, which is generally consistent with present temperature patterns over Europe. According to the analysed data, temperatures have increased more in spring and summer and less in winter and autumn. However, during the 20th century (1901-2000), researchers mention that the seasons warming most rapidly are winter and summer, while trends in spring are the lowest. Winter is presently the season that displays the less obvious upward trend, in

spite of certain peaks reached in the last decade (for example 2007, more than 3°C). Thus, the study emphasizes a clear rate of temperature increase, which will surely trigger important modifications of the vegetation cycle and great impact on water reserves, agriculture, and human health.

precipitation related) and edaphic (compound topographic index or wetness index, terrain concavity/convexity) were used in the model construction.

### Consequences of Past Environmental Changes in the Phylogeography of Peat-Bog Taxa in Europe

*Miguel Geraudes (University of Lisbon), Carlos Neto (University of Lisbon), João Paulo Fonseca (ISPA - IU), Tiago Monteiro-Henriques (ISA - UTL)*

Phylogeography includes potential tools which might turn the multi-proxy approach towards palaeoclimates more effective. Former glacial refugia are revealed by the persistence of high genetic diversity today and can have contributed to Mediterranean biodiversity hotspot, being critical in spatial planning policies and conservation strategies as significant reservoirs of biodiversity. We have identified refuges for *Drosera rotundifolia* L., *Genista anglica* L., *Gentiana pneumonanthe* L., and *Cirsium palustre* L. in the Iberian Peninsula, as well as in the Apennine and the Balcanic Peninsulas. They may have acted as glacial refugia for species of present-day wide distribution in Europe such as those. The peaty ecosystems of southern Europe are, other than the mountain ones, relict ecosystems from past colder climates. Their communities communities of specialists were fragmented into a disjunctive biogeographical distribution, especially the low-altitude sub-littoral bogs, decontextualized from current climate. The genetic structure of populations within such communities encompass signatures of the major climatic oscillations of the last million years. To understand this, the combination of different approaches was used: (1) morphological and phytosociological data, (2) palaeobotanical and palynological data and (3) phylogeographic analyses, using genetic information from AFLPs and DNA sequences from nuclear introns and chloroplast markers. More than 20 populations of each target species will be sampled in the Iberian Peninsula, in Central Europe, in the Italian Peninsula and in the Balkan Peninsula. The population structure of the 4 species within the Iberian Peninsula was thoroughly analyzed; and the relationship between northern populations, which went extinct during glacial advances, and southern refugial populations was tested. Different rates of molecular evolution were covered, trapping the genetic signal in a broader time scale. The within-population genetic diversity and phylogeographic patterns among populations is under evaluation, including the relationship and the level of historic gene flow among them. Using a species distribution model, the environmental envelope of the studied species was projected into future climatic conditions according to the available climate change scenarios constructed by the different research centers that take part on the IPCC (e.g. [www.worldclim.org](http://www.worldclim.org)). Therefore, the likelihood of species presence/absence was estimated according to the referred future scenarios, and final maps are being produced in a geographic information system (ESRI ArcGIS). Environmental variables such as climatic (temperature and

## C08.04-05 - Climate change and variability in different spatial and temporal scales 4

*Chair: Professor Nigel Tapper*

### Long-term changes of heavy precipitation in Japan

*Jun Matsumoto (Tokyo University), Kotaro Kamimura (Tokyo University), Hayato Suzuki (Tokyo University), Hideo Takahashi (Tokyo University)*

Long-term changes of heavy precipitation in summer on a daily basis at 50 stations all over Japan for 110 years from the beginning of the last century, and that in the whole year on an hourly basis at approximately 100 stations in the Kanto Plain region, Central Japan for 32 years from 1979 are investigated in order to examine the long-term changes of heavy precipitation in Japan. It was found that during the recent 110 years in summer, the occurrence of heavy rainfall, defined by the Rainfall Characteristics Index (RCI) to show the relative contribution of heavy precipitation to the total precipitation, presents no specific long-term trend and presents decadal-scale variations in a regional scale in most parts of Japan. It is noted that decreasing trend is predominant in the 21st century. On the other hand, warm season (May-October) hourly precipitation in the Kanto Plain region shows increasing trend in southern part of the Kanto Plain where Tokyo and other major cities are located, implying some effects of urbanization on short-term heavy precipitation occurrences in recent 32 years. No such trends have been detected in cold season (November-April).

### Drought disaster and its driving mechanism in northwestern China over the past millennium

*Harry Lee (University of Hong Kong)*

North Atlantic Oscillation (NAO) plays an important role in the Northern Hemisphere climate system. Although there is growing interest in the connection between NAO and precipitation change in China, there are few studies concerning that connection in northwestern China. Based on fine-grained historical drought disaster records and NAO proxies, we explored quantitatively their possible connection in northwestern China over the past millennium at the multi-decadal to centennial timescales. Statistical results show that NAO and drought disaster were negatively correlated, as positive modes of NAO caused northward-displaced, stronger-than average mid-latitude westerlies with an enhanced latitudinal water vapor gradient into the central Asian drylands, resulting in reduced drought frequency and intensity in northwestern China. But, their correlation was out-of-phase during the Little Ice Age because of the southward shifting of monsoons, westerlies, and the East Asian Jet Stream brought by long-term land surface cooling. As it has been indicated that the precipitation in northwestern China is also determined by El

Niño-Southern Oscillation and North Atlantic sea surface and air temperature aside from NAO, further studies are needed to evaluate their individual roles and combined impacts upon the drought disaster there.

### Moisture Variations on the Northeastern Tibetan Plateau during the last Millennium and Possible Forcing Factors

*Xiaohua Gou (Lanzhou University), Yang Deng (Lanzhou University), Fahu Chen (Lanzhou University)*

Six moisture-sensitive tree-ring width chronologies were used to reconstruct moisture variations over the past millennium on the northeastern Tibetan Plateau (NETP). A strong consistency between chronologies was found through the correlation analysis and the shared growth variability in the NETP has therefore been interpreted as a common response to a regional climate signal. Principal component analysis was used to extract the common signals in the tree ring chronologies. The first principal component (PC1) correlated well with regional precipitation and can thus be used as a regional moisture indicator. Wet spells were identified from AD 1081 to 1086, 1231 to 1244, 1359 to 1408, 1554 to 1586, 1743 to 1754, 1765 to 1773, 1892 to 1912, 1970 to 1985, whereas dry periods occurred AD 1121-1159, 1279-1309, 1451-1507, and 1696-1723. Decadal-scale variations of the PC1 and the Pacific Decadal Oscillation (PDO) show a consistent pattern during the 11th to 12th, 14th, and 16th to 19th centuries. An anti-phase relationship between the PC1 and the PDO during the 15th century may have been caused by a southward migration of the intertropical convergence zone (ITCZ). The PC1 also shows some coherent patterns with variations in solar activity. Multi-taper spectral analysis demonstrates that there exist significant periodicities of 205, 73, 51, 39, 33 years, and some 2-8 year cycles. The 50-70 year cycle may be linked to the PDO, whereas the ~205 and 35 years cycles and the 2-8 year cycle may be related to variations in solar activity and the ENSO pattern, respectively.

### Palaeoenvironment Reconstructions of the middle to late Holocene in a high-resolution sediment core from Tianchi Lake on Liupan Mountains, China

*Aifeng Zhou (Lanzhou University)*

The Asian monsoon is a key component of the earth's climate system that directly affects the livelihood of 50 million people on the loess plateau of central China. At the far edge of monsoonal influence, this region is especially vulnerable to future changes in temperature and evaporation/precipitation. Therefore, paleoclimatic information on the natural sensitivity of the region to changes in monsoon driven aridity is crucial. Here we present multiple proxy records from Tianchi Lake, one of the few nature lakes on the western loess plateau. The chronology is well constrained by a high-resolution radiocarbon age-model, spanning the past 6000 years. Here we present Glycerol dibiphytanyl glycerol tetraethers (GDGTs), lake macrophytes (paq) and plant-wax hydrogen isotope to

reconstruct regional climate change during the middle to late Holocene. Evidence from n-alkane  $\text{Paq}$ , C/N and  $^{13}\text{C}_{\text{org}}$  data suggest increasing relative abundance of macrophytes over past 6000 years, which we interpret as decreasing lake-level. Plant macrofossils and other environmental parameters suggest that the vegetation in the catchment was decreased from 6000 cal yr BP and then more rapidly from 2200 cal yr BP. This is coeval with documentary records of increasing local population density and infers historical human impact on the catchment. Using Sun et al (2011) regional calibration we derive mean annual GDGT based temperatures (MBT/CBT-MATs) with reasonable ranges. Our temperature reconstruction closely correlates on millennial to centennial timescales with the independent D/H measurements on C28 fatty acid ( $^{13}\text{C}_{28}$ ), whose signal is assumed to derive primarily from terrestrial plant waxes and the  $^{13}\text{C}_{28}$  values to reflect local changes in precipitation. Synchronous evolution of reconstructed temperature (MBT/CBT-MAT) and precipitation ( $^{13}\text{C}_{28}$ ) from Tianchi Lake suggest that the climate on western loess plateau shifted between 'warm/wet' and 'cold/dry' during the middle to late Holocene. Comparisons of our independent GDGT temperatures and plant-wax  $^{13}\text{C}_{28}$  records with stalagmite  $^{18}\text{O}$  records from the monsoon region and NH summer insolation suggest strongly that our record reflects regional changes in monsoon strength forced by NH summer insolation. Superimposed on the longer-term insolation driven changes are centennial scale variations, recorded by both the independent reconstructions of precipitation ( $^{13}\text{C}_{28}$ ) and temperature (MBT/CBT-MAT). Trade-wind driven of the frequency/intensity of ENSO cycle on the longer-term scale and the SST changes of the western tropical pacific might be the key point of the monsoon strength variations in study area.

## C08.04-06 - Climate change and variability in different spatial and temporal scales 5

*Chair: Professor Nigel Tapper*

### Long-term variability of selected agricultural climate conditions in Central and Eastern Europe and their impact on the fruit industry

*Agnieszka Wypych (Jagiellonian University), Tadeusz Niedzwiedz (University of Silesia), Zbigniew Ustrnul (University Krakow), Lukasz Malarzewski (University of Silesia)*

The rate of climate change is a broadly discussed subject today and affects human activity to a significant extent. Agriculture is the sector of the economy that is most vulnerable to climate change. Reported mean temperature increases as well as significant changes in precipitation amounts and the increasing frequency of extreme weather events are symptoms of changing climate conditions, which are increasingly affecting crop yields across the globe. The primary purpose of the paper is to describe the effect of climate change on agriculture based on the example of the fruit industry. The paper analyzes the tart cherry, which is highly sensitive to climate extremes and threshold events and requires long-term investment. Hence, the tart cherry appears to possess strategic economic value. Three European countries where tart cherry production is growing were analyzed: Germany, Poland, Ukraine. Data from seven meteorological stations representing different agricultural regions were used. Daily temperature data and precipitation totals covering the time period of 1951-2010 were obtained and used to calculate selected agricultural indices with thresholds critical for the tart cherry. The temperature characteristics of the study area were assessed and compared to those of Central and Eastern Europe in general. The paper then proceeds to analyze long-term changes in agricultural climate conditions with respect to tart cherry production. The paper further looks at the effect of atmospheric circulation on temperature in the study area. Changes in agricultural climate conditions are compared to changes in the intensity of North Atlantic circulation for the study period. Atmospheric circulation is a key determinant of contemporary climate change. This is especially true in temperate climate zones where changes in the advection of air masses can result in unfavorable weather conditions - some of which may be described as extreme.

### The Siberian High: Teleconnections, extremes and association with the Icelandic Low

*Amit Tubi (University of Jerusalem), Uri Dayan (University of Jerusalem)*

A 60-yr minimum temperature record of 11 stations in inner Eurasia enabled the characterization of the variability in the Siberian High (SH) intensity. The decline in the SH

intensity is observed in tandem with the positive mode of the Arctic Oscillation (AO), both increasing in recent years and highlighting the rate of warming over Siberia. The coldest 1968-9 winter in the 60-yr period corresponds with the lowest AO annual index value. Spatial correlation analyses indicate that enhanced cyclogenetic conditions over the eastern flank of the Icelandic Low (IL) are associated with a milder SH. Seasonal composite analyses of the circulation pattern during the coldest 1968-9 winter are characterized by a retreat of the IL, allowing a westward expansion of the SH cold core. A robust methodology, assuring an adequate representation of extremely cold spells in both their extent and duration was developed. This methodology yielded three exceptional events, the most severe one lasting 10 days and affecting all stations in the SH domain. Analyzing this event on a fine temporal resolution enabled the detection of short-term synoptic scale processes, such as the polar air mass penetration, resulting in a mean minimum temperature of -40 °C over the whole domain. This short-term polar air incursion and its termination featuring this spell as modulated by the location of the IL, point at its important role in modifying the SH.

### Natural seasons and their variations in Iran

*Bohloul Alijani (Kharazmi University)*

Seasons are natural indicators of the climate variability which are accepted by the people to adapt and plan their life and activities on their length and variability. This research has tried to define start, end, and duration of the seasons and study their variations in Iran. In order to define the natural seasons, the daily data of temperature, precipitation, relative humidity, wind speed, and sunshine hours were obtained from the Meteorological Organization of Iran for the weather stations of Iran for the period 1982-2007 period. This period was chosen because most of the stations had complete data. The data were analyzed in three steps. First, the daily mean of the period was calculated and then the mean values were clustered to get the homogenous climate periods of the year. Second, the start, end, and duration of the seasons for each year of the study period were determined according to the thresholds obtained from the first phase of the study. The results showed that winter starts with minimum temperatures below zero Celsius, spring begins when daily minimum goes above 14C. Summer begins with daily maximum above 25C and fall starts at maximums below 14C. This research showed that the natural seasons are not equal in Iran. The longest season is summer in most of the country. The spring has the shortest duration all over the country. Winter is getting longer from south to north while summer is very long in the south of the country. The annual analysis of the seasons showed that their characteristics have changed during the study period. Summer has become longer and warmer. But winter has become shorter and milder. Key words: seasons, seasonal variations, Iran, natural seasons, seasons in Iran.

### Recent spatial variability of air temperature in Tunkinskaya intermontane hollow

*Elena Istomina (Russian Academy of Science), Nadezhda Voropay (Russian Academy of Science)*

Climate changes can be evaluated best-attested with the use of meteorological stations data. But meteorological stations in Tunkinskaya intermontane hollow are situated in a flat open places. It is difficult to investigate the climate of mountain regions on the base of this data. To study detailed spatial-temporal variability of air temperature of a territory the space images (far-infrared band) and electronic temperature sensors (thermochrones) were used. In 2007 the microclimatic studies of the air temperature regime of key areas of Tunkinskaya Hollow (the Republic of Buryatia, Russia) were started. The Hollow is located 200 km to the west from Lake Baikal. The 20 electronic temperature sensors (thermochrones) were used for measurement of air temperature in the field. The sensors recorded air temperature every 3 hours simultaneously with routine measurements at meteorological stations. Choice of key areas was made taking into account the landscapes characteristics. We study a cross-section through the Tunkinskaya Hollow that includes the bottom of the Hollow and its mountainous border - the Tunkinskiy Ridge and the Khamar-Daban Ridge. Thermochrones located at an altitude of 806 m to 2119 m. Along with climate observations the complex landscape research being conducted. Geographic information system was developed for the study area. The GIS contains topographic maps, digital elevation model (SRTM), different-time satellite images Landsat 5 and 7, SPOT 4, and available geological and landscape-scale maps of the area. Complex landscape descriptions of more than 100 points was made. Descriptions were performed on specially designed forms, including the main characteristics of the Geosystems components: lithogenic base, soil and vegetation. The main emphasis is on quantitative characteristics. The landscape map of the area with scale 1: 100 000 was created. This allows us to study the climatic features of the territory in the context of a landscape approach. Series of the Landsat space images were used for extrapolation of the data of point observations and for reconstruction of air temperature field taking into account the emissive ability of different types of surface. The algorithm of calculation of air temperature with using of space images was developed. The maps of air temperature for different points of time were made. On the base of this unique data, the details of a temperature variability of the territory are shown, e.g. temperature inverse in winter season and others.

## C08.04-07 - Climate change and variability in different spatial and temporal scales 6

*Chair: Professor Nigel Tapper*

### Development and validation of 1936-2008 year monthly gridded temperature and precipitation data set for use in global climate change assessment for Georgia

*Marika Tatishvili (Georgian University)*

The development and validation of the 25kmX25km gridded monthly mean temperature and precipitation data set for Georgia that covers period 1936-2008 and accounts for the complexity of the Georgian terrain has been presented. The temperature and precipitation data set have been passed on quality control and missed data were restored using several methods. The obtained data sets were checked on homogeneity. For interpolation Spline with Barriers procedure has been used. The 25 resolution grid with 112 nodes has been created for global climate change assessment for Georgia. Some results have been presented.

### Climatic dimension of the Caspian Sea level fluctuations

*Natalia Lemeshko (Saint Petersburg University), Ekaterina Fomicheva (Saint Petersburg University)*

The Caspian Sea is a unique element of Earth's landscape. It is a closed sea-lake with a huge catchment area whose topography is plain in the north and mountainous in the southeast, which makes the Caspian Sea a reliable moisture integrator reflecting both long- and short-term climate fluctuations within a vast territory. The contemporary idea about the Caspian Sea level fluctuations are based on the structure of the Sea water balance that is determined by the climatic factors. Throughout more than a hundred-year observational period significant Caspian sea-level fluctuations have been recorded. The amplitude of the sea level fluctuations does not exceed 4 meters during the instrumental period (from the highest level (-25.2 m BS) in 1882 to the lowest level (-29.1 m BS) in 1977). Whilst the amplitude mounted to 8-10 meters during the New-Caspian transgression, some estimates suggest 12-19 m. Three warm climatic periods have been investigated: the Holocene climatic optimum (6.2 - 5.3 KA B.P.), the warming of 1930-es and the last three decades of the 20 century & first decade of 21 century which were accompanied by the global warming and the growth of the Caspian Sea level, in order to research ranges of the Sea level fluctuations. The peculiarity of regional climate changes has been examined for all seasons in 1990s with an increase in the mean global air temperature. The temperature and precipitation anomalies have been compared for 1991-2000 and the Holocene optimum. It has been concluded that quantitative estimates

of the air temperature and precipitation agree between themselves for the larger regions of the Eurasia territory. It means that the climatic optimum of the Holocene should be used for the near future climate scenarios as well as for assessment of the Caspian Sea level change. The paleoclimatic reconstruction-maps for winter and summer air temperature and annual precipitation for global warming on 1°C have been used as predicting scenarios of climate conditions in the beginning of 21 century. Based on the heat-water balance method and scenario a hydrological model has been developed to calculate the changes in climate and hydrological parameters with the progress of global warming. This model allows us to calculate changes in annual river runoff and evaporation for the Caspian Sea catchment. Some additional assumptions have been made to adapt this method for empiric scenario of climate change. The water balance approach and method of historical analogy (using instrumental data of the Sea water balance components) have been used for the assessment of the Caspian Sea level with global warming.

### Marmarik rivers runoff in global warming climate conditions

*Varduhi Margaryan (YSU)*

We studied the runoff of Marmarik River in conditions of global warming climate, because the Marmarik in comparison with, other rivers stands out comparatively by big natural runoff. Toward this end have been studied physiographic main factors stipulator the river runoff, available literary sources, have been collected, worked out and estimated observation data of hydrological and meteorological points and stations of basin, which are archived in Armstatehydromet, is being covered some peculiarities of runoff in climate change conditions. For studying, analyzing and estimating of water resources have been used physical-statistical and mathematical models. In the river basin hydrological and meteorological studies have been done in 20 th century beginning from 30 th. Deficiency is that the basin is studied very bad by meteorological observation. In the basin in different years worked one meteorological station (Hankavan) and two points (Aghavnadzor and Meghradzor). At the present time (2010) in the river basin works only one meteorological station, Hankavan also during some period was as a point (that is there were only precipitation and snow cover observation) and as a meteorological station later, at the same time did not save continuity of observations range. That is why we have been used date of observations of neighbour meteorological station Hankavan. Now (2010) in the basin work only three water measuring points: Hankavan (1956-2010) and Aghavnadzor (1396-2010), which situate on Marmarik river and Meghradzor (1935-2010), which situates on the tributary of Marmarik, Gomur. The rivers of Armenia, Marmarik also, characterize with spring flood, summer-autumn and autumn-winter shortage of water phases. Spring floods, as a rule, begin from the end of March-beginning of April and continue until the end of June-first decade of July, and during these periods often passes maximum runoff of river. During the flood (IV-VI) by the river passes 65-80 % of annual runoff. In Aghavnadzor point in 1936-2008 in I, II, V-XII months are being observed

decreasing of runoff volume, in May greatly, but in March and April, although lightly, but it increases. As a result of decreasing of runoff is being observed as during spring flood, as well as in shortage water phase, therefore, during the year. The volumes of maximum runoff are decrease also. At Hrazdan meteorological station is being noticed air temperature increasing, in January and February greatly. And it is a very reason of runoff changes. The changes of atmospheric precipitation of Hrazdan meteorological station are ignored, because distribution of precipitation has local character mainly and cannot characterize the situation right. At the same time precipitation is increases by height, but Hrazdan situates near the lower flow of river. Thus, global warming climate effect on river runoff volumes and runoff decreases.

### Climate Change Impacts and Coral Reef Ecosystems

*Abdollah Esmaeili (National Iranian South Oil Company)*

Climate change impacts threaten coral reef ecosystems by increasing ocean temperatures, storm activity, ocean acidification, and sea-level rise. These physical ocean changes lead to coral bleaching and diseases. Increasing atmospheric carbon dioxide has already begun to reduces calcification Increasing atmospheric carbon dioxide reduces calcification rates in reef-building and reef-associated organisms by altering sea water chemistry through decreases in pH (ocean acidification). In the long term, failure to address the impacts of rising temperatures and ocean acidification could make many other management efforts futile. Reducing greenhouse gases (primarily carbon dioxide) will be required to avoid irreversible climate-change effects. Therefore it is essential that we not only reduce emissions, but take urgent actions to reduce the impact of elevated greenhouse gases on coral reef ecosystems. In this paper, we will briefly discuss these subjects.



## C08.04-09 - Potential Impacts of Climate Variability and Change on Agriculture: Historical Variations 1

*Chair: Julie A. Winkler*

### Understanding climate change from rice cultivation: Lessons from local farmers in Assam, India

*Haruhisa Asada (Tokyo University)*

Impact of climate change on agriculture is one of the biggest challenges in the modern society. The effect of future climate change on crop production is estimated by computer simulation combining both climate model and crop model, which has a significant uncertainty. Furthermore, estimating future crop production is not simple as it largely depends on social and economic conditions. Therefore, it is necessary to know the local cropping system, which climatologists often neglect. In this sense, knowledge of local farmers will be useful for scientists to understand the relationship between climate and local cropping system including socio-economic factors. This study tries to understand climate change from the farmers' view who is engaging with rice cultivation in Assam, northeast India. Northeast India is widely known as the rainiest place in the Monsoon Asia, and rain-fed rice is traditionally cultivated in the low-lying Brahmaputra floodplain without modern irrigation. Field work was carried out during rainy season from May to November 2009 in the study village in eastern Assam, and farmers' responses to rainfall variation were investigated by hearing survey and field observation. In the study village, three kinds of responses for rainfall variations of different time scales were found among farmers. In the first case of rainfall shortage during 2009 monsoon season, influence of intra-seasonal variation of rainfall on rice yield was very limited for farmers using traditional cropping technologies. Farmers did not take any measures for rainfall shortage, but harvested sufficient rice production. In the second case of significant decrease of monsoon rainfall around 2000, farmers had to change existing cropping pattern as water level of paddy fields significantly declined caused by decadal variation of monsoon rainfall. Farmers gave up growing broadcast rice suitable for deep water condition and increased the area of transplant rice which has higher yield. They completed this dynamic change of cropping pattern without introducing modern cropping technology. In the third case of recurrent flood years during the early 1970s, farmers could not cultivate rice due to deep flood water, and had to migrate to other place seeking for new cultivable lands. This affected land holding pattern in the study village which eventually caused cropping pattern changes. These results suggest that the effect of climate change on agriculture varies with cropping technology available for local farmers. Rainfall amount is not the sole factor, but socio-economic conditions of local farmers also plays important role for crop production. Climatologists who tend to consider climate effect in macro scale, should have farmers view in micro scale. In order to understand ongoing climate change,

farmers' knowledge, experience and even memory should be utilized as well as meteorological observations.

### Phenological Models to Project Changes in the Beginning of Tart Cherry Blossom across Europe and North America

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In order to study the impact of climate change on agriculture and horticulture such as tart cherry production, phenological models are of great importance. They can act as separate models to investigate possible shifts in the timing of phenological events or they can be inserted as subroutines in complex management models. These integrated models are essential to investigate the impact of climate change on late frost hazard, yield formation, irrigation, pest and disease infestation etc. For these applications, phenological models must be able to project shifts in plant development not only for present climate conditions but also for possible future conditions up to 2100. Our studies have shown that the original, commonly used Growing Degree Day (GDD) model shows several systematic deficits. If one uses physiologically meaningful values for the starting date of temperature accumulation ( $t_1$ ), which also operate for future climate conditions (relatively early starting dates, due to rising temperatures), and for the base temperature (TBF), the models exhibit a built-in trend for the beginning of blossom ( $t_2$ ) with increasing temperature level, which cannot be influenced by the model parameters itself and which is too large in absolute value. As a consequence, large root mean square errors (RMSE) between observed and simulated blossoming stages emerge. Implementation of an additional daylength term in the GDD models eliminates these problems almost entirely, and markedly reduces the RMSE at verification. Additionally, this term automatically leads to physiologically meaningful model parameters. Moreover, the model optimized and verified for one tart cherry growing location in Germany, could be successfully applied to calculate the beginning of blossom in other regions in Europe and in North America, mainly for strictly standardized phenological observations in the Global Phenological Observation Programme (GPM). We developed combined chilling-forcing (CF) models for the beginning of tart cherry blossom which based on the chilling hour (CH) or chilling portion (CP) accumulation and on a modified GDD approach with an additionally daylength term. The phenological blossoming models were optimized for two major tart cherry growing regions in Germany (Rhineland-Palatinate), on the basis of gridded phenological and temperature data (14 km x 22 km grid) between 1961 and 2009. For

the internal verification of the models the dataset was split into two halves. The even years were used to optimize the models and the odd years to verify them. For an external verification, phenological observations from different experimental sites (study regions in CLIMARK) and phenological gardens (GPM Programme) in Europe and North America were used. The internal and external verification of the combined CF-models was acceptable, so that we were able to use these models to project possible shifts in the beginning of tart cherry blossom due to climate change.

### **Impact of land use changes as a result of global warming on soil erosion, soil organic carbon and greenhouse gas emissions to atmosphere**

*Andrey Zhidkin (Moscow University), Alexander Gennadiyev (Moscow University), Valentin Golosov (Moscow University), Kenneth Olson (University of Illinois), Maxim Markelov (Moscow University), Roman Kovach (Moscow University)*

If climate change did occur in the northern hemisphere and the mesic-frigid line was to move north, then it is likely that forest and prairie lands would be cultivated or pastured. The goal of our research was to assess the impact of global warming on land use conversion of forest land in the frigid temperature regime of the northern hemisphere to agricultural crop use and effects on soil erosion and deposition, soil organic carbon storage (SOC) in the landscape and greenhouse gas emissions (CO<sub>2</sub>). Our approach required the selection of study sites including 2 in Russia (Tula and Belgorod regions) and three sites in the USA (Albany, Hanover and Knoxville areas, IL). The soils of 30 transects studied were sampled and investigated in laboratories. The soil erosion rates were determined using USLE and RUSLE equations, as well as new method of magnetic tracer (spherical magnetic particles) and method radioactive tracer (cesium-137). At the Knoxville site the cropland retained 59.7 Mg C/ha or 87% as much as the timberland, at the Albany site cropland retained 31.8 Mg C/ha or 52% as much as the timberland, at the Hanover site the cropland retained 54.7 Mg C/ha or 69% as much as the timberland, at Tula the cropland retained 20.7 Mg C/ha or 107% as much as the timberland and at the Belgorod site the cropland retained 12.9 Mg C/ha or 75% as much as the timberland in the upper 0.5 m of the soils. Approximately 20% of SOC in timberland was oxidized during the first 40-50 years of land use change and after initial cultivation. The amount of soil erosion over the last 150 years was determined at all sites, the SOC content of the sediment was determined with 70% of the sediment and SOC retained on the landscape, an additional 20% released to atmosphere as CO<sub>2</sub> and 10% transported to rivers. Using the method of different-age tracers characterizing the soil erosion/deposition during the last 140-150 years (magnetic tracer) and during the last 20-25 years (radioactive tracer), the spatial and temporal features of the redistribution of the drifts on typical slopes in different parts of the forest-steppe zone of the East-European Plain were established. Data on the rate of the erosion-accumulation processes within the slopes studied on key sites in Tula, Kursk, and Belgorod oblasts were analyzed. A clear trend of an decrease in the soil erosion rate in this zone during the last 20-25 years was revealed compared to

the average rate for the last 140- to 150- year long plowing period, which was related to the climate warming, an abrupt reduction of the surface runoff during the spring snowmelt period, and the increasing soil-protecting role of the agricultural plants in the crop rotations because of the decrease in the proportion of row crops.

### **Changing Pattern of Rainfall and Agriculture in Assam (India)**

*Bimal K Kar (Gauhati University), Pahari Doley (Gauhati University)*

Rainfall, an important element of climate, which greatly influences the agricultural practices in an area, has been undergoing change as a part of the global phenomenon of climate change. This is no less true in the case of Assam, a state in India's eastern periphery mostly surrounded by eastern Himalayan foothills, where the economy is primarily based on agriculture. As a matter of fact, the amount of both annual and monsoon rainfall has been witnessing a declining trend in most parts of the state during the last few decades or so. Such a situation appears to have significant bearing in agriculture system in the state in respect of area coverage, cropping intensity and crop yield rate including that of rice production patterns and changes in crop calendar. It has also necessitated the increased provision for irrigation so as to overcome the deficit in natural supply of water and also to keep agricultural production process uninterrupted even due to slight change in crop calendar. With the above background, an attempt is made in this paper to analyse the patterns of annual rainfall including its seasonal variation, agricultural status in terms of area coverage, cropping intensity, irrigation and rice production, and their prevailing interrelations in six selected districts of Assam, viz. Dhubri, Kamrup, Nagaon, Dibrugarh, Karbi Anglong and Cachar, using secondary data obtained mainly from the Directorate of Economics and Statistics and Directorate of Agriculture, Govt. of Assam for the period 1991-2010. The data so obtained have been analysed and presented with the help of some simple but meaningful quantitative and cartographic techniques. The analysis reveals that although the declining but fluctuating trend of rainfall in the state has affected the agricultural production pattern, the prevailing rainfall-agriculture relationship in the state has not been so simple. Moreover, increased uncertainty in monsoon rainfall has not only resulted in gradual changes in crop calendar but also increased diversification in cropping pattern.

## C08.04-10 - Potential Impacts of Climate Variability and Change on Agriculture: Climate Projections and Assessment Strategies 2

*Chair: Julie A. Winkler*

### **Sensitivity analysis for agriculture using growing degree-days as a climate warming impact indicator for a region with extreme annual air temperature amplitude**

*Chris de Freitas (University of Auckland), Elena Grigorieva (Russian Academy of Sciences)*

The thermal component of climate is a key factor in agriculture, thus any change, whatever the cause, will affect the value of the resource. The problem is we are unable to adequately predict future climate. Sensitivity assessment circumnavigates this problem and informs planning decisions without knowing precisely the magnitude of climate change that might occur. The impact of change will depend on the climate of the region in question. For example, an average 1oC air temperature rise may be of little consequence where high temperatures are common and prevail over extended periods. Conversely, marginal climates for agriculture may be highly sensitive and respond dramatically to even the smallest change in thermal conditions in an already short growing season. The concept of growing degree-days (GDD) is used as a measure of the agricultural potential of climate on a regional scale. Typically, in general assessments of thermal impact on crops various base threshold temperatures are used due to the close relationship of these thresholds with the onset of various stages in crop development. The current study uses GDD for these thresholds as applied in the thermally extreme climate of the southern part of the Russian Far East and examines spatial patterns in these data using mean daily climate data for the period 1966 to 2005. Daily maximum and minimum air temperatures are used for calculating GDD at 17 locations using threshold base air temperatures of 0, 5, 10 and 15oC, with a high-temperature threshold cut-off of 30oC. Sensitivity changed thermal conditions of +1, +2 and +3oC are examined using a sensitivity index defined as the percentage change in GDD for each of the three warming scenarios. Generally, the results show GDD sensitivity decreases from north to south of the study area, but the mean GDD sensitivity varies considerably from one location to another. Marginal thermal conditions are observed in the north, both in the elevated areas and in the coastal regions. Specifically, the larger the GDD Sensitivity Index (GDDSI) index value the more sensitive the climate to warming (in terms of crop growing conditions) is at a particular location. In most cases, sensitivity does not increase significantly as warming rate increases. The higher the base threshold, the higher the sensitivity. Highest sensitivity is for GDD15 at Okhotsk in the far north of the study area. The colder the climate the higher the sensitivity. Where GDD at threshold 15oC is small,

sensitivity to warming is higher. Highest sensitivity is for GDD15 at Okhotsk in the far north of the study area. The mapped results are useful for identifying areas of high sensitivity to climate change as well as the magnitude of the potential.

### **Application of regional climate model simulations in agricultural assessment – evaluation of bias and bias correction methods**

*Pang-Ning Tan (Michigan University), Zubin Abraham (Michigan University), Julie A. Winkler (Michigan University), Perdinan Perdinan (Michigan University), Malgorzata Liszewska (Interdisciplinary Centre for Mathematical and Computational Modelling), Sharon Zhong (Michigan University)*

Assessments of the potential impacts of climate change on agriculture require climate scenarios at fine spatial and temporal resolution as input to crop phenology and yield models. Simulations from regional climate models (RCMs) are one source of fine resolution climate scenarios. However, phenology and yield models are very sensitive to biases in the RCM simulations. For example, a warm bias in spring and summer temperatures may result in a large overestimation of growing degree units and an underestimation of frost damage. We evaluate the biases present in RCM simulations available from well-known archives (e.g., ENSEMBLES, NARCCAP) against site-specific climate observations for multiple midlatitude locations. The evaluation focuses on climate parameters, including growing degree days, frequency of days with temperatures below freezing, and the frequency of days with precipitation, that are of importance for specialized agriculture such as fruit production. Alternative bias correction methods (e.g., quantile-quantile mapping and local intensity scaling) are applied to RCM simulations driven by reanalysis fields and by global climate models (GCMs). These bias correction procedures are evaluated against model output statistics (MOS) procedures that have been promoted as a means of adjusting for RCM error and for further downscaling the RCM output to a finer spatial scale. The evaluation focuses on the 'added value' of the MOS procedures over simpler, less time consuming bias correction options. The results of these analyses inform stakeholders on necessary steps before employing climate projections obtained from RCM simulations in assessments of the potential impacts of climate change on agriculture.

### **Impacts of precipitation variability on agricultural vegetation in sub-Saharan Africa**

*Susanne Rolinski (Potsdam-Institute for Climate Impact Research), Katharina Waha (Potsdam-Institute for Climate Impact Research), Christoph Müller (Potsdam-Institute for Climate Impact Research)*

Projections from global circulation models (GCMs) are widely used to assess the impact of climate change on the agricultural sector in sub-Saharan Africa (Jones & Thornton,

2003; Liu et al., 2008; Müller et al., 2011; Schlenker & Lobell, 2010). Although GCM projections agree in the level of median temperature increase of 3 to 4°C in 2090s compared to 1990s in the A1B projections (Christensen et al., 2007) they project very different precipitation patterns in various regions of sub-Saharan Africa due to a large variety in model setting, originating from models resolution and model physics, affecting e.g. the occurrence of convection or the vertical transport of moisture in the tropics (Lin, 2007). There is some consistency between GCMs with respect to projected increase of annual precipitation amount in East Africa and a drying in southern Africa. As farming in many regions of sub-Saharan Africa is closely linked to the occurrence of sufficient rainfall, the length and precipitation of the rainy season very much influence the crop productivity and reachable harvest in a region. Crop failure frequently occurs due to high water stress leading to low grain yield in case of an unusual delayed onset or early break of the rainy season if farmers' cultivation methods are not adapted to these variable conditions. This study focuses on the impact of changing precipitation variability on crop productivity by analysing changes in the wet season length and the precipitation amount in the wet season projected from 14 GCMs for the SRES A1b and transferred to three stylized precipitation experiments. We analyse the stress potential of these changes for growth and productivity of ten food crops grown in sub-Saharan Africa using the global dynamic vegetation model LPJmL (Bondeau et al., 2007; Gerten et al., 2004). The aim is to identify their magnitude and importance for future food production in sub-Saharan Africa. Results show that most parts of sub-Saharan Africa will experience decreases in both, the length of the rainy season and the amount of precipitation in the rainy season of up to 20% (Figure 3). The precipitation sum and the length of the rainy season will decrease most severely in parts of the Sahel, Southern Africa and Central Africa. Overall average crop production in sub-Saharan Africa decreases whereas an increase in the mean annual surface temperature of one Kelvin has a stronger effect on the average crop production than a decrease in the wet season length of 30 days and a decrease in the wet season precipitation of 100mm. The precipitation effect in a precipitation experiment with decreasing wet season precipitation is stronger than in a precipitation experiments with a shorter rainy season and increased rainfall per rain day. In the latter precipitation experiment crop production decrease to a lesser extent and some regions even gain crop production increases like e.g. parts of Nigeria, Uganda or South Africa.

### Climate Change Impact Assessments for International Market Systems: An Example for a Specialty Crop

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The vast majority of climate change impact assessments evaluate how local or regional systems and processes may be affected by a future climate. Alternative strategies that extend beyond the local or regional scale are needed when assessing the potential impacts of climate change on international market systems, including agricultural commodities. These industries have multiple production regions that are distributed worldwide and are likely to be differentially impacted by climate change. Furthermore, for many industries and market systems, especially those with long-term climate-dependent investments, temporal dynamics need to be incorporated into the assessment process, including changing patterns of international trade, consumption and production, and evolving adaptation strategies by industry stakeholder groups. A framework for conducting climate change assessments for international market systems, developed as part of the CLIMARK (Climate Change and International Markets) project is outlined, and progress toward applying the framework for an impact assessment for the international tart cherry industry is described. The tart cherry industry was selected for analysis in part because tart cherries are a perennial crop requiring long-term investments by the producer. Returns are not realized until 3-6 years after initial investments and capital recovery can take as long as 25 years. The key climate-limiting factor in production is the frequency and magnitude of spring freeze events after the crop has broken its protective winter dormancy. The sequence of unusual early spring warmth followed by freezing temperatures can be particularly damaging. Currently most production is concentrated in central Europe and the Great Lakes region of the United States. The tart cherry industry is at very different stages of development depending on production region, and, although cherry varieties in the growing regions are somewhat similar, they are not perfect substitutes for each other given differences such as taste, color, and size. The CLIMARK research team includes geographers, climatologists, computer scientists, horticulturalists,



and economists from current major production regions and from areas with potential for increased future production. Components of the project include the preparation of fine resolution climate scenarios, evaluation of phenological models for diverse production regions, the development of a yield model for tart cherry production, new methods for incorporating individual decision making and adaptation options into impact assessments, and modification of international trade models for use in impact studies. The transdisciplinary nature and global scale of this effort synergize to provide a more comprehensive and integrated evaluation of climate change impacts and an assessment product of greater utility to industry stakeholders.

## C08.04-11 - Potential Impacts of Climate Variability and Change on Agriculture: Changes in Productivity 3

*Chair: Julie A. Winkler*

### Simulation of the Impacts of Climate Variability and Change on Sour Cherry Production

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While the potential impacts of climatic variability and change on agronomic productivity have been investigated for many major cereal and oilseed crops, the effects on specialty crops have been less well documented. Impact assessment of specialty crops is complicated by the relatively high level of management required in commercial production systems, the necessary consideration of both crop quality and quantity, the localized geographical nature of production areas and, in the case of tree fruit production systems, to the longer term perennial nature of the crop and to the complex topography and terrain typically utilized for production and associated array of diverse microclimates. As a part of the CLIMARK research project investigating the impacts of climate change on the global marketing system of a specialty fruit crop commodity, a system of models was developed to quantify the spatial and temporal impacts of climate variability and change on sour cherry production in major production areas of Europe and the USA. The most important climate-related factor involved in sour cherry production is the loss or damage of bud tissue resulting from cold injury, which can occur in fall, prior to dormancy, in midwinter, during dormancy, or in spring, during and after budbreak of the crop. The yield model developed for this project simulates cold injury as a function of crop phenological stage and accounts for the impacts of weather conditions during the pollination period and during the previous season. The modeling system estimates regional yields based on gridded historical climate data from NLDAS2 and PRISM for the 1979-2010 period at spatial resolutions varying from 4-14 km. This paper will focus on the general development of the regional yield model as well as identification of spatial and temporal trends in productivity associated with climate.

### Agricultural productivity in Oltenia Plain, South West Romania.

#### Investigations for climate change adaptation measures

*Monica Dumitrascu (Romanian Academy), Diana Dogaru (Romanian Academy)*

Agriculture is one of the most vulnerable sector to climate change and variability, thus requiring in-depth investigations on crop efficiency measures and adaptation support strategies. Impact studies are of increasing relevance for water and food policy and decision making at various levels by providing estimations with the use of robust models, both crop growth and regional climatic models, on yields, water necessity and water - food relationships. In this sense, a systematic tool that analyses the crop productivity in terms of land and plant physical and environmental characteristics, as well as agricultural management practices could be is very useful. GEPIC model, developed by a research team at EAWAG, Switzerland, is a GIS-based EPIC model (Environmental/Policy Integrated Climate Model) that integrates a crop growth model with a Geographic Information System using a series of spatial and ancillary data sets. The objective of the present study is to estimate wheat yield and, subsequently, the water supply for irrigation in the Oltenia Plain, SW Romania, under current and future climatic conditions. The Oltenia Plain, SW Romania (about 8,000 sq km), is an important agriculture region of the country affected by drought and desertification. A productive agriculture in this region is possible through efficient use of the irrigations. The crop yield simulations in this study are realized by applying the GEPIC model at a high spatial resolution (~ 100 m). The input data required by the model are: daily climate data (precipitation and temperatures), geographical data (location data, slope data, DEM), soil data (depth, bulk density, percent of sand, percent of silt, pH, organic carbon content), land use, plant parameters and management data (irrigation and fertilizer application). Regional climate models developed within the framework of the CC-Waters project ([www.ccwaters.eu](http://www.ccwaters.eu)) are used for acquiring the future climatic parameters for 2050 and 2100 time horizons. The simulation results are expected to provide valuable information for the improvement of irrigation and fertilizer management, having in view the emergent need to take into consideration measures for crop efficiency and water use. Acknowledgments. This paper was developed in the framework of FP7 - Building Capacity for Black Sea Catchment Observation and Assessment System supporting Sustainable Development (enviroGRIDS); <http://www.envirogrids.net/>.

### The study of drought effect on yield changes of olive product in Roudbar of Gilan, Iran, South Western of Caspian Sea

*Bahman Ramezani Gourabi (Azad University)*

The aim of this research is appointment of drought connection with amount of olive production in Roudbar Township as a presentable species. To this intention, extracted the dry and wet years with using of standard precipitation index (SPI). Statistical activities were done by Access and Excel software's and needy maps was drawn with using of Arc



GIS. The result shows, this township in 1386-87 and 1372-73 years with drought and wettest tern, has been encountered, in order. Therefore, between amount of product and relationship between two variable, is significant; as the least amount of produce is belong to 1386-87 year with 3294 Ton, 6270 hectare and the greatest is belong 1372-73 year, with 6200 Ton and 2149 hectares. Keywords: SPI index, drought, olive, roudbar.



## C08.04-12 - Potential Impacts of Climate Variability and Change on Agriculture: Economic Considerations 4

*Chair: Julie A. Winkler*

### A multi-scale analysis of the impacts of climate variability on Mexican maize crops

*Candida Dewes (University of California)*

My dissertation research evaluates climate variability in Mexico and its impacts on maize crops. Extreme weather and climate events are the main environmental cause of major crop failures. Throughout the maize growing cycle, each stage presents different tolerance levels for extreme environmental conditions, and farmers have adapted their practices in order to minimize the exposure to climate hazards. Flooding due to extreme precipitation is hazardous in early stages, when new plants require very little water to grow. During mid-season the water requirements are high, and the occurrence of dry spells associated with very warm days create a high risk of crop moisture stress. Towards the harvesting stage, frost events can be hazardous to the point of ruining a year-long investment. Maize is one of the most important crops in Mexico, being cultivated at many scales in both commercial and traditional sectors. Using precipitation and temperature data interpolated from the Mexican meteorological station network, I defined seasonal and annual indices of extreme weather and climate events for the period 1950-2008. The climate indices were averaged over each state in which the warm season rainfed planting regime is dominant. Crop reports of area planted, area harvested, and yields exist at the state level from 1980 to 2008. A canonical correlation analysis will be performed within the overlapping period to distinguish the climate factors that most contribute to the variability in crop yields, and to detect a potential spatial dependence of this influence. Parallel to this interannual variability analysis, a different approach is employed to analyze climate impacts on the maize growth cycle. By focusing on a shorter time period and higher spatial resolution, I evaluate what effects the seasonal climate conditions and the occurrence of extreme events on each crop development stage might have had on the season's final yield. In this section, municipal crop data for years 2005-2008 are used to estimate the timing of development stages. Since planting and harvesting dates can be approximated to the month, the average 4-8 month duration of the planting season can be placed relative to the rainy season. I will test whether the starting date of the rainy season can serve as a proxy for the planting date, and whether the measure of growing degree days (as a function of daily temperature) can serve as a proxy for growing season length. The crop specific moisture requirement curve (Kc) will be used to define the timing of four main development stages. Climate conditions specific to each stage will be assessed and compared to the final crop outcome. The 2005-2008 base-period will be used to validate these assumptions over municipalities with dominant rainfed production. If the model is proved acceptable, I hope to extend the analysis of

intraseasonal climate conditions to the 1980-2008 period, and compare with crop outcomes at the state level.

### Who Should Pay for Climate Change Adaptation in Agriculture? Which Crops? How Much?

*Scott Loveridge (Michigan University), Ge Eu Lee (Michigan University), Julie A. Winkler (Michigan University)*

With public and scientific opinion on climate change diverging, it has become apparent that public opinion will play a major part in determining future scenarios for climate adaptation in the agricultural sector. Public funding may be needed to develop crop varieties adapted to the new climate conditions. While others are measuring overall public attitudes around the issue, we are not aware of any efforts to look specifically at the single sector most likely to be directly impacted by the changes: agriculture. We report on results of a telephone survey administered to adult residents of the State of Michigan (USA) in 2012. Roughly 1,000 households respond to questions about whether national or state government should finance agricultural adaptation. Furthermore, we explore the extent to which the type of crop makes a difference. Michigan is a good test case for this work as it produces many fruits and vegetables that are strongly identified with the growing preference for 'local' foods, as well as basic staple crops that do not typically carry as strong regional association (corn and soybeans). We test whether the public's willingness to support state initiatives varies by crop type. We also explore differences in opinions across six sub-state regions. Finally, we report on measures of willingness to pay.

### Concept of a Profitability Model for Ecological-Economical Assessment

*Sabrina Plegnière (Universität Trier), Markus Casper (Universität Trier)*

The consequences of climate variability and change will concern the ecological and economical components of agriculture. On the ecological side climate change will influence plant growth and yield; on the economical side, it will change cultivation technique as well as profit. There is a close relationship between the ecological and the economical side. Changes in plant growth and yield automatically influence the cultivation method and in consequence the profit. Therefore a concept of a profitability model will be presented which couples economical and ecological aspects of an agriculture system. First, simulations with a plant growth model (simulateur multidisciplinaire pour les cultures standard = STICS) shall give information about the impacts of the ecological side by running the model with different climates for the same crops or crop rotations. In addition, the influences of the soil and cultivation method on yield will be examined in the simulations with STICS. Next step is to obtain details about how sustainable the crop has been cultivated. This can be deduced from the emission of e.g. nitrate which can be calculated by the model. The results of this simulations are the basis for creating a



production and cost function. This function will give information about the effects from the ecological on the economical scope as well as the monetary assessment of every part of the production and the profit. Finally, the integrated assessment enables us to evaluate cultivation methods or adaption options, provide information about the profitability and estimate how sustainable crop can be cultivated in due consideration of climate, soil, cultivation, crop and spatial variability. With this innovative model it will be possible for the first time to assess sustainability or the environmental impact on profitability.

### Uncertainty and Hysteresis in Adapting to Global Climate Change

*Jinhua Zhao (Michigan University)*

Global climate change is one of the greatest environmental challenges facing the civilization, and despite efforts in mitigating emissions of greenhouse gases (GHGs), global temperature is likely to rise, possibly significantly (IPCC 2007 Synthesis Report). Climate change is characterized by several features that distinguish it from other environmental problems, including high degrees of uncertainties in assessing its impacts, the global nature of the public goods problem, and the scale of activities needed in adapting to the change. I argue that the process of adapting to climate change is defined to a large extent by uncertainties, transaction costs, and hysteresis. I then present a framework to evaluate the role of uncertainties and information in adapting to climate change, and apply the framework to farmers' land use decisions such as switching between annual crops and perennial crops (e.g., energy crops) and switching from fruit trees to real estate. In this paper, adaptation is defined as a set of activities that reflect major changes in resource allocation in response to large scale and long-term environmental changes. It includes mitigation activities, technological and institutional innovation and adoption, and environmentally driven mass migration. These adaptation activities share several common features: high degrees of uncertainties in the associated costs and benefits, significant sunk costs that are hard to be recouped if the activities fail to generate the expected benefits, and the opportunities of learning about these uncertainties. Under these conditions, a rational decision maker has incentive to delay the adoption of adaptation activities until more information is gathered, to avoid the expected loss from incurring the sunk costs if the activities turn out to be ineffective. This kind of hysteresis is optimal when individual decisions have no externalities, but when information is shared and there is learning from others, the delay in adaptation is socially suboptimal. I then apply the framework to study farmers' land use decisions. In one study, farmers make decisions to grow dedicated energy crops (e.g., switchgrass) that have lower carbon footprints as a regional mitigation strategy. The expected return from the energy crop has to be significantly higher than that from traditional annual crops (e.g., corn) in order for the farmer to switch to the energy crop. This is the case even when two way conversions are allowed. Policies that are intended to encourage energy crop production might in fact lead to lower acreage in energy crops under this setting. In another study, farmers face both continuous and discrete (large scale) shocks, and we study how these

shocks affect farmer decisions to abandon fruit trees. Finally, I discuss approaches to overcome the hysteresis and to promote the adoption of adaption strategies.

## C08.04-13 - Urban climates 1

*Chair: Arie Bitan, Hadas Saaroni*

### Evolution des îlots de chaleur (ICU) de grandes agglomérations urbaines françaises (1951-2010)

*Annick Douguedroit (Université de Provence)*

Le nombre de grandes agglomérations urbaines françaises dont il est possible de donner une estimation de l'évolution des îlots de chaleur urbains est réduit par le manque de données de température adéquates. Les principales retenues ici sont les agglomérations parisiennes, toulousaines, bordelaises et strasbourgeoises auxquelles certains résultats d'autres agglomérations, marseillaise, niçoise..., sont comparés. Comme on pouvait s'y attendre l'évolution des températures minimales et maximales de chaque station n'est pas symétrique dans chaque station et agglomération, induisant une variation de leurs écarts dans le temps. Elle diffère également entre stations de référence, de banlieue et de centre-ville. Les premières ont de faibles évolutions marquées par la distinction entre deux périodes successives, avant et après les années 70, plus nette pour les maxima que les minima et que l'on ne retrouve pas, en général, en ville. Les évolutions intra-urbaines diffèrent également dans les banlieues en rapport avec la date de l'intégration par l'urbanisation des environs de la station à l'ICU de la ville voisine. La plupart des stations de banlieue sont situées dans des zones d'urbanisation des années 1970-80. Les centres-villes, de type « centre ancien », les espaces à grattes-ciels de Paris n'étant pas représentés par aucune station, présentent deux types d'évolution de leurs températures minimales dans les premières décennies, soit stagnantes soit en hausse, en relation avec leur localisation géographique, intérieure ou littorale, associée à l'évolution démographique de l'agglomération urbaine. En conclusion l'évolution des températures, en particulier les minimales qui sont les considérées comme les plus représentatives des ICU, n'est pas identique à l'intérieur de toutes les agglomérations. Elle est partout représentée par une augmentation, sans que, ce qui peut paraître paradoxal, cette dernière ne soit pas la plus rapide dans l'agglomération la plus grande, et de beaucoup, la parisienne. Mais les écarts entre station de référence et centre-ville y sont plus élevés que dans les agglomérations inférieures au million d'habitants.

### Urban Climate and Environmental Changes in the Brazilian Context: Risk, Vulnerability and Mitigation

*Antonio Carlos Oscar Júnior (UFRJ)*

This paper proposes to examine the process of construction of the urban environment of the municipality of Duque de Caxias (Rio de Janeiro - Brazil) has contributed to changes in climate parameters, favoring the occurrence of urban problems such as thermal discomfort, heat islands, flooding and pollution. Such problems, mainly due to the

rapid and uncontrolled growth, coupled with social vulnerabilities, configure a perfect setting for the modifications of the physical and natural elements, thus creating serious risks to the population. To ascertain the climatic changes by which the municipality has passed, we will analyze the thermal and rain parameters. The analysis will be based on data from weather stations of São Bento (1949-1970) of Xerém (1920 to 1970). Through SIG's use of LANDSAT satellite imagery will be made "maps of land uses and thermal. It is hoped that this study emphasize the importance of addressing the climate in spatial and urban planning and management as well as in the vulnerability of urban populations in the face of climatic phenomena. It has been an ever-present reality in the life of the city. Some results can be pointed, such as the tendency of temperature increase from 1940, a time of significant urbanization of the study area; Considerable increase in the contribution of atmospheric pollutants, reflecting the health of the population; Finally, the space redefinition rainfall trend in the area of study.

### Urban form influencing the surface urban heat island

*Nina Schwarz (Helmholtz Centre for Environmental Research)*

The urban heat island is the phenomenon of altered temperatures in urban areas compared to their rural hinterlands. The surface urban heat island (SUHI) describes these temperature patterns with remotely sensed land surface temperatures. The SUHI is an indicator for a spatially explicit description of the urban climate and is very important in the light of climate change, likely inducing rising mean temperatures and more frequent heat waves. Measures to adapt cities to climate change also include spatial planning and climate-proof design of cities. Protecting and/or creating more green urban areas or water surfaces are frequently discussed and alter the spatial configuration of cities. Thus, it is essential to analyse the influence of the overall spatial structure of cities onto the SUHI. Therefore, the present study investigates the effect of urban form on the extent of the SUHI for European cities. The dataset used here combines different data sources: (1) SUHIs are quantified with MODIS monthly land surface temperature data products for summer 2001. (2) Urban form is analysed with the help of landscape metrics based upon CORINE land cover data. (3) Urban regions are defined as European Larger Urban Zones, proposed by Eurostat and the Urban Audit initiative. (4) Meteorological and climatological factors (precipitation, thermal climate zone) as well as topography (elevation, distance to coast) are controlled. A statistical analysis is used to quantify the influence of urban form onto the SUHI in European Larger Urban Zones when controlling for overall climate and topography. The results will insights into the relationship of the spatial form of a city and its SUHI. Implications for spatial planning will be discussed.

### Seasonal variation in cool island effect of two urban green spaces

*Shogo Shimizu (Tokyo University), Hideo Takahashi (Tokyo University)*

High temperatures caused by urban heat islands have become an environmental problem in urban areas. Green space within such regions creates a low-temperature area known as a cool island. Previous studies indicate that the temperature in such a green space is lower by several degrees Celsius than that in its surrounding area. In clear calm midnight conditions, cooler air in the green space flows out of the space (Narita et al., 2004). Thus, cool islands are an important element in the mitigation of heat. This study focuses on seasonal variation in the cool island effect of urban green spaces and differences in the effect at different green spaces. Few studies have documented the year-round cool island effect of urban green spaces (Narita, 1997; Sugawara et al., 2006). Since all previous studies were performed in only one green space, differences among green spaces are not known. In this study, year-round temperature variation within and in the vicinity of two urban green spaces of different sizes in the Tokyo metropolitan area were observed. Observations were performed within and in the vicinity of Institute for Nature Study (20 ha) and Koishikawa Korakuen Garden (8 ha). Air temperature was measured at 10-min intervals at eight positions, four of which were located inside the green space and the other four were located outside the space at a distance of hundreds of meters from the green space boundary. The observation period was August 2007 to September 2008. Diurnal variation patterns of cool island intensity, defined by the difference between the average temperature of the green space ( $T_g$ ) and the average temperature of its surrounding area ( $T_u$ ), on fine days vary with season. In summer, daytime cool island intensity was larger than nighttime intensity, whereas it was the opposite in winter. In spring and autumn, diurnal variation of cool island intensity was smaller than that in summer and winter. The daytime cool island intensity in summer was larger than that in winter, because of (i) the sunshade effect of tree canopies and high transpiration rate from tree leaves in summer and (ii) leaf abscission in winter. The temperature difference between the green space and its surrounding area was almost  $0^{\circ}\text{C}$  in winter. On the contrary, the nighttime cool island intensity was constant throughout the year. Cool island intensity was greater on fine and calm days, when higher radiation cooling was expected. Among the two green spaces, the cool island intensity was greater in Institute for Nature Study than in Koishikawa Korakuen Garden on almost all days regardless of season. This may be because of the difference in the areas of the green spaces. In addition, the greater cool island intensity in Institute for Nature Study could be due to its higher tree density.

## C08.04-14 - Urban climates 2

*Chair: Arie Bitan, Hadas Saaroni*

### Assessing the standard and perception on visibility degradation of locals and tourists in Hong Kong

*Pak Hong Yue (University of Hong Kong)*

Studies all around the world had shown an increasing trend of visibility degradation in the recent decades. While the level of visibility has proven to be related to the pollutants level in the atmosphere, visibility degradation would be a signal for deteriorating air quality and potential threat to health of the locals. Hong Kong has long been famous for the fabulous vista viewing from the Peak, in year 2010, 28% out of more than 36 million tourists visited the Peak as one of their tourist spots. The blurring of vista caused by visibility degradation may harm their enjoyment and impact the economic activities as well as the chance of getting a return trip of these tourists. In this study, questionnaire, meteorological measurement will be applied to analyse the impact caused by visibility degradation of Hong Kong. The perception of visibility reduction of tourists and locals will be drawn out and examined to outline the factors affecting their choices of perception and their responses to the problems. Also, the study will try to deduce a perceived standard of visibility violation through photographic investigation. The justifications of air quality from tourists and locals are of paramount importance to Hong Kong. This study will be significant to give some insights for the government planner, tourist board and monitoring organization to develop a better regulation and standard for the visibility of Hong Kong while it will be the first time for Hong Kong to have study result of the perception of visibility impairment of both tourists and locals.

### Space-based Technology for Water Security in Urban Area: A Case Study of Jaipur City in India

*Kamal Narain Joshi (Institute of Development Studies)*

Water security involves protection of vulnerable water systems, protection against water related hazards such as floods and droughts, sustainable development of water resources and safeguarding access to water functions and services. It is primarily concerned with human interventions in water systems. The unplanned growth of urban settlements and infrastructure development act as an obstacle in the path of water flow which ultimately hampers the recharge process of ground as well as surface water bodies in the area. This process has resulted in the conversion of water potential areas into water stress areas. Apart, the extensive damage to ecology and environment due to unplanned and un-managed industrial estate pollution, and un-appropriate use of land can also be seen in the urban areas and its periphery causing deterioration of water resources. As the urban areas spread, the natural hydrological features like rivers, nallah and water bodies

come in the heart of the city and people start encroaching upon them. It results in either completely or partly blocking of the system. Another important issue that many of the cities have experienced its expansion at the cost of flood risk, because they are settled in low-lying areas or along the river/nalla. These lands are often parts of some watersheds or catchments of the water bodies or rivers / nallas flowing in urban environs. Hence this process on one hand breaks the hydrological system and on other hand creates a permanent recurrent flood damage zone in the city area. The present paper provides an overview of some of the effects that land use have on water resource quality as well as quantity. The paper investigate the effects of land use change (from rural land use i.e. forest, agriculture, pastoral and culturable wasteland to urban land use) on water resources in Jaipur urban area. The remote sensing and GIS technique methodology have been adopted to map out the changes brought by human activities particularly in the field of haphazard growth of colonies, unscientific land use and encroachments etc. It also suggests alternative strategy or plan to solve the present problem.

### Adapting Australian Cities to Climate Change: Current Urban Research in the Cooperative Research Centre for Water Sensitive Cities

*Nigel Tapper (Monash University)*

Links between population size, urban density, removal of storm water and the urban heat island (UHI) have been long established in the scientific literature. Typical maximum UHIs for large cities are of the same order of magnitude as projected warming in many regions during the 21st century, so a realistic concern is that urban consolidation with no consideration of the climatic effects of such a process will be problematic, particularly in the face of climate change; the so-called urban climate - climate change nexus. The message from this is that a holistic approach needs to be taken to matters involving urban design. In the case of urban consolidation a range of approaches known to reduce urban temperatures (green infrastructure, maintenance of water in the urban environment, smart building materials, etc) must be applied at the same time as the consolidation process. It must also be recognized that not all heat island mitigation approaches are appropriate in all urban environments. Under the auspices of the Cooperative Research Centre for Water Sensitive Cities at Monash University, Melbourne, multi-disciplinary research efforts are currently being devoted to, amongst other things, identifying what heat reduction strategies, particularly those associated with water in the environment, are best applied in a range of Australian climates. Actively pursuing heat reduction strategies in urban environments, where most of the global population live, and where temperatures are already elevated, might provide some "head room" to manage the increased temperatures associated with future climate change.

## C08.04-15 - Weather and Climate Extremes 1

*Chair: Zbigniew Ustrnul*

### Analysis of Individual perception in extreme weather events survey

*Yu-gyung Na (Kyung Hee University), Seung-won Han (Kyung Hee University), Won Do Lee (Kyung Hee University), Chang-Hyeon Joh (Kyung Hee University)*

Climate change is highly important at the individual level in that it has been affecting individual life style through changing of perception (See Cantrill, 1992). Most of the climate change studies of prediction and management were conducted in Korea on the scientific and technological dimensions. Climatic uncertainty has however continuously increased in practice, and human adaptation to extreme weather events has changed in many directions in the context of perceptual changes. We should also consider perceptual change because climate change could lead to different results depending on the different social and cultural context even if it is concerned with the same risk (See Kim et al., 1995). The current research investigated Korean perceptions which are associated with extreme weather events in Korea. This is a preliminary empirical study that concerns social management under the rapid climate change such as extreme weather. Personality and geographical condition play the central role in our current perception study. Major finding is as in the following. First, this study carries out a survey of human cognitive abilities. Human cognitive process can be delayed, distorted and blocked against the input of new information of environmental changes. The analysis of the Korea National Statistical Office's environmental anxiety surveys in 2008 and 2010 shows that higher education group and younger people perceived the climate change more seriously. The level of details of environmental perception also varies with occupation groups. Human cognitive abilities associated with attitudes about responsibilities and adaptation. Second, responsibility and adaptation about extreme weather events are associated with environmental perception and spatial cognition. We surveyed people in Seoul to ask what people know about their neighborhood regarding environmental conditions, whether they accept environmental changes and how they would evaluate potential extreme weather. The survey was done for 4 weeks in January 2012 with questionnaire. The survey differs from conventional survey in the field in the sense that first we study extreme weather events based on the spatial perception and personal cognitive, and second we understand the adaptation behavior in response to the climate change at the individual level. Climate change risk management should take perception and cognition about the climate change into central account. The current study could provide the agent rules as the adaptation patterns reflected by individual perception. In the future research, the data and the results of the current study will be used for Agent-Based Model and Simulation (ABMS) studies. [\*] This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2010-330-B00278).

### Climate change impact assessment in Hungarian landscapes

*Burghard Meyer (Institute Geography Leipzig), Mezösi Gábor (University of Szeged), Peter Csorba (University of Debrecen)*

The assessment of regional climate change (CC) impacts combined with landscape functions sensitivity by predictive modelling of hazardous landscape processes is a fundamental new field of research especially the investigating of the effects of changing weather extremes on meso-regional scale landscape vulnerability. The climatic exposure parameters analysis was made on predicted climate change scenario. On results of the meso-scaled IPCC A1B climate scenario of the models REMO and Aladin of the periods 2021-2050 and 2071-2100 exposure against CC have been analysed on the basis of the original data and regional types of climate change impacts have been calculated by using cluster analysis. The CC information of the climate exposure parameters of REMO and Aladin models are especially analysed for extreme events (days with precipitation higher than 30 mm, heat waves, dry periods, wet periods) and for the daily temperature and precipitation. The exposure of climate change parameters, cluster analysis and an interpretation of main recent and future problematic processes in Hungary by a set of landscape functional indicators are used to explore the regional sensitivity against for soil erosion by water, drought, wind erosion, mass movement and flash floods when analysing the time periods 1961-1990, 2021-2050 and 2071-2100. Basing on sensitivity thresholds risk impact assessments single landscape functional sensitivity indicators are interpreted and an integrative summarizing of the five indicators was made when differentiating the regions in regions facing only few or multiple risks. In central Hungary especially the increasing exposure and sensitivity to droughts risks will be a serious problem when following the REMO scenario. In several regions most of indicators will change the risk from a sensitivity threshold from a tolerable risk to an increased or a very high risk. Policy programmes and/ or the management of adaptive measures to reduce these vulnerability e.g. for the planning of land use systems, agriculture, forestry, water management, soil protection, settlements planning or nature conservation are suitable to develop an early adaptation reaction of society.

## C08.04-16 - Weather and Climate Extremes 2

*Chair: Zbigniew Ustrnul*

### The important role of South-Pacific Convergence Zone in the El-Nino – Southern Oscillation Development

*Vladimir Platonov (Moscow University)*

The South-Pacific Convergence Zone (SPCZ) is the chief part of atmospheric circulation in tropical Pacific, and undergoes unprecedented displacements during the El-Nino - Southern Oscillation (ENSO) cycle. The SPCZ is shifting from the center of Pacific during the warm phase of ENSO to the eastern Australian coast during the cold phase. The areas of active tropical cyclogenesis genetically coupled with this zone undergo respective displacements. At the SPCZ converge two macro-scale currents of an opposite directions: easterly trade winds and equatorial westerly winds. This macro-scale convergence shift strongly to the east and lead to formation at the center of Pacific an extensive band of ascending movements during the warm ENSO phase (El-Nino) in the SPCZ system. Over Indonesia and Northern Australia, on the contrary, emerges the macro-scale divergence zone. Therefore, the water vapor is carrying, on the one hand, to Pacific, towards South America and, on the other hand, to Indian, towards Eastern Africa. This activation of SPCZ in the central Pacific is caused by intensive development of tropical cyclogenesis, involving rich tropical rains in uncharacteristic region. The well-known disastrous fires and droughts in Indonesia and Northern Australia during El-Nino are apparently the consequence of macro-scale divergence zone, mentioned above. During the cold ENSO Phase (La-Nina) the macro-scale atmospheric tropic circulation pattern changes considerably. The water vapor transport in these conditions to Indonesia and Northern Australia region as at trade winds circulation system from Pacific, so and at equatorial westerly winds system from Indian. This situation leads to generation of powerful South-Pacific Convergence Zone. This SPCZ during La-Nina is at most shifted to northeastern Australian coast at the expense of vigorous Pacific trade winds. This displacement of SPCZ to the Australian summer monsoon zone is namely one of reasons of abrupt activity of tropical cyclogenesis in this monsoon region. This activity is corresponding with a rich precipitation, storm winds and frequently dramatic floods. The striking example of these events is the most famous recent La-Nina 2010/11 accompanied with the destructive flood and, particularly, with the most vigorous tropical cyclone in Australian history, "Yasi".

### Long-term trend of extreme precipitation in Southeast Asia

*Jun Matsumoto (Tokyo University), Nobuhiko Endo (JAMSTEC/RIGC), Hoang Ahn Nguyen-Thi (Tokyo University), Tun Lwin (Myanmar Climate Change Watch)*

Trends in precipitation extremes using daily precipitation data at more than 200 stations in the whole Southeast Asian countries are investigated for the period from the 1950s to the 2000s. Number of wet days, defined by a day with at least 1 mm of precipitation, tends to decrease over these countries, while average precipitation intensity of wet days shows an increasing trend. Heavy precipitation indices, which are defined by precipitation amount and percentile, demonstrate that the number of stations with significant upward trend is larger than that with significant downward trend. Heavy precipitation increases in southern Vietnam, northern part of Myanmar, and the Visayas and Luzon Islands in the Philippines, while it decreases in northern Vietnam. In Vietnam, the contribution of heavy precipitation caused by typhoons is examined, and found out that increasing trend of heavy precipitation in Central Vietnam is, at least partially caused by the increase of typhoon related heavy precipitation. Annual maximum number of consecutive dry days decreases in the region where winter monsoon precipitation dominates.

### Extreme precipitation patterns in Wisconsin, USA during 1950-2006

*Woonsup Choi (University of Wisconsin-Milwaukee)*

The objective of the research is to examine temporal and spatial patterns of extreme precipitation in the State of Wisconsin, USA during 1950-2006. Specific research questions are (1) Which extreme precipitation indicators are increasing or decreasing and (2) To what extent are the spatial patterns of extreme precipitation changing. The data used were obtained from researchers at the University of Wisconsin Madison who produced them by interpolating weather stations data across the state to a grid mesh with a spatial resolution of 8 km. For extreme precipitation indicators, I calculated 99th, 95th, 90th, 85th, and 80th percentiles of daily total precipitation in a year, number of days per year with daily precipitation exceeding 10 mm, 20 mm, and 50 mm, and the annual frequency of 1-year duration, 1-year return period events. I conducted the Mann-Kendall test for trend and calculated Sen's slope for the indicators. In addition, I calculated decadal means of the indicators and their Moran's I values for spatial autocorrelation. The results are summarized as follows: (1) Significant trends are generally found in the western and southern parts of the state; (2) The western and southeastern parts of the state tend to show steep slopes of extreme precipitation indicators; (3) Spatial autocorrelation is the lowest during the 1980s, but is significant for all indicators across the time period; and (4) Some indicators are noticeably different between the upwind and downwind sides of the metropolitan Milwaukee area. Overall, the results are in line with national-scale assessments, while revealing more details. Striking differences were found in many indicators between the 1980s and the 1990s. The trend during the 1990s deviates most from the national trend and requires further investigation.

### **Extreme atmospheric precipitation causing floods in the Polish Carpathians and their synoptic determinants**

*Agnieszka Wypych (Jagiellonian University), Zbigniew Ustrnul (University Krakow)*

Floods and elevated water levels are the most important extreme weather events in Central Europe in terms of frequency and economic losses. The two basic flood types are snowmelt floods and continuous rainfall floods. The largest floods in Poland and across Central Europe are caused by continuous rainfall. The purpose of the paper is to evaluate regional extreme precipitation events in the Polish Carpathian Mountains taking place over the course of the last several decades as well as to determine the circulation basis for these events. Given that most extreme precipitation events cause floods and elevated water levels, one purpose of the paper is to describe the circulation determinants of floods and elevated water levels. The Carpathian region in Poland is the primary source area of dangerous floods in Poland. Extreme precipitation values were identified based on daily atmospheric precipitation totals measured at 14 weather stations in the Polish Carpathians between 1951 and 2010. The analysis looks at mean daily areal precipitation totals in excess of 100 mm per day as well as 50 mm over the course of two or three days of continuous precipitation, which causes flooding in the Carpathians. Both types of data sets were analyzed independently based on a variety of historical materials, some also covering the 1st part of the 21st century. The study analyzes long-term variability in flooding patterns. All extreme precipitation data were analyzed from a synoptic perspective, with special attention being paid to pressure patterns over Central Europe. Several circulation calendars were also consulted. The second part of the paper discussed in detail the meteorological causes of extreme flooding events of July 1997, July 2001, and May 2010.



# C08.05

# Coastal Systems



## C08.05-01 - Coastal Systems - Beaches and dunes

*Chair: Norbert P. Psuty, Edward Anthony*

### Mid-late Holocene coastal forcing variability as a possible cause of alternating drift- and swash-aligned gravel beach ridges in the Atlantic province of Tierra del Fuego, Argentina

*Julian Orford (Queen's University), Gustavo Bujalesky (CONICET), Alejandro Montes (CONICET)*

The nature of drift-aligned and swash-aligned coastal accumulation forms have been considered for some decades, as being a product of changing longshore sediment supply: with sediment-rich supply forcing drift-aligned ridges and sediment-poor supply forcing swash-aligned ridges. In recent work on gravel dominated barriers around the mid-latitude North Atlantic (Orford et al, 1996, 2002, and 2007) the paraglacial reworking of limited point sources of glacialic gravel sediments has been shown to account for the significant realisation over time of swash-aligned barriers, compared to decreasing presence of drift-aligned barriers. This is linked to diminishing sediment supply with, as a consequence, increasing cannibalisation of beach ridge sections, linking the transition from drift to swash-alignment. The questions remain as to i) whether this barrier transition is dominated by drift to swash status and ii) whether it is always a function of sediment supply? Is it feasible for forcing conditions (wave climate) to account for this transition, and thereby for a reverse transition to occur? These two questions have been considered in the context of a substantial late Holocene, mixed drift and swash aligned beach ridge series in the macro-tidal San Sebastian Bay, eastern Tierra del Fuego (Isla and Bujalesky, 2000). We consider through a 14C dated ridge sequence the controlling factors by which a prograded, interdigitated drift and swash-aligned gravel beach ridge series (still operating at present) may have been generated. Given the constancy of gravel-rich sediment supply (?), the possibilities of millennium periodic shifts in the interaction between Southern Hemisphere westerly winds (offshore) and incident northeasterly waves is considered as a possible generator of alternation of these characteristic coastal forms.

### Short-term evolution of a reflective beach sector in front of a coastal lagoon (Southwest Portuguese coast)

*Cristina Gama (Universidade de Évora), Luís Albardeiro (Universidade de Évora), José Jacob (Universidade do Algarve), Isabel Pinheiro (Administração da Região Hidrográfica do Alentejo)*

The subaerial beach act as detrital barriers in the opening and closing of lagoons located in sandy coastal areas. The study of beach morphodynamics, considering the

evolution of the beachface and the berm, in these cases is critical to coastal management. The studied area located in an embayed sandy coastline at the Portuguese Southwest Atlantic Coast, is a 308m long subaerial, coarse to very coarse, sandy beach adjacent to the Melides lagoon entrance. In order to characterize the morphodynamics of the study area under the effects of storms (pre and post-storm) and tides (spring and neap tides) during a period of one year (April 2010 to April 2011), 26 field surveys were conducted. A survey grid with an alongshore length of 308m and a width of 14-40m defined between the lower limit of the beachface and the backshore limit (entrance of the coastal lagoon or frontal dune) was used. We performed 12 cross-shore profiles 40m apart from each other. The alongshore profiles describes the main topographic variations (e.g. top of the beachface, berms elevation, beach cusps definition). Horizontal and vertical positioning was provided by Real-Time Kinematics (RTK) GPS. The results obtained allowed to develop high resolution Digital Elevation Models (DEM) using the ArcGIS software. DEM models were used to describe beach morphological changes. The nearshore wave characteristics were described by the SWAN wave model considering as boundary conditions the wave data recorded at the Sines wave rider buoy. The run-up levels were calculated using the wave parameters and the beachface slope (0.12 to 0.18). During the study period were documented two episodes of opening and closing of the Melides lagoon due to storms effect, and one artificial opening episode. A conceptual model for the reconstruction of the sandy beach detrital barrier that controls the opening and closing of the lagoon was performed. This study shows that the evolution of the sandy beach detrital barrier is characterized by a cyclical behaviour of recovery marked by the occurrence of storms. The developed conceptual model is characterized by rapid sediment transport between the submarine beach and the beachface. The incidence of more energetic storms ( $H_s=5m$ ) induces the destruction of the sandy beach detrital barrier leaving open the Melides lagoon to the Atlantic Ocean. Due to storms the beach profile is destroyed and about  $1.9 \times 10^3 m^3$  of sand is remobilized above -0.5m (MSL). Beach recovers much of its original morphology and sediment volume 10-12 days after the storm. At the stage of equilibrium, the sandy beach detrital barrier presents a wide berm (35 m), a berm with an elevation close to 5m (MSL) and a reflective beachface. This study was funded by the Administração da Região Hidrográfica do Alentejo (ARH). Bathymetric source was provided by GEBCO\_08Grid and the wave data by the Instituto Hidrográfico (Portugal) web site.

### Morphodynamics of two microtidal contrasting beaches with intertidal bar morphology: Lido di Dante, Northern Adriatic Sea

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The morphology and hydrodynamics of two contrasting (protected and natural) microtidal beaches of Lido di Dante, Northern Italy, were synchronously surveyed during medium to low-wave energy conditions in order to assess cross-shore and longshore intertidal bar mobility and to examine the influence of Low Crested Structures (LCS) and groin system on wave transmission, and consequently, on the morphodynamics of the protected beach relative to the morphodynamics of the natural beach. Lido di Dante is a small seaside resort in the Northern Adriatic Sea, 7 km from the town of Ravenna. The beach features two different sectors: the Northern one was subjected to erosion and therefore it has been protected by groins, nourishment and a semi-submerged breakwater (LCS); the Southern sector, in a natural state, is also under erosion and is backed by a dune system. A field experiment was undertaken during five days in May 2008 (10 tidal cycles, starting at Spring tide conditions), and involved the monitoring of the morphological changes on both sites during each low tide for the protected beach and each day-light low tide for the natural site (five profiles spaced every 10 m in both beaches). The hydrodynamic measurements for the protected beach were made from two instrument deployments along the central transect using self-recording equipment. A similar deployment was realised at the natural beach and a fifth currentmeter was installed outside the protected area (between the two beaches) with similar deployment characteristics as the first ones. During the first three tides, the offshore wave conditions were relatively more energetic, with  $H_s \sim 0.5$  m while low wave conditions with  $H_s < 0.3$  m prevailed during the rest of the campaign. The structures' protecting the northern site seems to play a significant role in wave energy dissipation in any wave-energy condition and the waves lost up to 70 % of their energy during the propagation over the LCS. The upper swash bar morphodynamics on both beaches exhibited an important dependency on tide-modulated swash processes and the variation in the rate of morphological response between the both sites can probably be attributed to the role played by the upper beach gradient in controlling bar migration. However, the lower swash bar on the natural beach highlights, on one hand, the landward swash bar migration under slack water conditions in a microtidal barred beach. On other hand, it also showed a longshore migration processes related to the significant alongshore component which was absent in the protected beach. These facts elucidate the difficulty to relate intertidal bar morphologies on the protected and natural beaches with a single hydrodynamic process and/or mechanism, and the complex relationship between tide-wave processes and wave attenuation caused by coastal protection structures. Powered by

### The morphodynamics of an embayed beach-dune system, Essaouira, Morocco: Implications for reasoned management.

*Abdel Elmimouni (Université Marrakech), Edward Anthony (Aix-Marseille Univ), Lahcen Daoudi (Université Cadi Ayyad)*

Essaouira beach borders a renowned and densely populated bay on the Atlantic coast of Morocco characterised by a complex and fragile dune environment that is presently in a state of geomorphic equilibrium. The processes prevailing in the bay, under the triple command of a constantly active wind regime, waves from the Atlantic, and to a lesser extent, tides, vary considerably in time and space, and could be durably modified in the future under growing human pressures and unreasonable planning. In order to understand the morphodynamics of this beach-dune system and of the nearshore zone, several field experiments, involving topographic, hydrodynamic and grain-size monitoring, were carried out. The experiments were aimed at highlighting seasonal, intra-annual and monthly patterns of evolution of the beach, especially under the influence of a nearby wadi, the Ksob, which is the main sediment purveyor of the beach. An additional objective of the study was also to monitor variations in the beach sediment budget following a major wadi flooding event. The hydrodynamic measurements involved wave and current parameters and were analysed in the light of the marked changes in wind intensity affecting the area. The currents flow dominantly alongshore to the south and southwest north and south of the bay, and exhibit bi-directional flow along the bay beach under both calm and high-energy conditions. The latter bay currents are more pronounced during high-energy conditions. The topographic data highlight longshore and cross-shore variations in beach morphology and their spatio-temporal changes. Essaouira bay comprises a complex beach-dune sediment cell composed of several micro-cells. The Ksob plays an important role in the dynamics of these cells. The dominant winds from the north transport significant quantities of sand to the south in the form of barchanes that are trapped in the estuary of the Ksob. During river flood events, these sands, as well as fresh inputs brought in by the wadi, are injected in the nearshore zone of Essaouira bay, and are subsequently redistributed onshore, and along the beach by tidal currents and currents generated by refracted swell. A planned resort construction in the Ksob estuary as well as the projected new Zerrar dam 30 km upstream of the bay could result in serious disequilibrium of the fragile sedimentary system of the bay. Keywords: beach-dune morphodynamics, hydrodynamics, erosion, sediment supply, wadi, river flood, coastal resort, coastal management, Essaouira bay, Morocco.

## C08.05-02 - Coastal Systems - Coastal erosion and management 1

*Chair: Hervé Regnaud, Edward Anthony*

### Spatial high resolution methodology for erosion risk assessment in a short coastal stretch

*José Pinho (University of Minho), Helena Granja (University of Minho)*

Erosion in low-lying sandy beaches acquires a special importance in the context of urban planning once this kind of beaches constitute the first barrier (buffer) against a dynamic ocean with a varying water level that in most cases constitute a threat to people and infrastructures. Different erosion risk assessment methodologies have been applied around the world, in an attempt to classify the coastal areas according to their response patterns to erosion and to evaluate eventual damages to the natural and constructed coastal heritage. In this work, field data and model outputs were integrated, processed and analyzed in a GIS in order to assess the vulnerability to erosion and to produce the associated risk maps using a multi-criteria assessment approach. Followed methodology was developed based on morphological, hydrodynamic, meteorological and other indicators that were quantified using data and results obtained from a short term monitoring program. It was based on previously developed works, but specifically adapted to the local characteristics of a short coastal stretch on the NW coastal zone of Portugal. Comparing this methodology to the previously developed ones, there are four main distinguishing aspects to be considered: (i) a spatial high resolution data base was used to compute vulnerability and impact indicators (ii) the coastal stretch was segmented for quantification of (vulnerability, impact and risk) indexes, accordingly to specific coastal types, obtained by a judicious delimitation based on the beach-dunes-urban front main characteristics, next to human occupation and administrative boundaries; (iii) a new set of vulnerability variables is proposed; and (iv) erosion impact variables resulted from a detailed quantification of the existing building and beach (not building) areas extracted from aerial photos. In a first phase, a base line was defined, delimiting areas that were strongly occupied from those that have capabilities to adapt to the effects of natural phenomena produced mainly by winds and waves. The stretch was divided into elementary segments considering typology, administrative boundaries and human occupation. For each segment a set of vulnerability indicators was quantified: coastal segment average elevation, width and slope, a volume rate computed using two DEMs obtained at different dates, a wave energy related indicator computed according to a wave propagation model, and the percentage of vegetated area. Buildings area in a buffer and the area occupied by sandy beaches in each segment were considered as impact indicators. The erosion risk index was finally computed based on two partial indexes: the vulnerability index and the impact index. Samples of the obtained erosion risk maps will be presented as well as samples of vulnerability and impact indicators maps.

These maps constitute a valuable database for coastal zone management and urban planning policies definition within the studied territory.

### Impact of extreme storm events and resilience of gravel barriers: example of Sillon de Talbert (Brittany, France)

*Pierre Stéphan (Laboratoire de Géographie Physique - CNRS)*

This research concerns morphological impacts caused by extreme storm events on the evolution of Sillon de Talbert, a wash-aligned gravel spit located on the macro-tidal coast of the northern Brittany (France). The role played by overwash dynamic on gravel barrier rollover processes is analysed in two timescales. i) On a decadal timescale, the mobility of the barrier was studied by a set of aerial photographs taken from 1930 to 2002, associated with DGPS topographic surveys from 2002 to 2011. The photographs were numerised with high resolution to obtain a pixel size of 0.5 m. They were then rectified with ArcGIS® software based on the 2002 orthophoto mosaic by selecting a series of well-distributed control points and integrated into a geographic information system (GIS). The seaward limit of crest vegetation and the landward base of the barriers were used as shoreline markers. Errors related to image rectification and shoreline digitizing are always less than  $\pm 1$  m. Oceanographic data set was also analysed between 1979 and 2011. Predicted tide data were from SHOM tide model and surge data were obtained from Roscoff tide gauge. Wave data were obtained from Météo-France, CETMEF and LNHE-EDF wave data base on TOMAWAC running model. Calculation of setup and swash runup was undertaken using H.F. Stockdon et al. (2006) formula. Results show high mean migration rates, greater than 1 m between 1930 and 2011. In detail, the retreat of the barrier is characterised by a succession of acceleration and deceleration phases, highly controlled by the frequency and the intensity of a few number of overwash events. ii) On an annual timescale, morphological evolution of Sillon de Talbert was studied by a DGPS survey undertaken annually between 2002 to 2011. Shoreline retreat speed, crest height variations, and sediment volume changes were calculated using Digital Elevation Models. The role played by overwash dynamic was also studied by analysing oceanographic data set. In March 2008, the high spring tide associated to energetic stormy wave conditions (storm Johanna) caused the flooding of the spit which migrated 10 m landward. The volume of sediment transported landward during the storm was estimated at 100,000 m<sup>3</sup> (10% of the total volume of the barrier). This sluicing overwash phase occurred after a period of stability related to a low morphogenic activity between 2002 and 2007. After the storm Johanna, a crestal overtopping phase corresponding to the reconstruction of the crest is measured between March 2008 and September 2011. The great resilience of the barrier to an extreme event is illustrated. This results show different pluri-annual phases of morphogenic activity on the Sillon de Talbert, also recognised on other coastal areas along the Brittany coastline. However, the morphological response of sandy barriers and dune systems to March 2008 extreme storm events is slower and gravel barriers appears to be more resilient.

### Influence of Sand Bypassing Operations on Coastal Beaches

*Charles Lemckert (Griffith University), Steven Brayshaw (Griffith University), Joe Lee (Griffith University)*

Sand bypassing operations are engineered solutions for mimicking longshore transport across trained river entrances in coastal environments. To help understand how these operations influence beaches in the up-coast direction, a study was undertaken to investigate how waves, sand pumping and offshore nourishment affected the beach width of five Gold Coast beaches, Queensland, Australia, which are impacted by the Tweed River Entrance Sand Bypassing Project (TRESBP). When first constructed in the early 1960s, the training walls of the Tweed River significantly impeded the natural northerly (up-coast) longshore transport of sand. In 2001, a sand bypassing system was completed that pumped sand across the Tweed River mouth to five different up-coast outlets, to mimic the natural net longshore transport rate of 500 000m<sup>3</sup>/year. In the 10 years since its inception, the width of the sediment receiving beaches has come under great public scrutiny. Initially, an excess volume of sand was pumped and expected adverse weather patterns (that would have dispersed the sand) did not occur. Beach widths were considered to be 'too' wide, limiting the amenity of southern Gold Coast beaches and causing significant political unrest within local communities, even though increased beach width offered significant protection from possible storm damage. This study used beach width monitoring, offshore wave buoy, sand pumping and offshore nourishment quantity data to investigate whether a simple empirical relationship could be found to improve the management operations of TRESBP and the state of the beaches (i.e. when and how much to pump). Using the Simulating WAVes Nearshore (SWAN) model, wave properties near the shore were predicted and then the Coastal Engineering Manual's 'CERC' formula to estimate approximate longshore sediment transport rates (LST) was used. This calculation, along with sand pumping rates and offshore nourishment from dredging the Tweed River Mouth, were then compared to the changes in beach width from September 2002 to December 2010. Analysis of the data revealed that the changes in beach width appeared to be more influenced by cross shore sediment transport from offshore stores, built up from dredging operations and sand pumping, than by LST. However, without the TRESBP, history shows that the beaches will significantly erode. Overall, it was found that the highly complex nature of the coastal environment made it nearly impossible to model/predict beach widths, but it is clear that the TRESBP is doing its job to maintain a static type nature of the coastal region, albeit of questionable public acceptance. It is evident that greater public education is required to keep them abreast of what coastal processes are and the strategies managers are using to maintain a useful system.

### Global Change and storm impacts on anthropogenic coastal features: The case study of the dune of Saint-Trojan (Isle of Oléron, France).

*Hervé Regnaud (Université de Rennes), Jonathan Musereau*

Most often, studies of coastal morphodynamics assume that environments are 'natural' and that natural equilibriums are modified by human interventions. In this paper, we study a coastal site which has been built by human action during the last centuries and which is, today, exposed to natural forcings. This site, which is called Saint-Trojan, is located along the most exposed coast of Oléron island, in the central part of the French Atlantic façade. During the 19th and a part of the 20th centuries, local inhabitants living close to the coastal dune developed several devices to stop sands invading their houses. They built huge sand fences to stabilize the dunes and planted a pine forest. As the sediment input was large these coastal works lead to a seaward progression of the coastline, of more than 2 kilometers. Nowadays, an opposite behavior is observed. The dune undergoes strong erosion and its retreat reaches unexpected rates of more than 10 meters per year. In some places, the ocean has already invaded the pine forest, for instance during a recent storm named Xynthia (February 2010). The reasons of the reversal of dynamics are many: sand supply has chronically decreased, erosive storms appear to be actually more frequent and side effects of tourism are also mentioned. We reconstruct the history of the coastal dune with a set of local sources (cartographies, archive of climate records, local evidences). The method is inspired by former works dealing with the concept of anthroposystems and anthropogenic landforms. Results incite us to discuss about the feature of such an environment compared with natural ones. We point out that the previous anthropogenic building of the dune of Saint-Trojan makes it retroactively more sensitive to storm and large wave events, and thus more vulnerable to Climate Change than the other parts of the oleronese coastline. We incite coastal managers to integrate such mechanisms in their prospective works about risk due to storms and surges. We also developed a statistical method to sort erosive storms from ordinary ones in order to anticipate the incoming crisis. It is based on a Storm Index mixing wind, wave and tide parameters (data from atmospheric and oceanographic models) which are crossed with field morphological data (DEM).

## C08.05-03 - Coastal Systems - Coastal erosion and management 2

*Chair: Hervé Regnauld, Edward Anthony*

### Sediment characteristics in Barito River Delta, Southern Kalimantan, Indonesia

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Barito River Delta is a delta in the mouth of Barito River. Barito River Delta has the width of shoreline more than 40 km and the length more than 80 km (Djuwansah, 1985). The boundaries of Barito River Delta are Barito River as the eastern boundary, Kapuas Murung River as the western boundary, Pulau Petak River as the northern boundary and Java Sea as the southern boundary (Bassoullet, et al., 1986). Barito River Delta is characterized by swampy land, mainly for rice cultivation. Two canals (Tamban, Serapat) connect Barito River and Kapuas Murung River. Talaran Canal connects Barito River and Pulau Petak River (Bassoullet, et al., 1986). The canals are used as irrigation channel to agriculture area. Land forest within Barito Watershed decreases every year. During the periods of 2000-2009, the area of forests in Barito watershed decreases approximately 1,047,163.82 hectre or 16.38 % (Ministry of Natural Environment, 2010). Land degradation in Barito Watershed is approximately 0.1 hectre/year (Moehansyah, 2006). Human activities in watershed increase the sediment yield to delta area. The measurement of sediment in subaerial of delta uses hand bore. The location of boring is in the upper of subaerial delta, in the lower of subaerial delta, in the central of delta and a long of river. Characteristic analysis of sediment consists of color of sediment, grain size, type of peat and mottling. To determine color of sediment uses munsell soil book. Analysis of grain size of sediment uses pipette method. To determine the type of peat uses bulk density analysis and color of peat. The research shows that the color of sediment in the eastern indicates the reduction color, whereas soil profiles in the western indicates the oxidation color. Mottling is found in 0-1 meter in the central of delta. Mottling is found in 0-2m in a long of river. Oxidation color is dominant in the surrounding of river because of the high of tide fluctuation. Tide fluctuation has impact to aeration condition in the soil. Reduction condition is found in the central of delta because the water cannot flow quickly. Clay has thickness about 1-2 meters in the central of delta and more than 2 meter in a long of river. Fine sand is found in 1.5-2 meter in the central of delta, and more than 2 meter near of river. Clay is thicker in a long of river than in the central of delta. The type of peat in the central of delta is hemist and saprist. Peat is thicker in a long of river than the central of delta. Agriculture activity decreases the peat thickness in the central of delta. Keyword: sediment characteristic, Barito River Delta

### Coastal dune management along a human-altered shoreline, the case of Dunkirk Port, Northern France

*Antoine Tresca (Université du Littoral Côte d'Opale), Marie-Hélène Ruz (Université du Littoral Côte d'Opale), Pascal Gregoire (Dunkirk Port)*

Dunkirk Port development since the end of the 1950s has resulted in major shoreline changes. Port infrastructures were expanded on land reclaimed from the sea, resulting in the development of a 12 km long shoreline, located between the two main seaport access limited by 2 jetties. This artificial shoreline can be divided in two parts. A western part, where a beach is backed by naturally developing coastal dunes, and an eastern part consisting of a 6 km long asphalt dike overtopped in places by low elevated aeolian dunes. In perspective of its sustainable development and action plan, Dunkirk Port is committed to preserve and manage the diversity of landscapes, habitats and species. In this context, the aim of this study was to promote foredune building in the naturally developing dunes area, and to test windbreaks in order to favour wind blown sand accumulation on the seaward side of the dike, which could help to enhance coastal dune development. Sixteen structures have been installed on the whole site, consisting of sand fences (brushwoods, wooden slats & synthetic fabrics), having a height of 1.2 m and a porosity of 50%. Six of them were first installed in the naturally developing dunes area in July 2010. One of them was placed in a 30 m wide dune breach, while 5 others were erected at the dune foot, perpendicular to dominant longshore winds. Then, in February 2011, ten experimental structures were positioned on the dike at different locations: dike toe, dike windward and leeward slopes. As it was impossible to make holes in the coated surface, chestnut posts inserted in concrete blocks were used to fix them in the ground. In order to evaluate the amount of sand captured in each of the 16 structures, topographic surveys were carried out every month using a differential global positioning system. Digital Elevation Models were generated and volumes have been calculated. First results show that the location of the structures is primordial to trap sand. In the naturally developing dunes area, the sand fences installed in the breach, well above maximum water levels, were rapidly filled, while structures erected at the dune toe were episodically reached by waves during storm surges. The most efficient windbreaks were brushwoods and wooden slats, while synthetic fabrics trapped less sand during the same period. Fetch length seems to play a major rule in sand fences filling. The volume of sand trapped by brushwoods erected in an area with a fetch length of 400 m was four times the volume trapped in brushwoods installed in an area of very limited fetch. On the dike, the most efficient fences were those installed at the dike toe, next to the upper beach. Structures erected higher on the dike trapped little sand, excepted a cross-shaped structure, where a nebkha of more than 1 m high is developing. Monitoring is still ongoing, the next step being to define the best solution to promote dune formation.

### **Managing sediment budget: recycling sand at the Sandy Hook Unit, Gateway National Recreation Area, NJ, USA**

*Norbert P. Psuty (Rutgers University), Andrea Spahn (Rutgers University), William Hudacek (Rutgers University), Monica Patel (Rutgers University)*

Long-term coastal monitoring in the National Park at Sandy Hook, New Jersey, has established the dimensions of sediment deficits and surpluses along portions of the dynamic Sandy Hook spit. More than two decades of intensive surveying and modeling of change have identified the alongshore variations of sediment budgets and topographical evolution on the ocean shoreline. Sandy Hook is composed of three facets (southern, central, and northern), each with different exposures to the incident wave energy. Early surveys documented annual losses in the range of 120,000 m<sup>3</sup> in the southern facet gradually diminishing to a positive budget at the northern facet. Beach nourishment episodes in communities updrift of the Park have altered the sediment budget and have reduced the annual losses to values in the range of 20,000 - 40,000 m<sup>3</sup>, and occasionally to small sediment surpluses. Construction and comparison of digital elevation models from the RTK-GPS surveys have depicted the geotemporal variations of coastal evolution and have focused on the more recent sediment budget scenarios. Whereas the southern facet has had periods of erosion and near stability, the central facet is either stable or accumulating. Surveys over the past decade have recorded an accumulative trend of 15,000 m<sup>3</sup> per year and a shoreline displacement of about 10 m annually. In addition, there are large pulses of sediment passing through in the form of sand waves that migrate alongshore. Each of these nearshore sand masses is estimated to have 40,000 - 80,000 m<sup>3</sup> of sediment. In a unique approach to shoreline management, the NPS has installed a buried pipeline and has initiated a program of backpassing from the slightly accumulative central facet to the eroding southern facet. The project involves a specially-constructed eductor apparatus that will fluidize the sediment in the beach and nearshore zone before moving a sand slurry to a mixing vat and then pumping a slurry approximately 6 km to beach disposal sites. This program has been used for the first time in the winter period of 2011-2012. The goal is to backpass, or re-cycle, up to 30,000 m<sup>3</sup> and attain a balanced annual sediment budget in the southern facet, thereby working at a scale of change that is similar to the natural system and conducive to the management of the natural and cultural resources in the areas of sediment excavation and sediment placement.

### **Influence on surface material on coastal erosion in Galle district in the Southern coast of Sri Lanka**

*Ashvin Wickramasooriya (University of Sri Lanka)*

Coastal erosion is one significant issue can be observed in the Southern coast of Sri Lanka. According to the coastline changes calculated by the coast Conservation Department of Sri Lanka, there are places within the study area which are eroded more

than 30 to 50 meters within last two to three decades. Many natural influences as well as human activities are responsible for accelerate such significant coastal erosion in this region. This research focused on clarifying the relationship between available surface materials on coastal erosion trends in the study area. The entire coastal belt considered in this study is about 62 km. Other natural influences such as oceanography conditions, wave energy, coastal accretion and human influences changes for long distance along the coast. Thus, to observe the actual influence of surface materials on coastal erosion, the study area has divided into 5 km segments. A detailed field work has carried out to demarcate available surface materials in each segment. The nature of the surface material varies from place to place. It has been identified that hard rocks, moderately weathered rocks, weathered overburden, Lateritic caps, Beach Rock (Sandstone), Limestone, and coastal deposits are the main surface materials identified along the Southern coast of Sri Lanka from Beruwala to Galle. Physical and chemical characteristics of these materials vary and therefore, surface material has identified as one of the factors that determine the rate of coastal erosion. Few physical and chemical parameters such as strength of materials, fracture intensity, porosity and mineralogy were considered to initiate the coastal erosion sensitivity index (CESI) with respect to surface materials. These four factors do not contribute to coastal erosion in similar manner. Therefore, weightage values (W) for each factor have been introduced based on individual factor's contribution to coastal erosion using Multi Criteria Decision Analysis Method. Also contribution to coastal erosion varies with different conditions within a same factor. Therefore, different ranks (R) have been introduced for each factor using pair wise comparison method. Coastal Erosion Sensitivity Index (CESI) has calculated considering both weightage values assigned for each factor and ranks within factors. Finally, coastal erosion sensitivity map of the study area was prepared using overlay analysis method used in Geographical Information Systems. When compared this map with the coastal erosion trend map introduced by Coast Conservation Department Sri Lanka, it can be conclude that nearly 80% to 85% of two maps show a significant correlation. Highest and lowest coastal erosion sensitive areas marked in the produced map are within the maximum and minimum coastal erosion changes for last thirty years respectively. Therefore, there is a relationship between surface materials along the coastal belt of the study area and trend of the coastal erosion.



## C08.05-04 - Coastal Systems - Coastal erosion and management 3

*Chair: Hervé Regnauld, Edward Anthony*

### **Marine Protected Area Policy to Support Local Marine Resources Conservation in Indonesia (A Case Study: Boano Island – Moluccas)**

*Nandi MSc (University of Leipzig), Jurgen Heinrich (University of Leipzig), Anang Widhi Nirwansyah (Gadjah Mada University)*

Background Indonesia is an archipelagic country which more than 17,500 islands and 5.8 million km square ocean territories. Autonomy law in UU No. 32 2004 has given local government autonomous authority including sustainable development of marine policy. The concept was formulated on basis of consideration of the interests involving the utilization of marine resources. Measureable reference in formulating national policy has provide marine protected area (Kawasan Konservasi Laut Daerah) based on PP No. 60 in 2007 (Government Regulations) about Marine Protection Area which accommodate all stakeholders need and conserving spirit for present and future progress. The target of marine conservation areas by 2010 covering 10 million hectares has been exceeded, reaching 13.95 million hectares and also targeting 20 million hectares in 2020. Some of the conservation area is a direct initiative of the ministry, while other region is an initiative of local governments. Boano Island as one of potential marine area in Moluccas has initiated to be conserved based on the indigenous resources of fishes, corals, mangroves, and cultural existences. Observation, measurement, and comprehensive analysis focusing on the natural condition and social economic variables as feasibility study shows the potential marine resources. Result Boano Island, District of West Seram district is one of the divisions based on Law No. 40 of 2003, which originally was part of the territory of Central Maluku District which later became Central Maluku District, District of West Seram and East Seram regency. Geographically, West Seram district is an archipelagic area, consists of 62 islands including 52 uninhabited islands. Most of its marine territory provides ample room for 124 species of fishes, 5,451.25 hectares of mangroves, and healthy condition of corals can provide revenue to the local economy, which also support the program based on local beliefs system. Conclusion: Integrating national and local policy to conserving marine resources area in Indonesia has been conducted in Marine Protected Area. Initiation from local government is accommodate in terms of autonomy issues and sustainable development that covering all stakeholders. Boano Island as one of Marine Protected Area project will be develop for eco-tourism and research center for marine ecology, considering indigenous resources and social economic condition. Strong cooperation between government, academicians, and industry is needed to support the natural diversity and future sustainability Keywords: Marine Protected Area, Policy, Boano Island

### **Sediment Budget at Plumb Beach, New York, USA: Vectors of Change and Impacts**

*Norbert P. Psuty (Rutgers University), Andrea Spahn (Rutgers University), Tanya Silveira (Rutgers University)*

Plumb Beach is at the eastern end of the Coney Island barrier island, part of the ocean shoreline of New York City. Plumb Beach extends for about 1500 m and is bordered to the east by Rockaway Inlet. As the neighboring updrift barrier island migrated westward, Plumb Beach became more and more isolated from the alongshore transport system. In the early twentieth century, a navigation channel separated Plumb Beach from any coastwise sediment transport and resulted in persistent erosion and inland displacement of the diminishing beach-dune topography of the barrier island remnant. In the 1930s, a major highway was constructed on fill over the remnants of Plumb Beach barrier. Continuing erosion is currently mobilizing and re-distributing the emplaced sediment, narrowing the buffer adjacent to the highway, and altering the local aquatic habitats. Studies are currently underway to quantify the vectors of change and to evaluate opportunities to augment and manage sediment supplies to reduce the impacts of sediment loss as well as limit the negative impacts of sediment accumulations in threatened habitats. Early attempts at shoreline stabilization consisted of a variety of riprap barriers, dumping of available sediment, and installation of some rudimentary offshore and shore parallel structures. In 1992, approximately 72,000 m<sup>3</sup> of sediment were placed along 520 m of the central Plumb Beach shoreline, displacing the water line about 55 m seaward. By 2008, most of that emplaced sediment was eroded from its original emplacement. Two major storms, November 2009 and March 2010, continued to alter the Plumb Beach morphology. Maximum inland displacement of the erosional scarp in the foredune was 5.6 m in the earlier storm and 6.4 m in the latter storm. Whereas previous estimates indicated losses in the range of 1500 to 2000 m<sup>3</sup> per year, the Nov 09 storm eroded 4800 m<sup>3</sup> from the central area of Plumb Beach and the Mar 10 storm eroded over 5,000 m<sup>3</sup>, leaving a very narrow, sand-bagged strip between the beach and the infrastructure. In each case, the downdrift beach-dune system had losses in the upper beach and the seaward face of the foredune. However, the downdrift system actually accumulated almost 5000 m<sup>3</sup> through a combination of seaward expansion of the low-tide portion of the beach profile and sediment transfer inland of the dune crest, further reducing the adjacent wetland habitat. Since 1974, more than 50% of the wetland habitat has been lost to the accreting beach-dune system, both by alongshore extension and inland displacement. Current plans for shoreline stabilization include use of sediment dredged from a nearby navigation channel to buffer the effects of erosion and sediment traps to either end of the central portion to catch and recycle alongshore transport.

### The impact of the storm Xynthia on PPR-L

*Céline Chadenas (CNRS), Denis Mercier (CNRS), Axel Creach (CNRS)*

The storm Xynthia, occurred on February 28th, 2010, was one of the most murderous that knew the metropolitan French territory for several decades, making 47 victims, among whom more than half on the department of Vendée. Indeed, the conjunction of various natural phenomena (atmospheric pressure, strength and orientation of the wind, the tidal range) carried an important flood of marine origin, recovering of water certain sectors urbanized on several municipalities from Vendee and Charente-Maritime (west central atlantic région of France). The balance sheet after disaster revealed certain number of problems: delays in the approval of the PPR-L in particular, at the origin of an urbanization exposing the populations to major natural risks, as the flood marine. Since February 28th, 2010, the French State seized these files by trying to define in a more precise way the criteria ending in the zonings of the PPR-L and the contents of these files. The number of circulars, recommendations, was multiplied, specifying every time the rules of protection of the housing environment towards the risk of flood and the necessary adaptations (height of the 1st floor, stage refuge) of built, current and future, according to the level of risk. The objective of the communication is double: bring to the fore the impact of the disaster Xynthia on the realization of the PPR-L with court / medium terms, by leaning on the example of the municipality of Faute-sur-Mer; analyze the evolution of the official texts since February 28th, 2010, with special attention to the proposed criteria for consideration of the hazard.

### A study of shoreline rotation and response to nourishment of a gravel pocket beach using low-cost videomonitoring techniques

*Umberto Andriolo (Università di Ferrara), Clara Armaroli (Università di Ferrara), Paolo Ciavola (Università di Ferrara), Mitchell Harley (Università di Ferrara)*

The study analyses a dataset of a coastal video station that has been operating at the gravel pocket beach Spiaggia San Michele-Sassi Neri on the Conero's coast (Marche, Italy) for one year. The system consists of two high resolution security IP cameras (both containing 2 optics for a total), monitoring a difficult to reach site, with high naturalistic and touristic value. Shoreline movements following and artificial nourishment are discussed for the period of April 2009-June 2010. The images obtained by the system were processed with shareware and freeware software in order to obtain Timex Exposure and Sigma-Variance images; afterwards, those were corrected, geo-rectified, and properly selected to have a dataset of images taken under the same wave and tide conditions. The shorelines were manually mapped on selected geo-rectified images in a GIS environment. A shoreline database was built and the Net Shoreline Movement was automatically computed using the Digital Analysis Shoreline System (software developed by the U.S. Geological Survey) comparing two shorelines for a selected time period, selecting a total of 49 shorelines. The daily calendar of nourishment works was compiled

detecting the presence of the dredges along the coast, and locating on the image the beachface zones where the gravel was discharged by the dredger. In this case nourishment was done by berm building on the shoreface, thus the position of discharge and the building up of the beach wedge was clearly visible. A shorter period analysis was carried out relating shoreline movements to the material deposition zones. Moreover, a comparison of coastlines mapped pre- and post- 6 storm events was undertaken in order to relate the shoreline change to the wave energy and wave direction. In agreement with the literature, a net rotation of the embayed shoreline was observed over the long period, resulting in shoreline recession in the northern part of the beach and accretion in the southern part.



## C08.05-05 - Coastal Systems - Coastal erosion and management 4

*Chair: Hervé Regnauld, Edward Anthony*

### Coastal Development and Management: A Case Study of Karnataka State, India

*Rathy Ganapathy (Mangalore University College), Dasharatha P. Angadi (Mangalore University College)*

Coastal zones are areas of Intensive activity of interchange within and between Physical, biological, social, Cultural and economic processes changes at any Stage and in any part of the System, can generate chain reactions for beyond their starting point and possibly in a totally different System whose environment conditions will be Subsequently altered. It has now been recognized that effective management of Coastal area should be based not only on an analysis of Individual activities and their impacts, but also on the combined effects of various activities on each other as well as on Coastal resources as a Whole. There is a need to bring the Various activities together in order to achieve a commonly acceptable Coastal Management frame work; the Integrated Coastal Area Management (ICAM) represent a continuous Proactive and adaptive process of resources management for Sustainable development and Management in Coastal areas of Karnataka in India. The paper observes that the coastal development and Management is depends on the Socio-Economic Sectors. The Following objectives have been formulated and they are: a) to identify the potentialities and prospects of development of Coastal Karnataka (Study area).b) to know the Banking, Education and Economic Sectors development of the Study area. c) to know the policies relating to Management of coastal Resources and activities play out in the study area. d) to find out tools and approaches are need to improve Coastal Management and decision making. The Study area is located West Coast of India in Karnataka State; the total length of the Coast is 320Kms. The Study is based on Primary and Secondary data.

### Sustainable Development of Coastal Zone and Marine Ecosystem: A Case Study of Karnataka, India

*Dasharatha P. Angadi (Mangalore University College)*

Coastal environments occupy one of the most dynamic interface on earth, at the boundary between land and Sea, and they Support some of the most diverse and productive habitats. These habitats include natural ecosystems, in addition to important managed ecosystems economic sectors and major Urban Centers. The existence of many Coastal ecosystems is dependent on the land-sea connection or arises directly from it (e.g. deltas and estuaries). Coastal environments, Settlements, and infrastructure

are exposed to land sourced and marine hazards such as storms (including tropical cyclones), associated waves and storms surges, tsunamis, river flooding shoreline erosion and influx of biohazards such as algal blooms and pollutants. All of the factors need to be recognized in assessing Coastal zone in India in particularly in Karnataka State. In this paper an attempt has been made to Sustainable development of Coastal Zone and marine Ecosystem. The Coastal Karnataka is selected as Study area it includes three districts. The total length of Coast is 320kms. This region lies between 12°27' to 15°49' North latitude and 75°49' to 75° 10' East longitude. The study is based on Primary and Secondary data.

### Nature compensation and coastal defence: building with nature in the Dutch Delta

*Frank Van der Meulen (Deltares), Bert van der Valk (Deltares)*

Keywords: barrier coast, sand nourishment, building with nature, Natura 2000 During 2008-2009, a special and unique case of nourishment has been completed along the Dutch delta coast. A new dune area was constructed to compensate for the predicted losses in ecological values in existing dunes in the delta, due to the use of the new harbor extension of Rotterdam, Maasvlakte 2 from 2013. The nourishment combines coastal defence and the development of high quality ecological values. The new area also adds to recreational facilities in the densely populated Dutch delta. Will the new dune area develop in the desired compensation direction? Design, construction and first development of the new area are presented and discussed. The Delfland Coast between Hook of Holland and The Hague was designated as one of the "weak links" along the coast. A large nourishment was carried out between 2008-2011 and as part of the protection works, the compensation dune area was constructed. This means that the coast is safe now (but not when a future climate change is taken into account). The use of Maasvlakte 2 (after 2013) is expected to cause damage to certain important dune habitats and plant populations in the immediate surroundings that are under protection of Natura 2000. The damage would be caused by NOx emissions from the traffic (boats, cars, etc) that uses the new harbor. Airborne N-deposition in fact acts as an extra nutrient load to the rare dune ecosystems, which are (extremely) nutrient poor under natural conditions. According to Natura 2000 regulations, the damage has to be compensated. Using some multiplying factors, it was calculated that ca 35 ha of new dune critical habitat area was needed. This was created by adding an extra 6,5 \*10<sup>6</sup> m<sup>3</sup> of sand to nourishments already foreseen along this coastal stretch. However, sand for this special extra area had to be of specific grain-size composition, because, after nourishment was completed, aeolian transport and deposition of the sand was foreseen, to create the optimal ecological soil start situation for rare dry and moist dune vegetations to develop. Besides the geomorphology of the new terrain, also the groundwater conditions have to develop in the desired direction. Monitoring of geomorphology, vegetation

development and groundwater is carried out to support the management of the area with the compensation requirement as an ultimate management goal.

### **Ostracoda and Foraminifera in Coastal Research**

*Anna Pint (Universität zu Köln), Peter Frenzel (Universität Jena), Helmut Brückner (Universität zu Köln), Thomas Daniel (Geowissenschaftliche Sammlungen), Max Engel (Universität zu Köln), Sascha Fürstenberg (Universität Jena), Daniel Kelterbaum (Universität zu Köln), Heike Schneider (Universität Jena), Carmen Trog (Naturkundemuseum Görlitz)*

Ostracods and foraminifers are classical groups of micropalaeontology. Both groups can be found globally in high diversity in the sand size fraction of aquatic and sometimes semiterrestrial sediments. It is possible to identify the taxa down to the species level by using their easily fossilizable hard parts, mainly archived in fine grained sediments. Even samples of only a few grams of sediment may contain hundreds or thousands of these kinds of microfossils. Thus, they have a great application potential in coastal research for geosciences, environmental micropalaeontology, and geoarchaeology. Ostracods are minute Crustacea with their body enclosed by a bivalved carapace made of calcite. They occur in salinities from freshwater to fully marine and even under hypersaline conditions. Brackish waters often show mass occurrences of this group. Foraminifers are Rhizopoda normally protected by a test. This test mainly consists of calcite or is agglutinated from sediment particles in marginal marine environments. The group is most diverse in marine habitats and strongly diminishes in diversity and abundance in brackish waters. Some marine taxa live planktonic, but most species are benthic like the ostracods. The association structure and shell chemistry of Ostracoda and Foraminifera can be used to reconstruct salinity, water temperature, oxygen and food availability, extreme events such as storms and tsunamis, precipitation/evaporation ratios, estimated water depth and turbulence, erosional and depositional processes, as well as habitat structure of palaeoenvironments. This shall be exemplified in four case studies from the City of Stralsund (southern Baltic Sea), the Island of Bonaire (southern Caribbean Sea), Kerch Peninsula (northern Black Sea), and the Alvor Estuary (southern Portuguese coast, Eastern Atlantic coast).

## C08.05-06 - Coastal Systems - Coastal monitoring 1

Chair: Andreas Vött, Edward Anthony

### Coastal morphodynamics determine intertidal wetland development: A case study on mangroves

Thorsten Balke (Deltares), Edward L. Webb (University of Singapore), Erik M Horstman (University of Twente), Claire Jeuken (Deltares), Peter M.J. Herman (NIOO-CEME), Tjeerd J Bouma (NIOO-CEME)

Coastal wetlands such as mangroves and salt marshes are declining worldwide (e.g. Duke et al. 2007). Due to their numerous ecosystem services, e.g. nursery grounds, carbon storage and coastal protection, they are now in the focus of many coastal managers and scientists. However we only begin to understand the mechanisms behind the dependency of coastal vegetation on local and large scale geomorphic processes (Friess et al. 2011). Minerogenic, tidal wetlands are closely linked to the morphodynamic development of the coastal zone, especially during their establishment. After successful establishment these wetlands are able to influence sedimentary processes, thereby creating positive bio-geomorphic feedbacks to maintain the ecosystem and therefore the shoreline. Hence, the most critical phase for coastal wetlands is the seedling stage where plants are extremely vulnerable to physical disturbance. For mangrove seedlings we show experimentally how physical disturbance created by morphodynamic processes (accretion and erosion) can limit or enable their establishment. Erosion around the individual seedling can excavate the roots and cause toppling, whereas rapid accretion can bury parts of the shoot and cause smothering. In the field, physical disturbance by morphodynamic processes (i.e. sediment mixing) was measured along transects from the mudflat into the mangrove forest. The mixing depth decreases towards the forest hence posing spatially variable establishment limitations to seedlings. Finally, we explain establishment of intertidal vegetation by modeling the spatial and temporal variability of the disturbance regime. Periods with calm conditions may offer 'windows of opportunity' (cf. Balke et al. 2011) during which mangrove seedlings can anchor and gain stability against future disturbance. However, if during this initial period thresholds are exceeded, seedling establishment will be prevented. Overall, our study provides a first mechanistic understanding of limitations to establishment of coastal vegetation by morphodynamics. Such understanding is urgently needed to develop alternative management and restoration strategies to protect the valuable coastal wetlands. Literature Cited: Duke et al (2007) A World Without Mangroves? Science 317: 41-42 Balke et al (2011) Windows of opportunity: thresholds to mangrove seedling establishment on tidal flats. Mar Ecol Prog Ser 440: 1-9 Friess et al (2011) Are all intertidal wetlands created equal? Bottlenecks, thresholds and knowledge gaps to mangrove and saltmarsh ecosystems. Biological Reviews doi:10.1111/j.1469-185X.2011.00198.x

### Determination of sediment budget and assessment of areas at risk from coastal hazards on the shore of northern France using airborne LiDAR

Adrien Crapoulet (Laboratoire d'Océanologie et de Géosciences), Arnaud Héquette (Laboratoire d'Océanologie et de Géosciences), Antoine Gardel (Laboratoire d'Océanologie et de Géosciences)

Despite strong urbanization and development of major harbors during the 20th century, the coast of northern France still largely consists of coastal dunes of variable width associated with 500 to 800 m wide, gently sloping, macrotidal sand beaches characterized by series of shore-parallel intertidal bars. These coastal accumulation landforms, which often represent the only barrier protecting low elevation backshore areas from marine flooding, are particularly vulnerable to coastal hazards that may increase during the next decades due to sea level rise associated with climate change. Climate change may have dramatic impacts along the low unconsolidated coastlines of northern France, especially where sediment supply is limited, which may result in negative sediment budget and recurring coastal erosion. Although several studies have shown that the stability of the shoreline strongly depends on the local sediment budget, no studies have been conducted so far to evaluate the changes in the coastal sediment stock at the scale of the northern France region during recent years. The main objectives of this study are to determine shoreline changes and variations in sediment budget at the regional scale, to assess the role of changes in sediment volume on the stability of the shoreline, and to identify the areas that are the most vulnerable to coastal hazards in the near future. This work is largely based on the acquisition and analysis of high-resolution topographic data of the entire littoral zone of northern France using a LiDAR (Light Detection and Ranging) airborne laser system for high precision which gives a fine rendition of the topography over large areas. LiDAR complete coverage of the coastal fringe of the northern France was conducted in 2008-2009 and another full LiDAR survey of the coastal zone was completed in March 2011. Additional LiDAR data have also been obtained in September 2011 at two specific sites (East Dunkirk and Wissant Bay) where detailed in situ topographic measurements are regularly carried out. These spatially dense elevation data sets were used for determining topographic variations between 2008 and 2011 and for carrying out high-resolution 3D mapping of the coastal zone. The analysis of these evolutions allowed us to quantify sediment volume changes in coastal dunes and intertidal areas, including estuaries that represent major sediment sinks in the coastal zone of the region. This work was complemented by an analysis of storm surge frequency based on theoretical tidal elevations and tide gauge data recorded at the harbors of Dunkirk, Calais and Boulogne-sur-Mer during the last decades. Analysis of these time series of water levels enabled to estimate the return periods of high water levels. The combination of digital elevation data with these water level statistics allowed us to determine potentially sensitive areas that may be exposed to marine flooding, but also to other natural hazards such as coastal erosion.

### Morphological changes and developments between Silivri and Tuzla coasts, Istanbul, Marmara Sea, during the last century (1900-2012)

*T. Ahmet Ertek (Istanbul University)*

The southern coastal parts of the Çatalca and Kocaeli peninsulas terminate at Silivri, Cape Moda, Cape Tuz and Pendik with high cliffs, whilst almost the rest of Istanbul's coastal areas are severely modified due largely to human interferences, cutting the land off from the sea. In that part, Haydarpasa and Karaköy ports serve as shipping and passenger transport, respectively. There are, on the other hand, a number of moorages for boats, fastcrafts, passenger ferries, ferryboats that meet daily needs. The marina sector developed at the coasts of Ataköy and Fenerbahçe. Shipbuilding yards between Pendik and Tuzla coast and natural gas filling factories in Ambarlı Port are other worth mentioning coastal structures. The coastal areas between Bakırköy and Eminönü and Moda and Tuzla were filled at 1960's and 1980's, causing expand of 200-500 m in coastal band. Stuffing beaches in various parts such as Silivri, Selimpaşa, Celaliye, Kumburgaz, B.Çekmece, Avcılar, Menekşe, Florya, Yeşilköy, Ataköy, Moda, Caddebostan and Süreyyapaşa led to disappearing of natural coastal landscape. Increased pollution in Marmara Sea waters dwindled the attention down to natural beaches during tourism season in the summers. Parks, fishing ports, seaports, boat yards and activity areas of sailing and water sports constructed on newly filled coastal areas took the place of sea towns. Thus, coastal areas which were once receded to personal use of the summer house and seaside residence owners kept 200-300 m inside due to coastal fills built for recreative purposes. These areas were then turned into common weal, including green fields, parks and a double flow three-lane road. The heavy traffic load on the E5 highway and O1 motorways have then been disburdened by that new alternative coastal road. The superintendence of structuring on river valleys and filling lands which have low resistance to natural disasters is of top priority in this tectonically active region. Nevertheless, skyscrapers and office towers in the coastal areas of Beylikdüzü, Ataköy, Yeşilköy, Gültepe, Maslak, Ümraniye and Kartal, settling on load-bearing grounds, seem to increase the population (ca. 12 million) of Istanbul in the future. Nowadays their numbers are around 30, but more 24 skyscrapers are being under construction. These tower blocks caused vertical urban development in contradistinction to horizontal expand formed of garden houses. As result, the Marmara Sea coast of Istanbul between Gümüşyaka and Tuzla had been of seawater intake in early 1900's. At present, these coastal areas are adversely affected by urbanization and excessive migration and lost almost completely its primary coastal characteristics.

### Depth of disturbance measurements on macrotidal mixed beaches: insights from the eastern Channel coast.

*Jerome Curoy (University of Sussex), Cherith Moses (University of Sussex), David Robinson (University of Sussex)*

Mixed beaches, with sediment sizes ranging over three orders of magnitude, are an increasingly important coastal defence. In Great Britain, beaches with an important gravel fraction are estimated to occur along approximately 19,000 km of shoreline and in France, at least 2270 km. On both sides of the Channel these beaches are heavily managed via a range of methods: sediment recycling, sediment recharging and/or beach groyning. Accurate measurement of the depth of disturbance is critical to quantifying cross-shore and alongshore sediment transport for management purposes. Because it is difficult to measure, the depth of disturbance is often estimated and considered homogenous across and alongshore. Using the method described in Curoy et al.(2009) the depth of disturbance has been measured on two mixed beaches in the eastern Channel: over 21 tides from March - December 2006 at Birling Gap, East Sussex, England; and, 28 tides in December 2005 at Cayeux-sur-Mer, Normandy, France. At Birling Gap, incident wave approach varied from 20-152° to the beach, significant wave heights ranged from 0.3 to 2.61 m and significant wave period varied from 2.1 to 8.6 s. At Cayeux-sur-Mer, incident wave approach varied from 7° to 60° to the beach, significant wave heights ranged from 0.4 m to 2.7 m and significant wave period varied between 4 and 9 s. The beach sand content for both beaches varied over time and was up to 30%. A sand content of >25% is thought to reduce the hydraulic conductivity of a mixed beach to approximately that of sand, influencing the profile response of the beach. This study contributes new baseline data to help refine presently limited understanding of the relationship between depth of disturbance ( $Z_m$ ) and tidal maximum significant wave height ( $H_{st. max.}$ ) on mixed beaches and allows a comparison of the results obtained on two different mixed beaches: · At Birling Gap: Upper beach:  $Z_m = 0.05H_{st. max.} + 0.02$  ( $R^2=0.58$ ); Upper middle beach:  $Z_m = 0.08H_{st. max.} + 0.03$  ( $R^2=0.75$ ); Lower middle beach:  $Z_m = 0.04H_{st. max.} + 0.07$  ( $R^2=0.26$ ); Lower beach:  $Z_m = 0.06H_{st. max.} + 0.03$  ( $R^2=0.3$ ). · At Cayeux-sur-Mer: Upper beach:  $Z_m = 0.11H_{st. max.}$  ( $R^2=0.25$ ); Middle beach:  $Z_m = 0.2H_{st. max.}$  ( $R^2=0.34$ ); Lower beach:  $Z_m = 0.17H_{st. max.}$  ( $R^2=0.64$ ). Results show that, despite a sand content of up to 30%, the depth of disturbance is significantly lower on these mixed beaches than on steep sandy beaches. The correlations determined from the measurements located at the middle sections of the beach are 26% lower at Cayeux-sur-Mer and 70 to 85% lower at Birling Gap compared with Ciavola et al. (1997) empirical formula for steep sandy beaches. Curoy, et al.(2009). Zeitschrift für Geomorphologie 53, 387-409. Ciavola et al. (1997). Marine Geology 141, 147-156.

## C08.05-07 - Coastal Systems - Coastal monitoring 2

*Chair: Andreas Vött, Edward Anthony*

### **Morphodynamic evolution of the submerged beach at Lido di Dante (Ravenna, Italy) through videomonitoring and modeling**

*Paolo Ciavola (University of Ferrara), Elisa Piazzalunga (University of Ferrara), Clara Armaroli (University of Ferrara)*

The understanding of morphological coastal changes has made great advancements in the last twenty years, thanks to the development of high frequency videomonitoring techniques. The temporal coverage of data acquisition is incomparable with traditional methods and can provide numerical modeling with unique datasets for calibration. The aim of this study is the analysis of the morphodynamic evolution of the submerged part of the beach of Lido di Dante (Ravenna, northern Italy) and the evaluation of the performance of an algorithm (Beach Wizard), which automatically integrates the results of a morphological model (XBeach), that was calibrated for the study site, with video-derived data (Argus images). The study site, located in the Emilia-Romagna Region, facing the Adriatic Sea, is a two-kilometre long natural beach, backed by a pine forest and bounded by coastal defences to the north and by the Bevano river mouth to the south. The area is exposed to microtidal conditions and the wave climate is usually of low energy. An Argus station is installed at Lido di Dante since February 2003 and it represents the instrument which allows the observation of the morphodynamic evolution of the coastal area with good resolution in space and time. Based on wave dissipation patterns, the bar crest position and its plan shape, along cross-shore transects 25 meters spaced, were studied for the period between September 2007 and October 2009. After a careful selection of the available time exposure images, aimed to remove those characterized by low quality information, the sand bar crest position was detected through the analysis of the pixel luminosity intensity. The sandbar system behaviour in response to changing wave forcing, according to its plan shape, amplitude and length of rhythmic forms, when present, and cross-shore bar crest location, was studied in order to extend the analysis already done for the four-years period between February 2003 and June 2007. A beach nourishment was carried out in April/May 2007. Therefore one of the main objectives of the study was to understand the short and long time effects of the sand replenishment to the submerged part of the beach. The results were also compared to the outcomes of Beach Wizard that was previously validated against two in situ measurements. The model performance was hence investigated for a significant (more than 180 images) dataset in order to estimate the model skill related to the number of high quality images, used for the bathymetry update, and to the length of the investigated period of time.

### **A Bay of Fundy Salt Marsh Restoration in New Brunswick, Canada**

*Jeff Ollerhead (Mount Allison University)*

The purpose of this presentation is to report on the progress of a salt marsh restoration at a site near Aulac, NB in the Cumberland Basin of the Bay of Fundy. Cumberland Basin is a 118 km<sup>2</sup> turbid estuary with a semi-diurnal tidal range of 10 to 13 m. The fetch ranges from 5 to 20 km and the water has a high suspended sediment concentration (mean > 300 mg/L). The project was designed in 2009-2010 and implemented in 2010. Three openings were cut in an existing dyke at the site in October 2010. As a result of this action, two different agricultural fields are now being regularly flooded with salt water from the Bay of Fundy. Field data were collected prior to construction for a number of environmental variables (e.g., existing vegetation) and marker horizons were installed. Since the openings were constructed, they have been mapped twice (2010 and 2011) using ground-based laser scanning (LiDAR), flows through one of the openings were measured using an acoustic Doppler current profiler (ADCP), and water levels both inside and outside of the restoration cells have been measured for several months. Erosion of the openings has been largely as expected. In addition, sediment deposition over the marker horizons has been measured using cryogenic coring and DGPS. In the first year, up to 50 cm of sediment deposition per m<sup>2</sup> was measured, with mean deposition ranging from 9 cm per m<sup>2</sup> at the west end of the site to 22 cm per m<sup>2</sup> at the east end of the site. The presentation concludes with an assessment of the initial success of the project.

### **Creating national inventories for habitats which are challenging to map- the case of the English and Scottish coastal vegetated shingle inventories**

*Andy Murdock (University of Southampton), Roland Randall (University of Cambridge), Chris Hill (University of Southampton), Jonathan Cox (Jonathan Cox Associates), Ian Strachan, Susan Watt (Scottish Natural Heritage), Stewart Angus (Scottish Natural Heritage), Sue Rees (Natural England), Alan Booth (Central Environmental Surveys)*

The UK Terrestrial Biodiversity Strategy and EU Habitats Directive require monitoring of habitat extent and condition for Annex 1 habitats. However, in many cases habitat inventories are either out of date, inconsistent or simply do not exist. In the UK, the government conservation agencies have been working to establish habitat baselines through the creation of GIS-based inventories depicting the area of priority habitats against the principle of being 'evidence-based' organisations. Typically, these datasets are created from multiple existing data sources (which may be inconsistent and outdated) and / or from aerial photographic interpretation (API) with variable levels of field validation. This is a time consuming process. In recent years, remote sensing techniques have been proposed as a more consistent and efficient mechanism for gathering this habitat extent information for surveillance. However, challenging habitats such as coastal vegetated shingle are hard to map using remote sensing because they are often form narrow, linear

sites, have vegetation cover at very low densities and have blurred transitions into other habitats, many of which are impossible to detect from remote sensing with the current resolution of widely available imagery. Similarly, inventories are based on habitat definitions which include consideration of boundary relationships with other habitats (e.g. allowable overlaps). Image classification approaches are of land cover which often assume overlaps do not exist. In addition, seasonal changes pose an added difficulty, especially to the spatial extents of the driftline vegetation. Finally, the detail required to identify habitats to Annex 1 level (species information) and for condition assessment is not possible to obtain from remote sensing methods alone. This paper describes some of the challenges in mapping coastal vegetated shingle habitats and an approach to generating national inventories which has been developed in England and extended in Scotland. This pragmatic approach uses expert ecological input and traditional habitat mapping techniques informed by remote sensing products (aerial photography, LiDAR, false colour infrared). The output is an inventory which meets multiple reporting and monitoring objectives and one which has been extensively validated through focussed ecological field surveys. We also discuss the potential to utilise digital field mapping techniques for the generation of inventories and the long term data management requirements for on-going monitoring.

### **A GIS-based shore monitoring and surveillance observatory on tropical islands exposed to climate change and extreme events: The example of Mayotte Island, Indian Ocean**

*Matthieu Jeanson (Laboratoire d'Océanologie et de Géoscience, UMR CNRS 8187 LOG), Edward Anthony (Aix-Marseille Univ), Franck Dolique (Université des Antilles et de la Guyane)*

The global change currently observed generates accelerated coastal erosion and an increase in the frequency and intensity of extreme weather events. Populated tropical island coasts are particularly vulnerable. Awareness of this vulnerability has prompted the construction of an operational observatory aimed at monitoring the coastal dynamics of several French tropical islands, including Mayotte. The aims of the project are to monitor the rhythms and mechanisms of evolution, adaptation and resilience of tropical island shores in the face of extreme climate and wave events (cyclones, storms, surges, strong swells) in order to develop and implement appropriate defence strategies and/or adaptation. Mayotte Island, in the northern Indian Ocean, is characterised by a highly diversified reef-lagoon complex comprising pocket beaches and mangroves. Field experiments involving hydrodynamic measurements, topographic surveys, and observations were coupled with the analysis of aerial photographs and regional meteorological data in order to gain a better understanding of the evolution of the reef-lagoon complex. The results highlight a remarkably variable mangrove system subject to progression or stability in the north and east of the island, but exhibiting a clearly regressive pattern along the southern and western shores. The hydrodynamic data also

throw light on the short-term morphodynamics of the small pocket beaches associated with some of these mangroves. The degree of exposure to waves, and reef structure, notably in terms of width and elevation relative to the tidal frame, have a determining influence on the afore-mentioned variations in mangrove dynamics along the shores of the island, and in the greater vulnerability of the mangrove shores of the south and west of the island, especially in the face of strong impinging development pressures. The operational observatory set up on Mayotte Island is a GIS tool based on a network sourced by these measurements and field observations. Within a local framework of strong socio-economic and demographic pressures, and a more global context of environmental change, this observatory should lead to a better understanding and prediction of the morphodynamics of the shores of Mayotte, while providing data indispensable to stakeholders involved in decision-making in the face of the major and rapid environmental and socio-economic changes liable to affect the fragile reef-mangrove coastal systems. Keywords: tropical islands, mangroves, coral reefs, beach morphodynamics, monitoring, observatory, GIS, coastal management, Mayotte Island, Indian Ocean.



## C08.05-08 - Coastal Systems - Coastal monitoring 3

*Chair: Andreas Vött, Edward Anthony*

### Monitoring annual coastal changes of different coast types in Western Greece by terrestrial laser scanning

*Dirk Hoffmeister (University of Cologne), Konstantin Ntageretzis (University Mainz), Nora Tilly (University of Cologne), Constanze Curdt (University of Cologne), Hanna Hadler (University Mainz), Timo Willershäuser (University Mainz), Georg Bareth (University of Cologne), Helmut Brückner (University of Cologne), Andreas Vött (Universität Mainz)*

Coasts are areas of permanent change, influenced by gradual changes and sudden impacts. In particular, western Greece is a tectonically active region, due to the nearby plate boundary of the Hellenic Arc. The region has suffered from numerous earthquakes and tsunamis during prehistoric and historic times and is thus characterized by a high seismic and tsunami hazard risk. Additionally, strong winter storms may reach considerable dimensions. In this study, terrestrial laser scanning is applied for annual change detection at six coastal areas of western Greece for three years (2009-2011). These areas show essential differences in size and coast type. The aim is to determine their annual changes. Thus, the Riegl LMS-Z420i laser scanner was used in combination with a precise DGPS system (Topcon HiPer Pro). Each scan position and a further target were recorded for georeferencing and merging of the point clouds. For the annual detection of changes, reference points for the base station of the DGPS system were marked. High-resolution digital elevation models are generated from each dataset of the different years and are compared to each other, resulting in mass balances of elevation changes. These results are checked by according photographs. Our results show that annual changes are detectable by multitemporal terrestrial laser scanning. On exposed areas, gravel with 30-50 cm diameter is displaced annually, as well as sand covers and sea weed. Minor changes are detectable for other areas, which are not directly exposed or consist of bigger gravel. However, for these coastal areas post-processing of point clouds turned out to be more difficult, due to noise effects by water and shadowing effects

### Improved remote sensing-based digital modelling of a macrotidal foreshore on the North Sea coast of France: the Shoreline Detection Method

*Aline Aubry (Laboratoire d'Océanologie et Géosciences), Antoine Gardel (Laboratoire d'Océanologie et de Géosciences), Sandric Lesourd (Laboratoire d'Océanologie et Géosciences)*

Topographic measurements of beach and intertidal zones have various uses, including coastal management and defence, economic exploitation of the intertidal zone, and flood forecasting. This study has evaluated the ability of SPOT5 and Formosat-2 satellite based-sensors, which have different band wavelengths and different spatial resolutions (10 m, 8m), to extract waterlines of a macrotidal beach in northern France as a complement to topographic mapping. The study area (12 km<sup>2</sup>) is characterized by various sedimentary facies and morphological features (multiple intertidal bar-trough beach, sandflat, coastal foredune) and is affected by semi-diurnal tides with a mean spring tide range of about 6.4 m. Spot 5 and Formosat-2 satellites were programmed (in April 2007, May 2008 and September 2008) to acquire images simultaneously with field topographic measurements. Extracting waterlines under various water-level conditions can provide topographic information on the intertidal zone because such lines can be regarded as contours. Satellite sensors can extract waterlines across a wide area, and this waterline detection method can serve as an alternative to digital elevation models created from aircraft-based LIDAR and photogrammetric methods. By regarding beach waterlines as shorelines, data from satellite sensors can be used to detect shorelines and complement conventional aerial photographic methods of shoreline change analyses or in situ measurements. Ability to extract waterlines was quantified by calculating errors of extracted waterline positions relative to the true positions, which were determined by field topographic measurements along some transects using a differential GPS and a total station. This work also enabled a comparison of topographic data from SPOT and Formosat-2 images with the in situ topographic data. Analysis of estimation errors and image costs shows that recourse to SPOT5 or Formosat-2 data is very cost-effective for extracting waterlines with reasonable accuracy. The results serve as general guidelines for using satellite-derived data to estimate intertidal topography, detect and monitor shoreline change. Furthermore, combining satellite-derived and ground-based data should enhance the accuracy of waterlines extracted by satellite sensors, which cannot provide topographic profiles of the beach. Waterline extraction based on satellite sensor data is applicable to shorelines in all tide-ranging settings but should prove particularly useful in estimating the intertidal topography on remote shores difficult of access, as well as on shores with large tidal ranges. Keywords: Shoreline, waterlines, macrotidal, topography, SPOT5, Formosat-2.

### Monitoring and Modelling Salt Marsh Margin Dynamics: Lessons from the Dengie Peninsula, Eastern England

*Thomas Spencer (University of Cambridge), Susan Brooks (University of London), Iris Moller (University of Cambridge), Denise Reed (University of New Orleans), Rosalind Turner (Mott MacDonald)*

Loss of intertidal salt marsh, which is of high biodiversity value and which provides a number of important ecological services, including the buffering of incident storm waves, is an important global environmental issue. However, the 'when', 'where' and 'how' of changes in salt marsh extent resulting from salt marsh edge erosion remain poorly understood, not least in the nature of the linkages between salt marsh surface and fronting mudflat elevations. In particular, it is not clear to what extent marsh edge dynamics are controlled by intrinsic thresholds to salt marsh and mudflat change, which can lead to cyclical patterns of marsh edge retreat and advance, and extrinsically-derived forcing, including the role of estuarine channel migration, changes in the configuration of offshore banks and accelerating sea level rise. These questions are examined for the data-rich setting of the fringing saltmarshes of the Dengie Peninsula, Essex coast, eastern England, across a range of time periods and spatial scales and incorporating both GIS methodologies and field observations. The paper considers i) centennial scale map evidence since the 1870s; ii) decadal scale change as revealed by aerial photography since the 1960s, and particularly annual imagery since the 1990s; iii) bi-annual cross-shore profile records of mudflat / salt marsh position at 1 km intervals along the Peninsula; and iii) short-term process studies of marsh creek and surface sediment budgets, wave energy modification across cliffed and ramped mudflat-saltmarsh transitions and studies of rates and styles of saltmarsh cliff failure. In addition, the paper assesses different forms of erosion control - from the placement of sunken barges as breakwaters to the emplacement of artificial polders - and their impact on the migration dynamics of the salt marsh edge. These different datasets are synthesised into a conceptual model which informs, in particular, the likely near-future trajectory of this southern North Sea coastal margin and, in general, the potential evolutionary pathway to be experienced by NW European salt marsh shorelines, in both the presence and absence of management interventions.

### Design and development of a large and high-resolution beach-monitoring program at Balearic Islands Coastal Observing and Forecasting System

*Lluís Gómez-Pujol (Balearic Islands Coastal Observing and Forecasting System), Alejandro Orfila (Mediterranean Institute for Advanced Studies), Amaya Álvarez-Ellacuría (Balearic Islands Coastal Observing and Forecasting System), Joaquim Tintoré (Balearic Islands Coastal Observing and Forecasting System)*

New monitoring technologies are being progressively implemented in coastal ocean observatories. These new observing systems, such as IMOS, OOI, IOOS, among others,

are delivering new insight into coastal ocean variability. SOCIB is one of such systems, a Coastal Ocean Observing and Forecasting System located in the Balearic Islands, a new facility of facilities open to international access. SOCIB is a multi-platform distributed and integrated system that will provide streams of oceanographic data and modelling services to support operational oceanography in a European and international framework. Among different facilities, SOCIB holds the Beach Monitoring Facility, which provides data on shoreline evolution, wave climate and sediment budgets. Beach Monitoring Facility is one of the more relevant facilities for the Balearic Islands society given the importance of beaches on the environmental and socio-economical context of the islands. The goal of this paper is to introduce SOCIB's Beach Monitoring Facility. Because a continuous, large and high-resolution dataset on coastline evolution, nearshore waves and currents, sediments and beach bathymetry is a key issue in order to characterize and manage coastal systems properly, the aim of the Marine and Terrestrial Beach Monitoring Facility is to contribute to this issue by means of the Modular Beach Integral Monitoring System (MOBIMS). MOBIMS enable the autonomous and sustained collection of physical data on coastline evolution, hydrodynamics, sediment budgets and sediment transport. Each one of the MOBIMS consists of a coastal video monitoring system (SIRENA developed at the Mediterranean Institute for Advanced Studies, IMEDEA ; Nieto et al. 2010), an Acoustic Doppler Current Profiler (ADCP) and a programme of bathymetric surveys and sediment sampling. This system is modular in order to gradually expand the number of beaches under observation to cover different types of energetic input.



## C08.05-09 - Coastal Systems - Coastal monitoring 4

*Chair: Andreas Vött, Edward Anthony*

### **Decadal beach profiles and wave conditions, and sediment redistribution in an embayed storm- and tide-dominated macrotidal setting: Wissant Bay, northern France**

*Edward Anthony (Aix-Marseille Université), Mouncef Sedrati (University of South Brittany)*

Wissant Bay, on the extreme northern coast of France, comprising a picturesque beach-dune shoreline, coastal marshes, and bold capes facing the Dover Strait, also incorporates some of the most rapidly eroding sectors of coast in France. Shoreline retreat has exceeded 250 m in the last fifty years in the central and western parts of the bay, while the eastern sector of the bay is now a zone of accretion, after being a sand-starved zone in the past, when the western sector was either stable or in accretion. The reasons for these changes are still not clear. They seem to involve interactions between a nearshore sand bank and the activity of current gyres related to the projecting headland of Cape Gris Nez, beach rotation processes and human activities, notably past aggregate extraction from the nearshore sand bank which acted hitherto as both a dissipater of incident storm wave energy and as a coastal sand source. The aim of this work is to contribute to the understanding of these long-term changes. To this end, 10-years of topographic profile data throughout the bay were analysed and confronted with offshore wave data. This analysis complements a previous analytical effort that determined gross rates of annual shoreline retreat by time slices of several decades from the careful interpretation of long series of ortho-rectified aerial photographs. The overall data suggest chronic sand bleeding from the western sector of the beach and longshore transport to the east, within a framework of what appears to be an ongoing beach rotation process within a dominant longshore sediment transport cell between the headland of Cape Gris Nez and the bold chalk cliffs of Cape Blanc Nez. The overall context appears to be one of a balanced overall embayment sediment budget. Potential sediment losses from the offshore sand bank, the lowering of which has also been invoked as a partial explanation for the chronic erosion of the western part of the bay through lessened storm wave dissipation, may be due to longshore transport within the dominant large-scale macro-scale sand circulation cell operating between the English Channel and the southern North Sea via the Dover Strait. Retreat of the beach-dune barrier in the western sector of Wissant Bay poses a threat in the coming years, as there is a likelihood of storm breaching of this narrowing barrier.

### **Monitoring of the morfolitodynamic processes on the White Sea inter-tidal zone (Kandalaksha Bay)**

*Natalia Kosevich (Moscow University), Tatyana Yu. Repkina (Moscow University), Natalia V. Shevchenko (Michigan University)*

Ice spreading is one of the significant morfolitodynamic processes in the coastal area of northern seas. However the mechanism, extent and rhythm of this process are not well studied. The quantitative data on the ice component of the lithodynamic flows can help solving the problems such as the origin of boulder clay loams of the Northern arctic, definition of deposits balance of the coastal zone, monitoring of the coastal environment of the Northern seas. In order to investigate one of the poorly studied aspects of the ice spreading in the White Sea Biological Station vicinity, the monitoring of the boulders movement within the intertidal zone due to the ice effect is conducted. Starting in 1960s prof. NN Marfenin, and later FA Romanenko (since 1999) studied this process by means of photo-registration. Their data showed boulders mobility within the intertidal zone. The ice shifted them to a distance of 20 m in one winter season. The mechanism of boulders capture and further shifting by the ice remains unknown. Three areas for boulder shift recording with different morphological and/or hydrodynamic conditions were organized in 2009. The first is located at Cape 'Cross', where due to immediate proximity to the axial channel flow the tidal currents are the strongest. The other two sites are located in areas with lower current velocities: within the small open bay, and within a straight coastal line. In all areas, the monitoring included:

### **Landscape Change Monitoring in the Black Sea Coastal Zone in Bulgaria for 1990-2006 Using Remote Sensing Data**

*Rumiana Vatsева (Bulgarian Academy of Sciences)*

Coastal zones are areas of substantial importance due to their significant natural and economic resources, as well as to their sensitivity with respect to unfavorable ecological impacts. Landscape change monitoring in the Bulgarian Black Sea coastal zone appears to be an essential factor to the integrated coastal zone management. The present study aims to analyze landscape dynamics in coastal zone of Bulgaria based on satellite imagery. The survey covers 16th-years period during the transition from planned economy to market economy in Bulgaria (1990 - 2006). The remotely sensed data used include multispectral images from Landsat TM of 1991 and 1992, Landsat ETM+ of 2000 and 2001, IRS-P6, SPOT 4 and SPOT 5 of 2006 and 2007. Visual interpretation of multispectral satellite imagery was applied for landscape change detection. The landscape change total area was 6682.9 ha in 1990 - 2000 and 3754.7 ha for the period 2000 - 2006. The results indicate that the urban area expanded substantially along the Black Sea coast in Bulgaria during the period 1990-2006, mostly to the detriment of arable land and woodland.

### **DSM generation from stereo aerial images for the reconstruction of the sea-cliff retreat pattern controlled by gullyng process, Costa da Galé and Melides sectors (Southwest of Portugal)**

*Cristina Gama (University of Evora), André Jalobeanu (University of Evora),  
Hélder Almeida (University of Évora)*

The seacliffs evolution is an important aspect to be taken in account in the evolution of the world coastline. The seacliffs can suffer erosion induced by the storm wave incidence or subaerial erosion leading to the retreat of the coastline. However the amount of sediments that come from the cliff retreat represent an important sediment source to the coastal system. In some cases it is essential to include this volume in the sediment budget balance of the studied coastal area. Many methods have been developed to monitor the evolution of seacliffs, most of them are supported by field measurements. In these work you propose the application of a new stereo photogrammetric method to reconstruct the cliff topography producing digital surface model (DSM) revealing the spatial distribution of the elevation errors. The model results are complemented by the acquisition of field data (GCP-ground control points) obtained using the DGPS (Differential Global Positioning System). This method also allows the generation of a coarse Digital elevation model (DEM) of the bottom of the seacliffs. The field study was conducted considering two small stretches of the sandy embayed coastline between Tróia and Sines (Southwest of Portugal). In these sectors the backshore of the subaerial beach is limited landward by the presence of seacliffs that suffer subaerial erosion (gullyng process). The seacliffs presents poorly consolidated sediments (sand, clay, granule and fine pebbles) that suffer subaerial erosion showing complex gully morphology between the top and the bottom of the cliff. The sediments eroded by this process are stored at the base of cliffs in the form of debris fans. During storm periods the subaerial beach significantly decreases its width and the sediments contained in debris fans suffers cut-off. The sediments are transported by the waves thereby entering in the coastal system. Two data series of digital aerial images at 20 cm resolution, acquired in 2008 and 2009, were used to reconstruct cliffs digital surface models (DSM) and monitor the evolution of the complex gully system. A data set of 50 GCP was used to constrain the sensor location and orientation. The method was able to detect the presence of main areas of cliff displacement although the sensitivity of camera calibration prevented the absolute estimation of the displacement rate. New field surveys should help improve the results. This work was partially funded by the French Research Funding Agency (ANR) (SpaceFusion project, Jeunes Chercheurs 2005 JC05 41500) and by the Portuguese Funding Agency (FCT) (AutoProbaDTM project PTDC/EIA-CCO/102669/2008, FCOMP-01-0124-FEDER-010039).

## C08.05-10 - Coastal Systems - Rocky coasts 1

*Chair: Wayne Stephenson, Edward Anthony*

### Wave transformations across a macro-tidal shore platform

*Wayne Stephenson (University of Otago), Larissa Naylor (University of Exeter), Bin Chen (University of Otago)*

Wave transformations across a macro-tidal shore platform Wayne Stephenson<sup>1</sup> Larissa Naylor<sup>2</sup> Bin Chen<sup>1</sup> <sup>1</sup> Department of Geography, University of Otago, PO Box 56 Dunedin, New Zealand. <sup>2</sup> College of Life and Environmental Sciences, Geography, University of Exeter Cornwall Campus, Penryn, Cornwall, TR10 9EZ How swell and wind waves are transformed across shore platforms has become a central question in rock coast studies with only a limited number of field studies recently reported in the literature. Critical questions include; how much energy relative to deep water is delivered to the platform cliff junction (where platform extension occurs), how much energy is transformed to infragravity frequencies and does energy in the infragravity band have any geomorphic consequence for rock coasts? Previous investigations of wave transformations across shore platforms have mostly occurred in micro-tidal environments where water depth and platform width are limiting factors on wave energy arriving at the cliff platform junction. Only one previous study has occurred in a macro-tidal setting, where the erosive potential of waves was assessed. Here we report on the results of the deployment of three wave recorders across a shore platform in a macro-tidal setting, on the Glamorgan coast of South Wales, United Kingdom. The pressure transducers were deployed across a platform for four days recording 2048 samples at 4 Hz, in burst at 10 minute intervals over eight high tides (489 bursts). At the outer edge of the platform water depths at high tide were 8 m meaning that waves crossed the platform without breaking. Maximum wave height at the top of the platform was 2.4 m and H<sub>sig</sub> never exceeded 1.34 m. Water depth at the cliff platform junction at high tide were 1.4 m and limited wave heights by forcing breaking. Only a small amount of energy were observed at infragravity frequencies at the top of the platform. Analysis shows that less than 8% of the total energy is contained within infragravity frequencies; swell, wind and capillary waves dominate containing 92% of the total energy. On this platform it is unlikely that infragravity energy has any geomorphic function other than to remove a small amount of energy from the gravity wave frequencies.

### Limitations to modeling tidal notch development: insights from erosion rates on Mediterranean and tropical coasts

*Cherith Moses (University of Sussex), Stefano Furlani (University of Trieste)*

Tidal notches, recesses extending along marine cliffs, develop because of higher erosion rates in the intertidal zone compared to the supratidal or subtidal zone. They are widely

distributed on Mediterranean and tropical rock coasts and are commonly used as geomorphological indicators of sea level change and tectonic movement. In such cases their formation is usually associated with wave erosion, although the role of bioerosion and secondarily weathering, e.g. solution, is sometimes given more importance. On certain rock types, e.g. granite and sandstone, wave erosion is mainly related to the removal of weathered materials rather than to direct erosion of the rock. Rock type is also thought to be important in this context, with limestone coasts said to provide more reliable indicators than other rock types. As well as indicating the vertical position of former sea levels, tidal notches have also been used to estimate the duration of stillstands (e.g. on harder limestones) and to calculate the periodicity of cliff-falls (e.g. on softer limestones). Despite their global importance, their genesis is still not fully understood and there are relatively few studies that directly measure rates of notch development. We review studies that measure, using a range of methods, rates of tidal notch development in Mediterranean and tropical coasts. We also present notch erosion rates directly measured using the Micro Erosion Meter (MEM) and Traversing MEM (TMEM) on limestone on the Northern Adriatic and Andaman coasts: the former collected over > 10 years on the Trieste and Istrian coasts and > 3 years on an experimental vertical slab in the Gulf of Trieste; the latter over a 9 year period at Krabi in Southern Thailand. We discuss these rates of erosion in the context of Pirazzoli's (1986) model of intertidal notch development. The model stresses the influence of cliff slope on the development of tidal notches in sheltered areas with a tidal range of 1.0 m and erosion rate at mean sea level 1.0 mm/yr. Moreover, we highlight some of the interactions over time and space between process and measurement that continue to limit our understanding of, and ability to model, tidal notch development. Our results suggest that intertidal notches may develop more rapidly than has previously been suggested, dependent on the dominant process and environmental conditions. We conclude by identifying fruitful areas for future research. Key words: Rock coasts, models, tidal notch, limestone, erosion, weathering, tropical, Mediterranean, relative sea level.

### Shore platforms as inherited landforms along the coast of Eastern Liguria (NW Italy)

*Alessandro Chelli (University of Parma), Marta Pappalardo (Dipartimento di Scienze della Terra), Mattia Barsanti (ENEA), Federica G Pannacciulli (ENEA), Ernesto Rosa*

Shore platforms are landforms shaped in the rocky coasts; they are widespread and studied especially along ocean's coastlines, characterized by wide tidal ranges, where they can be found in the intertidal and lower supratidal zone. Among rock coasts geomorphologists there is not agreement about the role that wave erosion and weathering exert in the genesis of these landforms. Studies carried out in different contexts stated the prevalence of either one process or the other or, in some cases, claim the occurrence of both. In the Mediterranean Sea shore platforms are not the main

landform. When present, they are constrained in the supralittoral, up to the elevation directly affected by marine processes. This is variable from place to place. The study of shore platforms along the Liguria eastern coast, was approached classifying them according to the classical scheme of Sunamura, which differentiates rocky coasts types in cliffs and type A and type B shore platforms. For the supralittoral zoning those criteria proposed first by Schneider were adopted. Geomorphological analysis and age constraints (for instance at Palmaria island, in the La Spezia Gulf, dated slope deposits overlapped to the platforms exist), enabled to assess that investigated shore platforms could be sometimes forms inherited from past climate-marine condition. Schmidt hammer test, traditionally employed to compare the degree of weathering of exposed rock surfaces through rock hardness value, provided some insight on processes operating on these shore platforms. Comparative tests were performed along each platform and between shore platforms at different height above mean sea level. Besides, comparative test were also performed among shore platforms and rock surfaces artificially exposed since the 19th century or new artificial rock cuts. The evidence provided by Schmidt hammer test display a seaward trend of increasing weathering. Rock hardness decreases in the intertidal and lowermost supratidal where repeated wetting and drying and biological weathering prove to be active. The comparison with old and new artificial rock outcrops demonstrated that weathering loosens the rock in a very short time span. The reduction in hardness of the rock is on the order of 15% to 50% compared to unweathered rock. This work demonstrates that shore platforms of Eastern Liguria are currently being dismantled due to different types of weathering processes, and are thus inherited landforms.

### **Sediments and inheritance in rock coast evolution. Linking Holocene sedimentary cliff retreat with a process of beach crest construction in a rock coast sector (NW Spain).**

*Alejandra Feal Pérez (University of Santiago de Compostela), Ramón Blanco Chao*

The use of pedological and sedimentological techniques to study of a complex sedimentary sequence have show new evidences of the importance of considered the time vector for understanding the present dynamic of rock coasts. This study was conducted in a rock platform-sedimentary cliff system located at the NW coast of the Iberian Peninsula. The area under investigation was subjected to periglacial conditions during Quaternary cold stages with active solifluction producing extensive spreads of unconsolidated both coarse and fine sediments. The occurrence of sea-shells (*Nassarius pygmaeus*, *Littorina saxatilis*, *Littorina neritoides*) in a silty sandy level dated in 5580-5530 cal BP suggest a marine influence in the sedimentation during the Holocene Climate Optimum. After this relative high-stand, a radiocarbon date of 4015 $\pm$ 3685 cal. yr. BP obtained in a continental- alluvial facies indicates a fall in the relative sea-level. During the Holocene Transgression the very high cohesiveness of the Weichselian sediments

conducted to the formation of a sedimentary ramp at the back of the shore platform that today's determine the slope of the boulder beach. During the Upper Holocene, after the sea level stabilization, the presence of this cohesive sediment ramp helped starting a different sedimentary dynamic at the back of the shore platform: a process of beach crest construction related to storm activity. The studied sequence has two coarse beach layers at an elevation of 2.8'3.5 m above the present astronomical highest high tide. AMS Radiocarbon-datings revealed that this deposition started at 1735-1590 cal yr BP and expands to the present. Lorang's (2002) equations applied to the studied sedimentary levels allowed to identify the type of wave (in terms of  $H_s$  and  $T_p$ ) needed to deposit the clasts at the top of the sedimentary cliff. The presence of a boulder beach and a cohesive clay ramp (formed by the erosion during the Holocene Transgression of late Pleistocene alluvial sedimentary levels) below it have been showed as necessary features to drive wave energy to the top of the sedimentary cliff allowing the deposition of clasts eroded from the Pleistocene deposits in the upper sedimentary level. The beach crest formation model described is a new example of the response of a para-periglacial coastal system to the Holocene transgression. By other hand, the reconstruction of the processes of beach construction points to a very important role of deep storms, which frequency and intensity modulates the wave energy arriving to the north coast of Spain. This research implies a new interpretation of coarse levels in a sedimentary sequence, underlining the imprint of high energy events and the synergies between past and present processes in the recent evolution and present morphodynamic of rock coasts environments. Lorang, M. S. 2002. Predicting the height of a gravel beach. *Geomorphology*, 48, pp. 87-101.

## C08.05-11 - Coastal Systems - Rocky coasts 2

*Chair: Wayne Stephenson, Edward Anthony*

### Determinants on the presence and character of Calas: a limestone rock coast macroform

*Lluís Gómez-Pujol (Balearic Islands Coastal Observing and Forecasting System), Bernadi Gelabert (Universitat de les Illes Balears), Joan J. Fornós (Universitat de les Illes Balears), Josep Eliseu Pardo (Universitat Politècnica de València), Vicenç M. Rosselló (Universitat de València), Francesca Segura (Universitat de València)*

Calas are characteristic embayed coastline landforms related with steep sided drowned valleys that were deeply incised during low sea-levels stages into carbonate plateaus. Therefore coastal, fluvial and karst processes and structural control are the main factors in cala's morphology. Calas or calanques, are a conspicuous rock coast macroforms quite frequent in Mediterranean, but also in many other locations as southwestern Australia or Caribbean islands among others. This paper studies the determinants on the presence and character of calas in three different islands of the Balearic Archipelago (Mallorca, Menorca and Formentera Islands), Western Mediterranean, by means of DEM exploitation, embayment and catchment morphometric analysis and through the compilation of fault and joint orientations. All islands exhibit emerged carbonate platforms (Upper Miocene in age) outcropping with horizontal or very gentle dipping bedding. Two patterns discernible at all the study sites are the absence or poor development of calas when carbonate plateaus exhibit strong coast-parallel structures; and a greater variability of cala embayment size according to stream catchment size, lithology and karst processes, or to the catchment distance from the coastline. Also, the amount of incision of the streams, and then the character of a cala at its mouth, depends on the proportion of impermeable rocks exposed in each drainage basin. Major incisions correlate with greater proportion of impermeable rocks at basin surface. This work was supported by the research fund of MICINN Project CGL2010-18616/BTE of the Spanish Government.

### Evaluating the complex response of rapidly-retreating soft rock cliffs to global warming: decadal scale variability in the cliffs of the East Anglian coast

*Susan Brooks (University of London), Thomas Spencer (University of Cambridge)*

Rapidly eroding soft rock cliffs typically retreat at rates in excess of several metres per year, thus allowing the resolution of linkages between cliff dynamics and a range of climatic and marine forcing factors. This paper firstly presents averaged decadal-scale rates of retreat in the unprotected cliffline between Benacre and Southwold, Suffolk Coast, eastern England. The application of the DSAS GIS package (Thieler et al., 2005) to

historic map and aerial photograph sources show these cliffs have experienced considerable decadal-scale variability in retreat rates. For the 1990s, rates were close to 5 m/a, while for the 2000s they fell to 2 m/a, against the long-term average of 2 - 4 m/a between 1883 and 2008 (Brooks and Spencer, 2010). Secondly, we present new evidence from the wider coastline of East Anglia, also gathered from application of DSAS, that suggests that this decadal-scale variability in cliff retreat is a more widespread phenomenon. Unprotected soft rock cliffs from dispersed locations around the east Anglian coast all show similar variability in retreat behavior on decadal timescales, which we attribute to changing patterns of storminess in these decades. The 1990s were characterized by frequent months in which the North Atlantic Oscillation (NAO; a well-established measure of inter-annual climatic variability in North-West Europe) was extremely positive ( $> +3$ ) or extremely negative ( $> -3$ ), while the 2000s showed few occurrences in such extreme values. Depression tracks in positive NAO phases make the East Anglian coast prone to storm surges in which raised water levels result from deeply developed low pressure systems, generally associated with westerly air streams. In negative NAO phases the region is prone to easterly airflow which results in periods of strong onshore wind. Both phases are associated with high energetics in the forcing factors. In this paper we evaluate the complex effects of both westerly and easterly dominant weather types (Lamb, 1972) on cliff retreat and suggest that the response to global warming in these cliff systems needs to consider a complex suite of climatic and associated marine phenomena and should not be regarded as a simple response to secular sea level rise over the twentieth century.

### Erosion processes on the rocky coasts of Ponza Island (Italy)

*Alessio Valente (University of Sannio), Sergio Ginesu (University of Sassari)*

The Island of Ponza is part of the Pontine Archipelago located at an average distance of about 50 km from the coast of southern Lazio in Italy. From the geographical point of view, this archipelago is situated between the outer edge of the continental shelf and slope, which connects with the abyssal plain of the Tyrrhenian Sea. Its origin is linked to volcanism that has characterized this margin of the Apennines during the Plio-Pleistocene extensional phases. At present tectonic and volcanic events (the latest emission date back about 200,000 years) can be considered concluded even if the area is still affected by a weak earthquake activity. The coast of the island is characterized by cliffs cut off in volcanic rocks, mostly sub-vertical, with heights ranging from about 10 m to over than 130 m. Not lacking at the base of them, as well as inside inlets and bays, often coinciding with secondary craters, sandy-pebbly beaches. The concentration of energy on headlands has also formed arches and sea stacks. Evidences of marine abrasion, active since the Early Pleistocene, are present in some relics of surfaces at altitudes of 200-270 m, 100-120 m and 45-50 m. To these raised surfaces are respectively associated gravelly beach deposits, a strongly altered paleosol and weakly cemented eolian deposits. Marine erosion takes place at the foot of the cliffs, whereas on the face of

them works the abrasion of the wind, the run off of the water and its infiltration in the lines of weakness, the weathering of the rocks by meteoric agents and, even, the seismic action. The lithological nature of the volcanic formations, characterized by high fracturing as well as fault plane and fractures, which also isolate blocks of considerable size, determines conditions of great danger with frequent falls involving rock masses from small to extremely large sizes. The danger is usually heightened, when the top of the cliff is mantled by epiclastic deposits from loose to weakly cemented. These deposits, due to the flow of water and the physical action of plant roots, can become unstable, resulting in slidings and rapid flows. In these mass movements are also involved other volcanic material detached from the cliffs. The continuous retreat of the cliff is proved by: the constant presence of significant accumulation of debris at their foot, despite the wave action; absence or lack of evidence, on the exposed face of the cliff, of notches or sea terraces immediately above to the present sea level, related to eustatic sea level changes occurred in the latest Pleistocene (this phenomenon shows a low coefficient of morphological preservation and thus a "high speed of erosion"; the presence of truncated valleys; the uncovering of the underground ducts of the Roman age.

### **Structural evidence of recent uplift at a small coastal area (S. Paio , Vila do Conde, NW Portugal)**

*Maria Araújo (Universidade do Porto), Manuel João Abrunhosa (CEAUCP)*

Variscan granite and undeformed pegmatite veins intrude a metamorphic complex probably derived from a Precambrian-Lower Proterozoic crustal terrane (ZOM) accreted to the east to the core of the variscan orogen (ZCI) along a large deep crustal suture zone (ZCPT) that is recognized as a major neotectonic feature. Granite was affected by tectonic events from ductile-brittle mid-crustal to pure brittle stages in high-crustal settings. High-crustal faults and joints postdate lamprophyre dikes. 5 kilometres to the NE a low angle reverse fault cuts through a probable Pliocene-Pleistocene deposit. The fault has a granite footwall overlaying sediments demonstrating a horizontal compressive regime. It is concordant with present regional tectonic stress. If similar faults were able to reach the nearby coast we would expect previous geoforms to be vertically dislocated from their original or normal position to a higher one in a short distance. We could also anticipate that a leveled geoform could maintain its normal position a short distance from the fault trace. Because faulting as usual is polycyclic it is possible to accept, giving the right local conditions, that geoforms built by coastal processes can also be dislocated in altimetric steps, the older in the top. This conceptual model is being confronted with detailed geomorphologic and geologic observations. This area is the highest point on this coastal stretch, culminating at 20m amsl with rectilinear rocky cliffs. It supports several small remains of marine deposits at different elevations. The lower one consists of a complex outcrop where an aeolian deposit dated of ca 84.ka BP is covering a solifluidal and a marine deposit, lying at 5m. As it is superposed by a 84k deposit, the underlying marine deposit must be from last interglacial (probably MIS 5e). 90 m to the south,

fossilizing an almost fresh granite notch there is another marine deposit at 10m. At 19m, the same granite outcrop, almost unaltered, supports the remains of another marine deposit. 18 km to the South (Lavadores, Vila Nova de Gaia) we find a staircase of 3 distinct marine levels, ca 26, 18 and 5m high. However, at Lavadores the bedrock alteration is much stronger in the higher levels than in the highest level at S. Paio, indicating that the southern staircase probably represents marine levels from MIS 5e till at least MIS 9. At S. Paio the several benches organized in a staircase fashion seem to correspond to a younger age, possibly to different relative positions of the sea level included into last interglacial. This could mean that this area had suffered a localized uplift, producing a clear relationship between topography and tectonics. We are focusing on the study of rock structures, trying to identify fragile neotectonic movements responsible for the topographic development of the area.



## C08.05-12 - Coastal Systems - Sea-level rise and impacts 1

*Chair: Helmut Brückner, Edward Anthony*

### Community Adaptation to Sea-level Rise

*Riswan Septiayadi Sianturi (Gadjah Mada University)*

### Late Holocene submerged beachrock, Hasir Island, Marmara Sea, Turkey: cement fabrics, stable isotope measurements and AMS 14C ages

*T. Ahmet Ertek (Istanbul University), Elcin Kilic (Istanbul University), A. Evren Erginal (Ardaahan University)*

The Marmara Sea, located between the Mediterranean and Black Sea, Turkey, keeps invaluable records regarding both Late Pleistocene water exchanges between these two seas and Holocene sea-level changes, which made this deep inland sea focus of interest since the second half of 19th century. In this study, we, for the first time, attempt to discuss implications of a totally submerged beachrock on the coast of the Hasir Island, Marmara Archipelago, based on micro-morphological features, stable isotope determinations and AMS 14C ages. Our results reveal that 1-m thick beachrock which slightly exceeds contemporary tidal range is indicative of a former sea-level at Late Holocene. Various types of sequential cements were determined, such as micrite envelopes, void fills, rhombohedral blades and aragonite needles. The coccolithophore *Emiliania huxleyi* and some species of ostracod also exist. Stable average isotope values for <sup>18</sup>O and <sup>13</sup>C from beachrock carbonates yielded average values of -0.4 and 2 PDB, respectively. These data show that beachrock is characterized by marine phreatic cements with slightly negative <sup>18</sup>O and positive <sup>13</sup>C values and occurred when level of the Marmara Sea was 1.5-2 meters lower than today based on calibrated AMS 14C ages of 2.9 - 2.5 ka BP.

### The future of coastal zones – global analysis of present and future population exposed to coastal hazards

*Barbara Neumann (University Kiel), Athanasios T. Vafeidis (University Kiel), Juliane Zimmermann (University Kiel), Robert J. Nicholls (University of Southampton)*

While there is broad scientific consensus that global mean sea-levels are rising at an accelerating rate, the factual rise in the 21st century is unsure. Recent studies raise that future sea-level rise (SLR) could exceed the dimensions suggested by the IPCC in its Fourth Assessment Report (AR4) by far. The impacts of SLR will primarily be felt in low-

lying coastal regions with increased coastal flooding, submergence and erosion, besides other biophysical effects and associated socio-economic impacts. At the same time, the coastal population is growing at a much larger rate than the inland population, a trend that is going along with a rapid change in land use and urban development in the coastal zone. To assess the future socio-economic impacts of SLR, data on the people exposed to SLR and storm surges are essential but difficult to retrieve at global scales, in particular with regard to the demographic development. In our study, which was conducted in the context of the UK Foresight project on migration and global environmental change, we have taken a global look at the urban and rural population in the low-elevation coastal zone (LECZ) at present and in the years 2030 and 2060. The assessments have been carried out through geospatial analysis of publicly available global-scale spatial datasets and national-scale projections of the United Nations on future population growth and urbanization. Scenario-based assumptions on coastal versus inland population development have been developed and implemented on the basis of these data in order to estimate the future coastal urban and rural population at national scales. According to our assessment, the coastal population will be growing from 625 Mio (year 2000) to 949 Mio in 2030 and exceed 1.388 Mio by 2060 under highest-end growth assumption (Scenario C) - which would amount to almost one fifth of today's world population. But even under lowest-end estimates (Scenario B), there will be more than a billion people living in the LECZ globally by 2060. The results show that Africa will be experiencing the highest growth of coastal population and urbanization, especially Sub-Saharan Africa. The dramatic development of Africa's coastal zones will add to the general high vulnerability of many African coastal countries, while Asia will be struggling with the overall large number of people exposed to coastal hazards. Asia's coastal population, which amounted to 461 Mio in the year 2000, will be growing at only half to two-thirds of the rate of Africa and still reach 983 Mio people by 2060 (Scenario C), making up more than 70 % of the global coastal population. The study sheds new light on the present and future coastal population potentially exposed to coastal hazards and provides a good basis for further impact assessment modelling. Nevertheless, global studies always come along with data issues and limitations that need to be taken into account.

### Using the past, to understand the present, to predict for the future

*Sarah McGowan (University of New England), Robert Baker (University of New England)*

Climate change and associated sea-level rise are an increasing concern for coastal communities. One of the greatest challenges lies in predicting future rates of sea-level rise and climate change. This study outlines the need to understand past episodes of sea-level variation, in order to better understand present sea-level rise, enabling a better prediction of future sea-levels. This study undertakes a somewhat controversial approach to predicting future sea-levels. Evidence from past episodes of higher sea-levels during the Holocene and Pleistocene from the south-eastern Australian coast is used to develop

estimates of future rates of sea-level rise. A rule of thumb calculated from ice cores and other palaeo-proxies is that for every 1°C increase in temperature, on average, there would be a 0.8m positive response in mean sea-levels in south-eastern Australia. Although this approach is controversial it is relevant as correlations between past sea-level heights and temperatures have been reported. Palaeo data can therefore be used to test the validity of models predicting the response of coastlines to sea-level rise. These estimates were then applied to a case study of an area surrounding the Hexham Swamp, Newcastle, New South Wales, Australia. The outlined approach provides an alternative to the computer generated simulations with ad hoc assumptions. When assessing the vulnerability of coastal and estuarine areas to future sea-level rise, there is a need to consider multiple sea-level rise scenarios to account for the uncertainty of predictions. Whilst developing sea-level rise policies for future coastal adaptation it is necessary to ensure that these policies are informed by accurate scientific knowledge to enable the development of adequate coastal management plans. The variations in predictions of future sea-level heights is particularly concerning as decisions are being made now regarding future coastal development on land that may be subject to inundation within the lifetime of the development. Within estuaries a small increase in sea-level rise can result in a significant increase in the area of land inundated due to the low gradient of the shoreline. This study has also illustrated the need for planning policies to be developed at a local scale as rates of sea-level rise will not be synchronous globally and impacts will vary due to regional and local coastal conditions.



## C08.05-13 - Coastal Systems - Sea-level rise and impacts 2

*Chair: Helmut Brückner, Edward Anthony*

### First record of Late Holocene coquina on Thrace (Western Black Sea) coast of Turkey

*A. Evren Erginal (Ardahan University), Elmas K'rc' Elmas (Istanbul University)*

First record of carbonate-cemented coquina on Thrace coast of Turkey is presented based on field observations, microanalytical examinations, fossil contents and radiocarbon dating data from fossil shells. The moderately to hardly cemented coquina crops out along the Karaburun coast to the northeast of Lake Terkos, western Istanbul, and exhibit a well-developed cross-beds with abundant broken shells. Having an average thickness of 80 cm, the cemented beds extend along a low-angle sandy beach with small fragments of shell debris. They are mostly composed of discontinuously exposed large blocks exposed between rip-rap breakwaters. XRD and EDX data show the existence of calcite, aragonite, quartz and magnesite minerals and various elements in decreasing order of O, Ca, C, Si, Al, Fe, Mg, K and Na, respectively. Its shell components are composed of *Donacilla* sp., *Venus gallina*, *Pecten glaucum*, *Ostrea edulis*, *Cardium* sp., and *Donax* sp. The rock also contains various foraminifera, such as *Spiroplectinella wrighti* (Silvestri), *Spiroloculina excavata* d'Orbigny, *Quinqueloculina* sp., *Triloculina* sp., *Polymorphina* sp., *Brizalina spathulata* (Williamson), *Cassidulina crassa* d'Orbigny, *Valvulineria minuta* Parker, *Neoeponides bradyi* (Le Calvez), *Rosalina floridensis* (Cushman), *Cibicides* sp., *Lobatula lobatula* (Walker & Jacob), *Asterigerinata mamilla* (Williamson), *Ammonia compacta* (Hofker), *A. tepida* (Cushman), *Elphidium macellum* (Fichtel & Moll), *Elphidium* sp., and the coccolithophore *Emiliania huxleyi*. From bottom to top, radiometric dating results from those shelly coquina beds typical of high-energy marine environment yielded calibrated ages ranging from 3.70 ka to 2.85 ka BP, matching the subboreal stage of Holocene. Much of these benthic foraminifera, *E. huxleyi* and shells were, on the other hand, founded in samples collected from uppermost level dated at 3140-2850 ka cal. BP.

### Impacts of the last rapid sea-level rise on the Caspian barrier coasts

*Mikhail Lychagin (Moscow University), Maria Kasatenkova (Moscow University)*

Global warming causes world-wide concern on the impact of sea-level rise on oceanic coasts. Predicting this impact is hampered by the slow pace of sea-level rise in the past, and the complexity of coastal processes. The Caspian Sea, having experienced phases of sea-level rise of up to a hundred times the eustatic rate, offers accelerated real-world models of how coastal zone behave under such conditions. These data can be used to predict possible changes within coastal areas of other seas. Of a special concern is a

problem of contamination of coastal zone by heavy metals and other pollutants. The study of the Caspian shores during the last period of the rapid sea-level rise in 1978-1995 showed that impacts of this dangerous event on the coastal landscapes are highly determined by their morphology. The mostly possible dangerous processes for the abrasive shores are their erosion and destruction. For the accumulative shores a set of dangerous processes is definitely higher. It includes flooding and water-logging of the coastal landscapes, salinization of soils and groundwater, disturbance of biogeochemical cycles, and also accumulation of heavy metals in coastal soils and sediments. Barrier coasts are typical for the western and southern Caspian. The coasts with intermediate shore-face slopes experienced mainly passive drowning during the continuous sea retreat. Sea-level rise caused formation of larger barriers and adjacent lagoons, which encroached landwards dozens of meters each year. From the geochemical viewpoint the sea-level rise caused a sharp alteration of geochemical conditions in soils and sediments with a consequent changes in migration of heavy metals and other chemical substances. The most complicate geochemical pattern became characteristic for lagoons and adjacent marsh zones. The Caspian barrier coasts are located in different mineralogical and geochemical provinces and climatic belts. Therefore natural heavy metal levels of coastal soils and sediments differ up to ten times. Essential climatic differences along the seashores caused a significant variability in the intensity of the modern geochemical processes. Salinization and sulfidization are the mostly pronounced in semi-desert conditions, while organic matter accumulation is the highest in humid subtropics. The study showed that the risk of HM accumulation is the highest within coastal areas built by clayey deposits, water-logged by brackish waters, with soils enriched by organic matter. Along the sea coasts of a special concern are lagoon shores, salt marshes and river deltas. Additional technogenic input of heavy metals in such areas located in highly populated or industrial regions can determine excess of HM permissible levels in components of coastal ecosystems.

### The Implications of New Sea Level Rise Estimates for US Pacific Coast Wetlands

*Denise Reed (University of New Orleans)*

The response of flats and marshes to sea-level rise depends on the balance between submergence, erosive forces, and sediment supply, and is mediated by climatic influences on biotic processes. This paper will describe interactions among these processes as influenced by new predictions of sea-level change for the US Pacific Coast to be released to spring 2012. Along this complex shoreline, tidal marshes are found within major estuarine embayments such as San Francisco Bay, but also within bar-built estuaries and along the margins of rivers that flow directly into the ocean, e.g., the Salmon River, OR. Extensive tidal marshes also existed historically within the deltas of the major rivers flowing into Puget Sound. The National Research Council Committee on SEA LEVEL RISE IN CALIFORNIA, OREGON, AND WASHINGTON has been charged with

evaluation of sea level rise for California, Oregon, and Washington for the years 2030, 2050 and 2100 which will be published in spring 2012. The Committee also examines the response of coastal wetland systems to these predictions. Their estimates of sea-level rise along the coast also consider regional variation in tectonics and other influences on vertical land motion. Within estuaries, transitions between subtidal (permanently flooded) areas, intertidal flats (unvegetated area regularly exposed by falling tides), and vegetated marshes occur as tides interact with local topography on time scales ranging from weeks to millennia. As local sea-level changes, the tidal dynamics within the estuary may change. Changes in tidal dynamics, including the tidal range, affect saltwater penetration, the duration of flooding or exposure of intertidal flats and marshes, and the depth of flooding, which in turn influences wave activity, the potential for erosion, and a host of biological processes. Compounding these changes is the variety of vegetation types found in coastal marshes on the US Pacific Coast. These, for the most part, are different from those of the more studied coastal wetlands of the SE US for which many studies of the response to sea-level rise have been conducted. The situation is further complicated by extensive management of rivers feeding sediments and freshwater to the coastal zone. The paper will consider the fate of coastal wetlands under the new predictions both assuming the current coastal context and in terms of what other actions, both on the coast and within watersheds, could be undertaken to enhance coastal wetland adaptation and survival.

#### **Palaeo-environmental evolution and coastal risks on the Kathari coastline (Kition, Larnaca, Cyprus)**

*Guénaëlle Bony (CNRS Cerege), Daniel Borschneck (Université de Provence), Nicolas Carayon (Université de Provence), Clément Flaux (Université de Provence), Nick Marriner (Université de Provence), Christophe Morhange (Université de Provence), Jean-Marie Rouchy (Université de Provence)*

At the request of HISOMA Laboratory, attached to MOM Laboratory (Lyon), a coring campaign was conducted along the coastline of the archaeological site of Kathari (Kition, Larnaca). The two main objectives of this study are: to characterize the palaeo-environmental evolution of the shoreline from the Bronze Age; to understand the evolution of the settlement with regards to relative sea-level variations (e.g. tectonic movements) and sediment supply. Kition was a harbor city founded by the Mycenaeans. It is located in southeast Cyprus, on the shores of the current Larnaca Bay. This city has experienced continuous human settlement from the end of the Late Bronze Age until today. Archaeological remains, attesting to the urban organization of the city, are few. Only two areas of the city have been identified: the district of Bamboula and its military harbor renowned for the Phoenician Slipway (Yon, 2006) and the district of Kathari used as a place worship. Between Kathari and the promontory of Prodomos, located further east, many tombs dated from different periods were found. Several studies on the palaeo-environmental evolution of this area have been conducted (Niccolaou, 1976; Gifford,

1978; Morhange et al., 2000). These studies demonstrate a logical evolution of the coastline. Only Morhange et al. (2000) clearly indicate, in their study of the military harbor of Bamboula, that the harbor basin was transformed into a salt lake around 1600 BP. Following these studies, several hypotheses concerning the environmental changes were raised: modifications in the sediment budget of Thremitos (the main sediment source in the Bay of Larnaca) and/or tectonic uplift. Our study focuses on several issues. Does the Bay of Kathari follow the same palaeo-environmental evolution as Bamboula? What is the chronology of this coastal evolution? Are the Tremithos sediment supplies only responsible for these environmental changes? To resolve these issues, two cores were undertaken and analyzed at high resolution. Results show a more complex evolution than previously attested. Indeed, it appears that the salt lake transformation took place evenly along the coast of Larnaca, especially east of Prodomos where this promontory was an island at this period. This first environmental change was linked to the accretion of a pebble spit (Morhange et al., 2000) which closed the lagoon. During the same period, only the small bay of Kathari was transformed into a fresh water lake. This environmental change, in contradiction with the rest of the bay, is probably due to the water table. In fact this area, without any river, is characterized by a water deficit. The second environmental transformation of the Bay of Larnaca comprised a reconnection to the sea. These environmental changes were probably due to the opening of the pebble spit. Because these environmental changes were sudden, we hypothesize that they were driven by a vertical tectonic movement.

## C08.05-14 - Coastal Systems - Sea-level rise and impacts 3

*Chair: Helmut Brückner, Edward Anthony*

### **Barrier rollover and barrier spit accretion due to the combined action of storm surge induced washover events and progradation: Insights from ground-penetrating radar surveys and sedimentological data**

*Tanja Tillmann (Goethe University), Jürgen Wunderlich (Goethe University)*

Barriers comprise approximately 15 % of the world's coastlines and are formed due to the combined action of wind, waves, and longshore currents. Barrier islands and barrier spits are geological young, highly dynamic and represent a complex coastal system that includes a number of different but closely related sedimentary depositional environments and geomorphologic elements of varying origin, genesis and evolution. The stratification of barrier islands is often exclusively investigated by using borehole data. Therefore, the processes of evolution and the internal structure of barrier islands are often unknown. In recent years the ground-penetrating radar (GPR) method has been widely used to examine the internal structures of Holocene sediments. In this study ground-penetrating radar data of different antenna frequencies, sedimentological data and amino acid racemisation datings (AAR) were combined to reveal the sedimentary structure and architecture of the southern barrier island spit of Sylt and to define different coastal environments and to set up a barrier island stratigraphy. Based on these data, two sedimentological models of barrier spit development have been generated for Southern Sylt which describes the inter-action between extreme events, coastal processes and sedimentary development and contains the major episodes of barrier island evolution. The first model is concerned with the spit add-on zone where the barrier spit is attached to the central island moraine core and shows a landward migration through barrier rollover affected by an interplay of barrier retreat and washover flooding associated with accumulation of sediment in a backbarrier environment as a result of several storm surges. With the exception of the uppermost dune facies the spit add-on zone reveals a transgressive coarsening upward sequence starting with sandy mud flat deposits at the bottom which turn into coarser sandy tidal flat deposits toward the top. Sandy tidal flat deposits are overlain by washover sheet and washover fan deposits. The second model demonstrates a barrier spit accretion through southerly directed progradation. Eroded sediment was transported along the west coast of Sylt by longshore drift and was added to the southern spit-end. Growth and progradation of the southern spit-end has forced a southward directed tidal-inlet migration of the Hörnum tidal inlet. Progradation and barrier spit accretion were also interrupted by severe storm surges. Storm surge generated erosion unconformities in a foreshore to shoreface environment redraw old spit-end positions that represent stages of barrier spit progradation. Spit enlargement increased when the time interval between storm surges was long and the delivery rate of sand from

longshore drift was high. Annual winter storms also caused inundation of the barrier spit-end and produced elongate washover channels formed during numerous erosional overwash processes.

### **Geographical Model (Phase 1) for Tsunami Risk Reduction**

*Laura Cano (Texas University), Osvaldo Muñiz (Texas University)*

Local and regional tsunami events cause considerable property damage and high casualties when preventive measures to reduce risks are scarce or they have not been designed at all. Hazard mitigation and preventive measures are focused on the creation of physical structures to reduce the effect of high waves (Koutitas and Karambas, 2005), geospatial information to model wave trains on coastal areas and emergency relief (ESRI, 2006), warning system procedures for effective and efficient evacuation (Bernard, 2005), and educational programs for public awareness (Samant, Tobin, and Tucker, 2007; Damiano and Pacheco, 2011). The aim of this study is twofold. The first phase of this study develops a geographical model for population evacuation based on geospatial analysis. The second phase is devoted to design evacuation strategy procedures based on specific geographical education objectives. During the first phase the researchers work with three specific locations in Chile, Costa Rica, and Mexico in order to obtain a geographical model. The study of specific locations in the selected countries of the Pacific allows a comparison of coastal characteristics and geomorphology of local and contiguous region, population growth, population distribution, and population density. This paper reports the result of Phase 1 which shows digital elevation maps, population maps of rural and urban communities and preliminary evacuation route maps. This analysis is initially performed with GIS applications and high resolution remote sensing imagery which are complemented with population data from census information and surveys. References Bernard, E. 2005. Concept for a Regional Tsunami Warning System for the Indian Ocean, NOAA, USA. Damiano, G, and Pacheco, C. 2011. Plan de operaciones de emergencia ante sismos y/o tsunamis. Distrito Callao, COOPI, Cooperazione Internazionale, Lima, Peru. ESRI. 2006. GIS and Emergency Management in Indian Ocean Earthquake/Tsunami Disaster, An ESRI White Paper. Koutitas, C. and Karambas, T. 2005. A computational approach to design codes for tsunami-resisting coastal structures, ISET Journal of Earthquake Technology, Paper 46, 42: 4, pp.137-145. Samant, L. W., Tobin, T., and Tucker, B. 2007. Preparing Your Community for Tsunamis: A Guidebook for Local Advocates. GeoHazards International.

### **Vegetation dynamics and its response to freshwater input and climate variability in Yellow River Delta**

*Dejuan Jiang (Chinese Academy of Sciences)*

Vegetation coverage can deliver important information of wetland landscape and its ecological regimes. In Yellow River Delta wetland, vegetation cover is greatly sensitive to

local climate conditions (precipitation and temperature) and freshwater input of Yellow river. Particularly, freshwater inflow has a significant restrictive effect on wetland vegetation. Therefore, the study on vegetation dynamics and its response to freshwater input and climate variability in Yellow River Delta has theoretical and practical significance. First, based on the data of MODIS images and under the support of GIS technique, the normalized difference vegetation index (NDVI) was calculated. Then, using NDVI as a key quantitative index, the spatial and temporal characteristics of vegetation cover were detected by the spatial autocorrelation analysis method. Finally, the Person correlation coefficients between NDVI and freshwater inflow, precipitation and temperature was calculated and further, the effects of freshwater input and climate variables on vegetation cover were evaluated. The results of this study would be helpful for the assessment of wetland ecological conditions and to develop appropriate adaptation and mitigation strategies for vegetation protection and restoration in the estuary wetland of Yellow River Delta.

#### **The potential of different overwash deposits for palaeotempestological research – preliminary findings from Western Australia**

*Simon Matthias May (University of Cologne), Helmut Brückner (University of Cologne), Max Engel (University of Cologne), Dieter Kelletat (University of Duisburg-Essen), Anja Scheffers (Southern Cross University), Peter Squire (Southern Cross University), Anna Pint (University of Cologne)*

Palaeotempestology, the study of prehistoric storms, uses sedimentary evidence to enlarge the temporal frame given by historical records and provides important information about past storm frequencies and magnitudes, and thus a basis for coastal hazard assessment. Along the Pilbara coast, Western Australia, different sedimentary archives (washover fans, beach ridge sequences, mud flats) were investigated in 2011 in order to identify and date sedimentary traces of storm overwash. The stratigraphy of washover fans at Onslow shows several depositional units of mainly well stratified sand with distinct heavy mineral laminae of varying concentrations, similar to storm deposits from the Florida (Sedgwick and Davis, 2003) but also to tsunami deposits from India (Switzer et al., 2012). These units are intercalated by massive coarse sand deposits with channel structures, implying different flow regimes and flow conditions during deposition. According to bioturbation horizons, several different depositional events (cyclone and/or tsunami) can be inferred. At Point Lefroy headland, southwestern Exmouth Gulf, distinct lobate washover fans were detected in the mud flat behind the dune belt. They exhibit washover terraces and incised channels. Its stratigraphy shows distinct layers of shell debris, sand and coarser components such as coral and larger shells, intersected by a minimum of three palaeosols, unambiguously documenting multiple depositional events and periods of geomorphologic stability, when soil formation took place. Multitemporal satellite images and aerial photos indicate that these overwash fans were stable at least during the last 45 years. Reactivation is likely since the dune gaps at the apex of the fans

provide pathways for inundation during extreme wave events. Our preliminary findings suggest that the investigated sedimentary archives have a high potential for improving extreme wave histories (tsunamis and cyclone landfalls) of Western Australia. Main challenges for the future include dating ( $^{14}\text{C}$ , OSL, U/Th,  $^{210}\text{Pb}$ ) and distinguishing between event types based on sedimentology, microfauna, and shell taphonomy. Sedgwick, P.E., Davis, R.A., 2003. Stratigraphy of washover deposits in Florida: implications for recognition in the stratigraphic record. *Marine Geology* 200, 31-48. Switzer, A.D., Srinivasalu, S., Thangadurai, N., Ram Mohan, V., 2012. Bedding structures in Indian tsunami deposits provide clues to the dynamics of tsunami inundation. In: Terry, J.P., Goff, J. (Eds.), *Natural Hazards in the Asia-Pacific Region: Recent Advances and Emerging Concepts*. Geological Society, London, Special Publications 361, 61-77.



# C08.06

## Cold Region Environments

## C08.06-01 - Contextualising climate change: methodological, institutional and regional responses

*Chair: Tatiana Vlasova, Nancy Doubleday*

### Strengthening Arctic Cooperation to meet the climate, energy and resource depletion changes and challenges

*Tatiana Vlasova (RAS)*

More and more government, non-government institutes, organizations and programs both international and national are becoming involved in the investigation and monitoring of changes happening in the Arctic (Arctic Council groups and projects, indigenous people's organizations, IASSA, IASC, UNEP, Polar foundation, WWF, and many other). The goal of this paper is to figure out ways for strengthening multi-disciplinary, multi-scale and inter-institutional cooperation in investigation and monitoring of the Arctic change. The Arctic nowadays has gained increased attention due to many opportunities, challenges and rapid changes. Among them there are: the Arctic is expected to warm at twice the global average rate and climate changes impacts (both positive and negative) are more pronounced in the Arctic, opening new perspectives and thresholds and having far-reaching consequences for ecosystems and for the people dependent on ecosystem services; the Arctic may serve as an indicator of environmental change and an "early warning system" for other parts of the world; the increasing interest to the Arctic for new sources of depleting fossil fuel resources; the spread and the improvements in Internet and mobile communication as well as sea ice melting opening new routs, make the remote regions of the Arctic more accessible for settlement and development; the need for experience exchange in elaborating strategies for sustainable development in the Arctic and adaptation to climate changes at different scales. In the era of global climate changes and globalization many new and poorly predicted issues are emerging as well as new perspectives and opportunities are opening in the Arctic. That is why there is a strong need nowadays to increase not only multi-disciplinary research (social and natural sciences synthesis with local and traditional knowledge integration), but to enhance multi-scale geographical approaches (from global to national and local), as well as to strengthen inter-institutional cooperation in observing, investigation and managing Arctic changes in order to increase robustness and resilience of entire human-nature systems at different territorial scales. The experience of the Integrated Arctic Socially-oriented observation System (IASOS) network elaborated within the International Polar Year 2007/2008 in understanding and finding ways of responding to changes happening in the Russian Arctic will be demonstrated and it will be shown the need for broad Arctic cooperation in monitoring challenges, changes and best ways for building resilience and sustainability in the Arctic.

### The features of the Central Siberia local tribes (on the example of the Kethes) and their problems in the period of globalization and climate change

*Alexei (Aleksey) Medvedkov (Moscow University)*

The features of the Central Siberia local tribes (on the example of the Kethes) and their problems in the period of globalization and climate change There is one tribe among the wide variety of local ones in the North of Enisey river area which incite a lot of scientific questions. It is the tribe of the Kethes. The dispersed groups of the Kethes live in the middle and the lower parts of the Enisey river basin and the lower part of the Podkamennaya Tunguska river basin. According to an approximate estimation, the total population of the Kethes is about 1200 inhabitants. The Kethes is a unique phenomenon because of the language that doesn't have any analog. The main activities of the Kethes are fishing, hunting after elks and reindeer, mushrooms harvesting, berrying and furring (sable and squirrel). Some groups grow potato and other vegetables. The unemployment is a serious problem for the Kethes' community. During the postsoviet period the Kethes' social behavior became more profit-oriented. Currently the land where the Kethes live is used for poaching. In addition, legal entrepreneurs often ignore the interests of the Kethes. The problem of the Kethes isolation from their traditional source of living is getting more and more important. Along with a gradual disappearance of traditions, there is also a disappearance of the Kethes' language. Less than 15% of the Kethes can speak the native language. It reflects the problem of communication between generations. Some members of local communities don't see the necessity of the native language usage. The Siberian Kethes follow the lifestyle which has strong relations with natural resources and subsistence production. Climate changes lead to some negative consequences for local tribes: the decrease in productivity of natural system, the decrease in berries, pine nut and mushrooms harvest (the outcome of short and strong spring frosts in the period of flowering and dry heat), the decrease in sable population and other fur-bearing animals' populations as a result of nutritive base reduction, the increase in the number of forest fires and their area as a result of watering lack in landscapes and the expansion of the swamped permafrost area (the level of frozen subsoil in some regions lowered at 1-2 meters deep). So, the question of special measures and strategy projecting for local tribes' adaptation to climate changes is becoming more important. The decrease in natural abilities of a 'feeding landscape' leads to the necessity for local natural economy diversification. Under the conditions of global warming and the increase of climate instability we can more clearly fix the close interrelation between the development of local traditional economies and geographical and ecological factors of nature.

### **Polar glacier, the eyewitness of the climate change**

*David Chinarro (Universidad San Jorge), Carmen Dominguez (University of Salamanca), José L. Villarroel (University of Zaragoza), José A. Cuchi (University of Zaragoza), Adolfo Eraso (University of Madrid)*

This work is intended to analyze the results on Antarctic glaciers as indicators or gauges of climate change. The available stuff are the different research studies, that analyzes time-series of the discharge, precipitation, air temperature, solar radiation, weather pressure, and humidity, measured over some glaciers and ice caps situated on South Shetland Islands. Since glaciers are close to the melting point, they can reveal noticeably some aspects of climate change, and thereby, provide some of the clearest evidence of this change. The data are used to investigate the influence of model coherent structures where the essential factors are the air temperature and the discharge time series. Some techniques, as artificial neural network, wavelets or Singular Spectral Analysis, will be exposed comparatively in order to valid the model closer to the natural system dynamics. The system identification methods are applied to find out coherent structure models that are significant of system dynamics. Nevertheless only an efficient core of the certain seasonal period should be considered to build the model, due to anomalous discharge at the beginning and end of the season, manifested in the intermittent glacier ablations and irregular outbursts. The analytical process to determine the effective core of the discharge time series is performed by methodical calculations based on wavelet coherence. Some models have been attempted from the identification of block structured systems, getting a comparative study by the adjustment coefficients, that reveals the efficient of some nonlinear methods over others. The conclusions are tackled from the causal analysis to highlight the major changes that are occurring in a certain glacier. Final reflections try to avoid inaccurate statistical generalizations or incompletely tested assumptions, that might bring up hackneyed controversy and slow down the scientific progress on global warming. Only a few assertions turned out on quantitative analysis carried out on an Antarctic glacier. Even though mathematic results allow a free interpretation, undoubtedly, the glacier is the key indicator that can shed light about the climate change.

### **Social-Cultural-Ecological Systems Perspectives on Cold Region Environments and the Changes Affecting These Regions and the Peoples Who Inhabit the Cold Regions**

*Nancy Doubleday (McMaster University)*

Interactive Session Hosted by Cold Region Environments Commission The following session will be held as a round table in part, open to interested participants, who will be asked to respond to the challenge of framing current knowledge in the context of complex systems models drawn from interdisciplinary sciences, social sciences and humanities. A discussion draft will be circulated by the session chairs addressing problems of complex social-cultural-ecological systems in selected cold regions,

exploring the proposed session theme, including the following key elements: · Connecting Changes in Peri-glacial Regions, Permafrost and People is essential to understanding environmental change and health and well-being in cold regions using integrated frameworks for understanding environmental and social change. · Creating change-oriented approaches to health and well-being is of necessity a complex task well-situated within traditions of geographic thought and emergent resilience frameworks. The attendees will be invited to discuss the problems of integration of knowledge of the interactions of people and cold region environments across scales at a range of system scales. Ideally the discussion of the interactive session and of the session as a whole, will 'provide outlines for a set of papers illustrating best practices for cold region knowledge integration, as well as locating a self-identified group of people willing to collaborate to contribute future synthesis papers.'



# C08.07

## Cultural Approach in Geography



## C08.07-01 - Cultural Approaches in Social and Geographical Theory 1

*Chair: Benno Werlen*

### The spacing capital of individuals. Elements of a geographical approach of practice.

*Mathis Stock (Institut Universitaire Kurt Bösch), Michel Lussault (Université de Lyon)*

The question of the differential capacities of individuals has been theoretically explored by numerous authors. Bourdieu (1984) proposes, as element of his theory of practice, a model of agency where agents engage their social, economic, cultural, technological capital in order to achieve objectives within a specific social field. Within geography, Lévy (1999; 2003) proposed a "spatial capital", defined as disposition of individuals of engaging with spatial problems, especially distance. He defines the "maitrise des métriques" as a fundamental element, but also location of residence or past, memorised experiences of cities. In this paper, we would like to go a step further in the working out of the differential capacities of individuals' coping with space (Lussault, Stock, 2010). In order to make clear the practice-centred spatialities, we propose here the notion of "spacing capital" of individuals. Spacing - in French we would say "capital de spatialité" - is defined as relationship to (material or immaterial) spatial realities, which arise through action and deal with action. In the urban, digital and globalised societies, spatial cultures develop not any longer alongside regional differentiations (i.e. France, America, Maghreb, China, etc.) despite persistent national habitus and national regulations. It needs further elaboration. That means the individual systems of placement/dis-placement are under scrutiny because they contribute to generate spatial cultures. We need therefore not to study the spatial dimensions of social classes or of cultures defined a priori, but to consider the very spatial cultures of individuals as a main problem. The aim of explaining the highly differentiated spatial cultures is attempted through the development of a geographical theory where elementary spatial competences are seen as expressions of different modalities of spacing capital. We form the hypothesis that those competences depend not only upon the cultural, economic or social capital, but also upon the spacing capital of individuals. There is therefore a reworking of the "theory of capital" to engage where the spatial, cultural, social, economical dimensions of the dispositions and accumulation of advantages are to be reordered in order to achieve a more adequate theoretical framework. The identification of the spacing capitals permits then to work on the relationships to identity and alterity in a globalised world, where the negotiations between I- and We-Identities in relationship to the Other appear to be more complex."

### The place of culture in social theory and in social geography. A new approach towards linking agency, structure and culture

*Tabea Bork-Hüffer (University of Cologne)*

Social theory approaches as developed e.g. by Anthony Giddens have received substantial appraisal within human geography and especially social geography. Yet, one approach that hardly received attention in geography up-to-date is Margaret S. Archer's (1982; 1988; 1995) morphogenetic approach that she developed parallel and for the most part as a criticism on Giddens' theory of structuration. Archer is a proponent of realist social theory and the theory of relational emergentism. In comparison to Giddens' theory, one strength of Archer's approach is that she pays special tribute to the role of culture in the structure-agency interlinkage - especially in her work on "Culture and Agency. The Place of Culture in Social Theory" (Archer 1988). Furthermore, she delivers a conceptualization of the social dimension through integrating the different kinds of influences of other agents (individual, corporate and primary agents) in the creation of structure (and culture) but also in their influence on an individual's actions and vice versa. In opposition, Giddens puts special emphasis on the role of the individual actor within his theory of structuration. In this paper a theoretical approach is presented that is based on a combination and further development of mainly Archer's and Giddens' approaches. It is argued that both approaches elaborate in-depth on different aspects of the nature of structure and agency as well as their interlinkage and when combining strong parts of both approaches it is possible to overcome some of their individual shortcomings and one-sided emphasis. Special attention is paid to the various interlinkages and interdependencies between structure, agency and individual action as well as to their development in time and space in order to understand the broader context of individual actions. The approach was applied to the example of rural-to-urban migrants' health seeking actions in Guangzhou, China. The primary data that is used consists of 39 qualitative interviews with migrants and a quantitative survey with 450 migrants as well as 29 qualitative interviews with representatives of administrative units of different levels, health services providers, representatives of NGOs and social organizations. Selected results that show the relevance of culture in migrants' actions are presented. Among these are the influence of culturally shaped health beliefs, principles, instructions, precepts and established systems of rules (e.g. guanxi system, the Confucian belief system, the system of face and the systems of Traditional Chinese Medicine and Western Medicine). The results exemplify the potential of the approach in integrating the cultural dimension in (geographical) research.

### Social practices in metropolitan regions. Experiences from the fringe.

*Antje Matern (Universität Hamburg)*

This paper contributes to social theories about region-building and social practices on macro-regional level. It focuses on metropolitan regions, a spatial planners concept and contribution to discourses about competition of places in the globalized space of flows.

Patterns of regional governance - that combine hierarchical, market oriented and cooperative forms of governing - already became a main concept in spatial planning and regional development (Benz 2005, Herrschel, Newman 2002). But with the discourses about the competition of places in globalization a new debate about region-building and regional governance on a macro-regional scale (Brenner 2003, Salet 2007) as strategy to bunch regional resources and strengths and to foster competitive regions by networking started. Additionally, by urban-rural partnerships (another concept announced) positive development trends should spill over from metropolitan to peripheral areas. Debates in political and spatial research about metropolitan regions and governance often ignore ongoing discourses about relational spaces e.g. in social geography (Werlen 2010) or sociology (Giddens 1999) and use container space concepts. While the governance debate focuses on different patterns of governance, structures and cases of conflicts (Christmann 2010), research about metropolitan regions concentrate on infrastructures assets and facility factors (Blotevogel 2009). Consequently, practices of (collective) construction of spaces are neglected while normative models of an ideal metropolitan region were overemphasized. This paper contributes to these gaps in spatial planning and governance research by analyzing the region-building and social practices of urban-rural partnerships in the metropolitan region of Hamburg. In a case study analysis (undertaking as PhD project finished 2011) the project focuses on construction of spaces as social practices, motivations, techniques and the materiality of practices. In this actors-oriented analysis the concept of 'Matrix-space' (Läpple 1991) was adopted for identification of on-going spacing processes in different spatial dimensions with special regards to practices of actors from the periphery. In the interrelation of path dependencies regarding actors constellations, distribution of power and institutionalizations of collective spacing on one side and orientations on global trends and international discourses on the other side, the construction processes in the metropolitan region illustrates dependencies of social practices and influences of power, localization of actors and involvement in collective spacing as well as impacts of spacing on spatial pattern with regard to territorial cohesion. Thereby, the analysis identified e.g. shortcomings of urban-rural partnerships for territorial cohesion caused by imbalances of power and the reproduction of dependencies on social practices.

### **Between place and chance: regimes of producing public transport stops**

*Andrey Vozyanov (University at St. Petersburg)*

Public transport stop (hereinafter PTS) represents kind of urban location with specific features such as transitivity, anonymity, local centrality and orientating role. These are constituted on the intersection of physical space properties (which are localization, naming, terminal architecture or road and service signs) and social interactions (of one people getting on and off the vehicles while others are waiting and thirds are driving, with all of them being somehow aware of PTSs urban map). PTS is included in relationships with adjacent space. In some cases it services certain objects, be that trade center,

university or factory. Otherwise it turns out to be the center of previously homogeneous space (e.g. street with monotonous development). PTS may also be a toponymic marker, see common urban question 'On which stop do you live'? One part of my report is about how PTSs are localized, equipped, developed and which changes in nearby landscape it may involve. I will try to define and characterize the common relations between 'micro-histories' of PTS and nearby area. My interest is particularly focused on scenarios of either building the PTS into the local map or influencing such a map via PTS establishing. PTS is usually stable locus regularly providing passengers' access to transport. It may also specify routes and schedules, 'tuning up' urban dwellers' city knowledge and forming their geographical habits and rhythms. Nevertheless, PTSs' topography is changeable. On planning level this is implemented through placing, moving or removing PTS. Corrections may also be made via tactics and practices of passengering stakeholders. Such process occurs in various forms - from routinized practices to claims for official PTS recognition. My paper will describe an example of tactic intervention in fixed PTSs map which I would call 'placeless stops'. By this I mean stopping public vehicle by passenger's request and on driver's 'mercy' in place not designed as PTS. To my view it is important to problematize this practice. When 'placeless stop' happens (rather than takes place!) it misses both certainty and spatial stability. As far as such stop is voluntary and dependent on driver's decision, it may evoke conflicts, inequalities and risks. Via mentioned practice passenger's getting to place drifts from the provided right towards the accidental chance. To illustrate this thesis with help of my field research data I'll try to find out where and when placeless stops are most frequent and who is authorized for them. Besides that, placeless stop practices questionably effect on passenger's opportunities. This is because namely the PTS places and organizes info about passenger's navigation and service, which play significant role in sustainable urban mobility.

## C08.07-01 - Cultural Approaches in Social and Geographical Theory 2

*Chair: Benno Werlen*

### **Multiculturalism: the new European cosmopolitanism under fire**

*Louis Dupont (Université Paris-Sorbonne)*

Multiculturalism: the new European cosmopolitanism under fire. And now Great Britain ! As did his peers in the Netherlands and Germany, the British Prime Minister, David Cameron, recently called multiculturalism a 'failure'. Those countries have been leaders in Europe in claiming that multiculturalism is at once : 'telling the truth about the realities of Europe' and 'setting its horizon'. Multiculturalism has indeed become over the years the new European cosmopolitanism in most well-intentioned political and intellectual European circles, where it is seen as a heuristic device and focus of comparison between cities and countries. Multicultural environment is said to provide personal enrichment, a source of creativity, social and economic assets, a way of seeing and being in the World. By mimetic as well as by conviction, this discourse has spread throughout the World. In focusing on multiculturalism, this paper questions the construction of a global discourse in the social sciences. Indeed, multiculturalism's recent reversal of fortune in Europe gives us an opportunity to examine its contradictions as a cosmopolitan and globalized concept or term (along with, say, sustainability and risk in physical geography): between the discourse and the realities, between the multicultural thought (liberal and critical) and its links to the various discourses, as well as between North American and European visions of culture, and their combined influences on how people and places see and call themselves.

### **Spaces, places, messages. Aspects of a theory on architecture and space as acts of communication and power.**

*Werner Hennings (Universität Bielefeld)*

After a long period of indifference social sciences have rediscovered space (spatial turn). Despite this interest even recent theories of space often lack an appropriate attention as for implications concerning communication theory, i.e. those aspects of a theory of space which could explain how architecture, places and spatial structures can narrate stories and history. Architecture, places and spatial structures in this respect can be seen as texts (narrative places) which develop as parts of a system of signs continuously exchanged in the act of communication between senders and receivers, signs which materialize in a specific form and load with a specific meaning and message. Spatial structures thus constitute an archive of the society mirroring its social experience and culture. Based on the theoretical findings of Eco, Chomsky and Giddens, the lecture first would like to present in a theoretical part some elementary aspects of a theory of

narrative places which sees architecture and spatial arrangements embedded in the wider framework of communication and language theories. Subsequently in an empirical part, the lecture would like to observe the spatial structures of the small town of Jicin east of Prague which in the beginning of the 17th century has been the capital of the Duke of Friedland, Albrecht von Wallenstein, commanding general of the armies of the emperor of the Holy Roman Empire of German Nation. Architecture and spatial structure of the buildings constructed by Wallenstein's architects relate to three messages materialized in narrative places: - Politically Wallenstein being a man convinced of the ideas of absolutism; the spatial structure and the architecture clearly reflect the social order of the time - Philosophically Wallenstein being a man convinced of the Ancient Greece; the spatial structure of the landscaping reflects obviously the principal elements of pre-socratic dialectics and - Personally Wallenstein being a man of Macchiavellian power; architecture and spatial structure of his palace in Prague (Palais Valdstejn) standing in relation to his buildings in Jicin and Hradschin, seat of the Emperor in Prague thereby reflecting the duke's manorial ambitions.

### **Atmospheres - the stepchildren in social research**

*Thomas Doerfler (University of Göttingen)*

Atmospheres had always been stepchildren in social research: too metaphoric to be operationalized adequately, too metaphysical to be in the focus of anti-essentialist social studies. But in contrast there exists no social setting without an atmospheric context like emotions, a sense of place, normative orders etc., as one can see regarding social scenes like tribal feasts, matrimonial bedrooms or prison cells; literature has found uncountable stories in this. Hence, social research had hardly come across the potential of such analysis as its tools haven't been designed for 'atmospheric' approaches. Interactivism, behaviorism, functionalism or recent 'turns' like the 'linguistic turn', the 'pictorial turn' or the 'discursive turn' (if they are at all) fail to grasp atmospheric contexts as they are focused on language, imaginations and/or political determinations that shall surround human actions. To analyze atmospheres signifies for their protagonists to act 'metaphysical', to be interested in 'irrational' context that stick 'essentialistically' to the place and space to be analyzed. Especially recent 'postmodern', German-speaking social geography propagates such declines as it propagates the (formerly critical) Derridean/Foucaultian argument that there exists nothing outside the text/discourse, now having become a dogma to block any research on the material requisites for social settings. Beside the fact that there has to be undertaken further research on the epistemological grounds of atmospheres, thereby not falling behind the legitimate criticism on essentialist terminologies, it is necessary to emphasize the practical and cultural aspects of atmospheric contexts: There is no atmosphere without the subject, no social setting without cultural praxis incorporated in habitus, doxa and similar concepts. On the one hand it is necessary to provide a profound social theory on atmospheres, how they could be analyzed, established, perceived and therefore built, avoiding

postmodern/poststructural shortcuts or dead ends and providing empirical insights which show the potentials for explaining certain (built) environments via their atmospheres: the clashes of divergent interests between city inhabitants and urban planners, the pleasurable enjoyment of specific environments (suburbia, creative city districts) etc. Insights from my recent research project in Hamburg are given to concretize the points made: a comparison between the urban, but neglected districts of Wilhelmsburg and the suburban 'Mustergemeinde' Neu Wulmstorf can bring up the decisive distinctions between suburban and urban atmospheres as lived spaces. The paper would like to contribute to the current initiatives on researching urban ambiances by investigating the social and cultural practices and unconscious imaginaries of place settings as necessary, but neglected concepts in contemporary social/cultural geography.

### **Kidding ourselves? The Highs and Lows of Liverpool Young Researchers Network (LYRN).**

*Tracy Ramsey (University Liverpool), Ceri Anwen Jones-Ellis (University Liverpool), Yvonne McNamara (University Liverpool)*

Davies (1999:14) contends that, during periods of heightened uncertainty, young people become the 'societal litmus test' or Amin's (2003) 'lightening rod' for wider public fears concerning social stability, an issue brought into sharp relief in the UK during the 2011 summer riots. In the UK responses to concerns regarding social stability have been manifest in a range of repressive measures specifically targeting young people, including Anti-Social Behaviour Orders (Crime and Disorder Act, 1998) and Dispersal Orders (Anti-Social Behaviour Act, 2003). Repressive measures, which would be unacceptable if directed towards other identified sections of the community, have been ameliorated by an ostensibly inclusive policy agenda, which has emphasised young people's participation in matters that affect them (UNCRC, Article 12 Right to Participation, ratified in 1991 by UK government). However, the meaningfulness of young people's participation is frequently questioned (Cruikshank, 1999) as their discursive constructions have remained resistant to change, as the economic and political environment has led many UK youth services to target their services to those deemed 'at risk', thus compounding the construction of young people as either 'in trouble' or 'as trouble' (Griffin, 2001). This changes the parameters within which workers engage with young people and the nature of the relationship between them. This tokenism may be extended to 'participation practice', as young people are asked to confirm decisions made by adults, or work without designated budgets to support any changes they advocate, thus undermining their participation and empowerment. In contrast, research with young people has a developing and honourable history (for example Aldred, 2002). However, researchers are frequently aware that their determination to develop young people-led research may fall short of their ambition. A number of explanations are offered for this as 'we all take part, in different ways, in shaping narratives of youth' (Griffin, 2001:162). Critical to notions of genuine participation is power sharing, specifically power to construct the research agenda (Lukes, 2005). The

following is a description and partial analysis of a participatory research project which, despite the reflexivity, experience and determination of the research team, was in danger of becoming another tokenistic 'young people's' research project, until the young people took power.

## C08.07-02 - Cultural approaches to sacred spaces in the global era 1

*Chair: Rubén Camilo Lois-González, Valerià Paül, Miguel Pazos-Otón*

### Place to roads: Bio-Bio's case (Chile)

*Hugo Capella Miterique (Universidad de Chile)*

Roads have been studied in geography in its functional dimension but with less regard to its cultural one. Nevertheless, roads are one of the main elements to understand territorial building and inheritance. In this article, we focus, on a theoretical revision around the geographical complexity of the road concept, understood not only in its spatial dimension, but also as a temporal marker. In that sense, roads supply not only a Kantian dimension, but also live functions and lived experiences, as places. After that, we'll base the article on the study case of Bio-Bio's Road in Chile, to show how the study of a forgotten road can be useful to understand a whole cosmology. Bio-Bio's road represents an old river path that has been completely forgotten behind the idea of boundary but that has left a deep print into the territory. Thanks to the study of this landmark we are able to understand different pattern settlements, to rebuild the Mapuche's cosmology and to finally find a regional identity, from merge to a mixed diversity.

### The way of Saint-James: architectural transformation of a cultural landscape

*Belen Castro Fernandez (University College Dublin)*

The Way of Saint-James: architectural transformation of a cultural landscape The architectural restoration developed in Galicia between the 40's and the 80's of the twentieth century boosted the monumental revitalization of the Way of Saint-James. The interventions made for the defense of its artistic heritage lead to a stage that reaches the present, where the Way of Saint-James is considered as World Heritage since 1993. The Galician medieval heritage deserved a priority attention because it was the keypoint of a historical and unrepeatable personality: that of a country located in the peripheral of the Western Europe whose privilege was settled on the medieval pilgrimage to the jacobean sanctuary. This medieval pilgrimage gave an european culture to Galicia, with main artistic and literary hits, such as the compostelan romanico or the galician-portuguese poetry. Maybe, the most amazing fact from the analisis of these interventions is the progressive creation of an open-air museum on route (on the route of the Way of Saint-James), that goes beyond previous experiences with medieval art. The cathedrals, the monasteries and the romanico churches are still the keepers of the historical memory in Galicia. So it explains why the 40's, 50's, 60's and 70's interventions were so important for our collective awareness of the Way of Saint-James. These interventions were conditioned by

both the Spanish and European postwar. This led to the withdrawal of many criteria from the modern restoration as stated in 1931 Athens Charter. And so, in an Europe marked by the reconstruction it was very difficult to apply strictly the criteria of the Camilo Boito's philological restoration or the Gustavo Giovannoni's scientific restoration. As a consequence, the restoration interventions that were made that time on the artistic heritage from the Way of Saint-James, were projected from a reductionist point of view vision. A tour for actions than have simplified the way and the evolution of monuments is shown here, selecting from all its history a single moment that usually coincides with the medieval settlement stage. And this, implies the elimination of all the subsequent interventions.

### The New Tendencies in the Geography of Pilgrimage. Changes, Patterns and New Dynamics in the Sacred Space of Santiago de Compostela.

*Rubén Camilo Lois-González (Universidade de Santiago de Compostela),  
Lucrezia Lopez (Universidade de Santiago de Compostela)*

Religion has 'territorially organized' the sacred space, thus creating sacred places and peregrination routes; the first ones mark the routes, while these allow reaching the places. Nowadays, new cultural and secular tendencies are changing the religious essence of the sacred places; consequently, the geography of pilgrimage focuses its attention on both sacred and secular places (COLLINS-KREINER, 2010). This change requires a reconsideration of the meaning of 'pilgrim' and his contextualization in a scenery where mobile individuals are continuously proliferating: pilgrims (religious and secular ones) and tourists (religious and cultural ones etc.). All of them share the same desire to live an authentic experience; therefore our question is what the difference among them is? One of the most consolidated European holy places and, at the same time, tourist destinations is the city of Santiago de Compostela and, of course, the Way of Santiago; here, the original religious essence lives together with new cultural changes. With a careful look to the global era, we pretend to analyze how these new cultural patterns affect the holy space. From the point of view of a phenomenological methodology, which has been recently re-discovered by the geography of pilgrimage, we can consider some transformations regarding experiences and human practices linked to pilgrimage. Considering that pilgrimage is a performative act, which exists when we make it and respect its rituals (COLEMAN, EADE, 2004), it can be interpreted as a theatrical representation of the daily life. The value of the pilgrimage becomes complete thanks to an adequate location: pilgrimage landscape (ALDERMAN, 2002). As far as landscape is concerned, we consider that the sacred space organization and the scenery observe behavioral and movement patterns; for these reasons, we investigate the pilgrimage landscape as social product. Considering that, the physic and symbolic territorial organization is determined by a cultural meaning, the sacred conception of the medieval and religious world has been replaced by a new setting endowed with services and improved accommodation and hospitality offer, etc? This implies a social change, as

inhabitants have to 'change their role'. In other words, the sacred space is undergoing a process of commercialization moment, which requires new tourism equipments (SCHRAMM, 2004). Finally, we analyze how the cultural products of the globalization are transforming the sacred space: while in the past the 'essence' of the pilgrimage lied in the sense of adventure and the unknown world, nowadays the new technologies are turning the unknown place into 'something' easy to reach by means of web-pages that enable to make virtual route or to read blogs.

### **Pilgrim experience of a sacred place in the shadow of a myth**

*Mats Nilsson (Departement of Geography/Tourism)*

Tourism, among them tourism around myth, rapid increase in the world is often considered a result of our constant desire for new experiences to places that we perceive to be different. The sites will give us experiences that contribute to satisfaction and variety and a break from our daily lives: something new, exciting and create a curiosity of us at varying ways. Places where myths are part of the identity are in tremendous quantities. They have in most cases created a long time and around those circuits at various levels stories and events that will enhance the importance and hence the attraction of the myth. This Article intends to contribute to our understanding of place and myth based on concepts such as identity, symbol and sacred tourism. Articles are an understanding of how places of course in tourism contexts in which myths are at the center. How these sites with focus on myths understood from today's tourism agenda. Identity relevant to the site and the site's identity in shaping the individual's experience of place have long been a focus and a starting point for cultural geographical research. What is considered sacred, however, differ from individual to individual but in this study are related which the individual is regarded as sacred. Sacred place, of course, often, perhaps idealized, as something that is contrary to everyday life and can such an understanding from the outset appear to be a "center" for tourism. The article characterized the relationship between the concepts of place, identity, symbol, myth and the sacred in a touristic context. This means in this context that the Central is a place that has an identity built around and around a myth in a touristic context, as the center of experiences in which people interpret, perceive and make sense. Location is defined to be the center for mediation and meaning or focus on human feelings rather than just a physical location in the room. Purpose of seeking deeper insights into the (myth) identity that is marketed for a place and individuals who experience and are part of the site, and what it means for them based on their conditions, world and ambient. The starting point is a place-related identity and highlights section which together creates an attraction for the site and, by extension, a commercialized part of the sacred. Two overarching questions about the site design are: the role of myths for a place? It can also be slightly different: What impacts will the myth have of a place? The questions are deliberately open, covered and do not lead to the same answer but the intention is that the answer can have several shades. The article wants to contribute to the understanding of how places identity related to a

myth, used and fills the functions of individual travelers and how to spot and myth interact on an individual's experience. The study intends to relate both generally and also show on the site-specific.



## C08.07-03 - Cultural approaches to sacred spaces in the global era 2

*Chair: Rubén Camilo Lois-González, Valerià Paül, Dr Miguel Pazos-Otón*

### Geographical Studies of Pilgrimage in Ukraine

*Olga Lyubitseva (Kyiv University)*

Pilgrimage is an exceptional cultural phenomenon which comprises the subject-object field of Cultural Geography and Geography of Religion. Geographical studies of Catholic sacred centers (Poland, France) are better known than Orthodox ones. Ukraine has different religions and historically shaped traditions of pilgrimage. These traditions been suppressed during Soviet times revived after the independence gained by the country. The Geography of Religion began to take shape in Ukraine as the separate direction of scientific research in the early 1990s with the direct participation of the author, and, given the number of scientific publications on this subject, one can state the formation of this scientific discipline. The main problems of the Geography of Religion are as follows: 1) the religious situation and the dynamics of its spatial changes evaluation; 2) the spatial patters of the sacred centers of the country identification; 3) spatial and temporal characteristics of the pilgrimage determination; 4) assessment to the ability of sacred centers of the country to meet the needs of the believers and operate in accordance with the principles of balanced development. Territorial organization of the religious sphere in Ukraine is determined by the proportion of Orthodoxy, Catholicism and Protestantism in Christianity, Islam, Judaism and other small religious communities. Each religion has its own hierarchy of pilgrimage centers, which has been formed historically and entrenched in the minds of believers. There are three orthodox large monasteries in Ukraine, which plays the most significant role: Svyato-Uspens'ka Kievo-Pechers'ka (got this status in 1598), Svyato-Uspens'ka Pochaivska (1833), Svyato-Uspens'ka Svyatogors'ka (2004). Rocky Orthodox monasteries of Crimea and Pod'ilya are known since the Middle Ages. Sacred places of Old Believers are preserved in Chernivtsi and Chernigiv regions. Geography of Catholic sacred centers in Ukraine is presented by the hierarchical structure, in which Lviv and Zarvanitsa are the most known. Reformed Faiths (Protestantism, Lutheranism, Calvinism) centers are located mostly in Volyn and Trans-Carpathian region are mostly represented now by Baptizm, legovizm and modern sectarian forms. The Judaism centers of pilgrimage in Ukraine are related to Khasidizm: Medzhibozh, Uman', Berdychev, Belz, etc. The followers of Islam are concentrated mainly in Crimea. There are also the sainted places of Armenian and Karaim religions in Crimea. Issues of the logistic provision of centers of pilgrimage, improvement of their infrastructure, including hospitality, aimed to the balanced development are of the greatest importance. These problems become yet more topical in connection with the

increasing number of the both Ukrainian and foreign pilgrims, development of centers of pilgrimage, and clergymen's neglect towards the problems of the balanced development.

### Religious landscapes in borderlands: an example of Czechia

*Tomas Havlicek (University Prague)*

With the growing significance of the new cultural geography since the 1980s and the return of religious topics to social and geographical sciences, more attention has been given to research on sacred structures. A culture cannot understand itself without first understanding its implicit connection and development within the constructs of religious belief and practice (Carrette 1999, Brace, Bailey, Harvey 2006). The paper that follows aims to contribute to discussions surrounding the study of Czechia's religious landscape, by exploring the condition, development and role of sacred structures in the country's borderlands. The results of field monitoring (monitoring of sacral objects and interviews with key actors in micro-regions) show that the religious landscape (religious identity) in Czechia develops only partly after general presumptions. The character of the religious landscape does as well as the role of religion in a given territory but also the human and the social factor. By the synthesis of the ascertained information it is possible to distinguish three key posts are: a) religious representative (e.g. priest), b) involved subjects (e.g. municipal and regional authorities, councillors), c) local population (believers, patron or sponsor). Local people can also contribute to the flowering of religion and sacral objects in their home place. Sacred structures represent also a significant pillar in the formation of regional identity. Nearly every municipality presents itself visually on the Internet or in postcards predominantly with images of its sacred structures (churches, chapels, etc.). Most residents of Czechia's rural areas also identify with sacred structures, in spite of the fact that representatives of local government often perceive such items more as cultural-historical symbols in the landscape than as religious structures. Sacred structures helps to build more cross-border interaction in the "new" Europe.

### Valorisation locale d'un itinéraire de pèlerinage et développement durable en moyenne montagne : le chemin de Saint Jacques du Puy-en-Velay à Conques (GR 65)

*Mauricette Fournier (Université Blaise Pascal)*

Cette communication se propose de montrer l'impact de la valorisation d'un itinéraire culturel sur les territoires qu'il traverse dans les moyennes montagnes du Massif Central (Velay, Margeride, Aubrac), espaces de faibles densités à l'économie très fragile, et précisément de montrer comment le GR 65 participe à un développement à la fois endogène et durable. Sur les premiers 200 km de la via Podiensis (Le Puy-en-Velay / Conques), rebaptisée localement « l'autoroute de Saint-Jacques » en raison de l'importance de sa fréquentation (18000 marcheurs comptabilisés à Saugues en 2011 ; 25% d'étrangers) 3 hypothèses ont été testées à partir d'enquêtes de terrain (auprès des

responsables de structures d'hébergements, commerçants, élus locaux et pèlerins) : 1- la capacité d'initiatives des sociétés locales ; c'est en effet au rôle précurseur de certaines associations attiligériennes que l'on doit la renaissance de cet itinéraire jacquaire à partir des années 70 (redécouverte des sentiers historiques, balisage, topo-guides) ; c'est encore grâce à la dynamique des acteurs endogènes (municipalités et acteurs privés) qu'a été mis en place le dense réseau (1 gîte d'étapes /5 km) des structures avant que le caractère massif de la fréquentation n'incite maintenant de nouveaux arrivants à en ouvrir d'autres. 2- le GR 65 comme levier de développement durable ; - au plan économique le GR 65 est devenu une source de revenus pour les populations et les collectivités riveraines ; les structures d'accueil bénéficient d'une saison touristique élargie (6 mois d'avril à octobre) ; les commerçants locaux se sont aussi adaptés à la demande des pèlerins (restauration, chaussures, pharmacies, librairies, pressing...), ce qui permet leur maintien dans ces territoires démographiquement anémiée ; de nouveaux services sont proposés (port des bagages) ; - au plan environnemental, la voie jacquaire a permis la mise en valeur des patrimoines naturels et bâtis des régions traversées ; les paysages sont entretenus, les édifices réhabilités. 3- le GR 65 comme créateur d'identité ; les riverains sont maintenant fiers d'avancer qu'ils habitent sur le chemin ; les prestataires d'hébergement se connaissent le long du linéaire ; s'est ainsi développée une forme d'attachement à l'itinéraire de Saint-Jacques. Ainsi la via Podiensis constitue-elle un élément majeur de la recomposition en cours de ces espaces montagnards. Elle permet l'affirmation de territoires singuliers sur ce linéaire.

### The Changing World Religion Map

*Stan Brunn (University of Lexington)*

Global religions are being challenged by three underlying factors: the worlds of speed, fluidity, and cyberspace. Each of these is discussed within the context of transformations in traditional cultural hearths and homelands, new global diasporas, transboundary interactions, and the role of social media at personal, local, regional and global scales. Place based institutions are being challenged by new social media, secularization, de-institutionalization of formal institutions and the multiple new religions faces. Virtual religion is now a recognized ingredient of many faith based communities. The cyberspaced knowledge-information sector is even questioning the place-based nature of traditional religious places, landscapes and pilgrimages. States themselves are facing the changing faces and mixes of religious or faith-based issues, groups and parties. Adjusting to religious worlds where speed, dynamics, and local equals global and vice-versa are challenges faced by traditional permanent religious institutions and their adherents as well as temporary and even ad hoc institutions. The result of these changes are evident in both the cultural wars, conflicts and faces of communities and megacities in the Global North and also the Global South. Maps of religious networks, adherents, and institutions are both devolving and evolving. Cartographic examples of these shifts on regional and global scales are presented for discussion.



## C08.07-04 - Cultures and sustainability

*Chair: Benno Werlen*

### Relevance of cultural knowledge and skills to guide individual and social practices towards sustainability

*Bhaskar Poldas (Nexus Institut für Kooperationsmanagement)*

Dr. Bhaskar Poldas, post doctoral research fellow of German Academic Exchange Service, affiliated to Sustainable Hyderabad project & nexus Institute for cooperation management and interdisciplinary research, Berlin ([www.nexusinstitut.de](http://www.nexusinstitut.de)) In India culture strongly influences lifestyles of people and social practices. Some of these are quite detrimental to environment and climate. For instance, people compete with each other in celebrating marriages of children in a pompous way. They boast to have organized wedding buffet for guests in such a grand way, with so many no. of dishes. Large amounts of food are wasted on such occasions. Spending huge money on food is just one negative aspect in lavish wedding parties. According to food minister, around 100,000 weddings and social events are held in India daily. With food wasted each day in Mumbai the city's vast slum population can be fed, he added. Similar is the case when people of a religion compete with each other in burning fire crackers to celebrate a religious festival. On the occasion tons of fire crackers are burnt, extremely polluting the air, generating tons of waste on the roads, causing severe sound pollution, badly disrupting the traffic flow on the streets and jeopardising the passersby. These are only two examples of cultural aspects adversely affecting the climate, which can be tackled with knowledge and skills embedded in the very same culture, following the homoeopathic principle 'Like cures like'. The author as part of his research on 'Religious explanations for the impacts of climate change and their influence on the climate related behaviour of citizens' has been studying cultural and religious aspects influencing the climate related behaviour of citizens in the emerging Megacity Hyderabad, India to find culture-based strategies to motivate citizens to adapt their lifestyles to be climate friendly. This paper presents results of expert interviews with religious scholars of three major religions in Hyderabad, Hinduism, Islam and Christianity. In the survey when asked, inter alia, about the ways and means to guide citizens to lead a climate friendly lifestyle, the scholars have made promising suggestions. The survey is part of German research project 'Sustainable Hyderabad' ([www.sustainable-hyderabad.in](http://www.sustainable-hyderabad.in)). It is funded by the German Federal Ministry for Education and Research (BMBF) within the program 'Research for the Sustainable Development of the Megacities of Tomorrow - Climate and Energy Efficient Structures in Urban Growth Centres.'

### Learning, Faith, and Sustainability: Considering the Work of Faith-Based Organizations in Kenya

*Joanne Moyer (University of Manitoba)*

Sustainability, global society's response to the interconnected reality of widespread poverty and environmental degradation, is essentially a learning process. To move more effectively toward this goal, a deeper understanding of learning is necessary. Non-governmental organizations (NGOs) have become a vital force within the sustainability project in recent decades, and as such, form the context for much of this learning. This research investigated learning within faith-based organizations (FBOs), a prominent, though often ignored, segment of the NGO family. Using the framework of Mezirow's transformative learning theory, the research examined learning among individuals within FBOs doing environmental and development work in Kenya, East Africa. Research findings focus on the cultural and social context of the learning, learning content and process, and the relationship between individual transformation and social action and change. The research highlights, for instance, the importance of instrumental learning and related learning processes, an undervalued component of the theory. Learning by doing, through practical application and experimentation is not included as a primary learning mechanism in transformative learning theory, but is highly relevant in the Kenyan context, and may even play a significant role in facilitating transformation of higher level meaning structures. For example, learning the skills required to band or ring birds helped staff and volunteers at a Christian conservation organization to increase their broader awareness, appreciation and commitment to environmental issues, while staff at a rural development organization were personally empowered while learning and teaching practical health, agriculture and appropriate technology skills in communities. Personal and social actions were understood by the participants as important expressions of their learning, both as a means of deepening their learning, and as an extension of their learning to others in their communities. The study concludes by considering the implications of these learning insights for the sustainability project.

### Mediation Agreement to Resolve an Environmental Conflict and its Social Implications – The Case of Wadi Zalmon (Israel National Park)

*Irit Amit-Cohen (Bar Ilan University), Riki Halamish-Leshem (Tel Hai College)*

Mediation refers to an informal process in which a neutral third party helps parties in conflict attain an agreement which they were unable to reach on their own. It is mainly used to solve social, economic and political problems, but its characteristics allow using it to resolve also environmental disputes. The purpose of this article is to examine over a period of time the different attitudes of some groups of populations (communities, municipalities and governmental authorities) toward mediation agreement and its implications. The agreement was signed for an area which was declared a National Park due to its unique landscape - characterized as a cultural landscape (a landscape which

represents a combined works of nature and of man). Examination over time is intended to expose whether changes have taken place in the populations in respect to the agreement and its social and cultural influences on them. The paper is dealing with Wadi Zalmon, a stream flowing from east to west in Western Galilee, in the north part of Israel and its environs. In this declaration are involved many populations, which represent the multicultural distinctiveness of Israeli society: Christians, Moslems, Bedouins and Jews.

**Putting sustainability into teaching practice – Experiences from an international network on global environmental sustainability**

*Holger Jahnke (University of Flensburg)*

In the past two years, the universities of Flensburg, Javeriana in Bogotá and the University of the West Indies are developing a joint course on 'Environmental and global studies' which focuses on questions of sustainability and sustainable development in an interdisciplinary perspective. In a regular basis, theoretical foundations, empirical case studies from the field of renewable energies as well as teaching concepts are tested and evaluated at all sites. In this presentation I will focus on some key issues of the regular exchanges, which offer insights in the cultural and epistemological foundations of teaching sustainability and sustainable development in the respective geographical context where the course is taking place. These issues touch upon very fundamental distinctions of theory and practice, local and global, as well as reality and imagination.

## C08.07-05 - Cultural Identities 1: The globalizing East Asia

*Chair: Je-Hun Ryu, Shangyi Zhou*

### The Reconfiguration of Urban Identity after Globalization in Incheon City, Korea

*Je-Hun Ryu (Korea University)*

In the 1990s, however, Republic of Korea began to participate in the globalization that followed the demise of Cold War, being accompanied by neo-liberalism. Consequently, a new trend of reevaluating the geopolitical conditions surrounding the Korean Peninsula emerged among people. In Incheon City, also appeared a group of citizens who began to think alternately of the geopolitical position of Incheon City, which had been intimately associated with that of Seoul. Due to the revival of diplomatic tie with China in 1992, the trade barrier against China was eliminated on the west coast where Incheon Port had occupied the leading position among many ports. Incheon Port has been expected to grow in the future as a main trading port that would be open to China as well as North Korea. Moreover, the opening of Incheon International Airport (2001) newly provided the geopolitical conditions under which the importance of Incheon City had to be reevaluated in terms of economic strategy rather than military strategy. A group of citizens are now even dreaming of the future of Incheon City as a global city, which is economically independent from Seoul, with its hinterland of Northeast Asia. In addition, the planning of Songdo New City, following the reclamation on the tidal flat, has encouraged citizens to reconfigure the urban identity in that direction. The reconfiguration of urban identity, of course, involves the acceptance of the postmodern concept of identity that premises its complexity and multiplicity.

### Racialising nation through a sensibilities of hate in Japan

*Masato Mori (Mie University)*

This paper discusses the relationship between national identity and ecology of alien species (fauna and flora), focusing on the symbolic construction of the myth of purity of Japaneseness. In this paper I argue that it is the organization of emotion toward the alien species which have racialised the nation. I look at attempts to foster civic inclusion and argue that they need to work through felt exclusion and fears. I trace history of discursive construction of the sense of fear towards 'alien' in general, particularly after the late 1980s, when Japan witnessed herself being in a process of 'internationalization' and globalisation. The reformation of immigration act for children of Japanese immigrants in the early fostered a process of civic inclusion and exclusion through a definition of non-native. A representation of non-natives as offenders to Japanese nation included 'alien' people, such as Japanese-south American and Korean residents in Japan, and 'alien'

fauna and flora, such as black bass and bluegill through the 1990s. I choose the imperial palace in Tokyo, a canonical site for Japanese nationhood, to exemplify this issue. The ministry of environment launched a cleansing campaign of alien species living in a pond surrounding the palace in the early 2000s.

### Representing the imagined city: place and the politics of difference during Guangzhou's 2010 language conflict

*Hong Zhu (South China University)*

In this article we investigate local citizens' place politics and discourses of place identity during the 2010 language conflict in Guangzhou, China. Drawing on geographical scholarships on the relational construction of place and the progressive politics of difference, we conceptualize place as an assemblage of trans-local connections and disparate trajectories which constitute the radical hybridity of any particular place. In concretizing a relational rethinking of place into a local politics of difference, we suggest that Doreen Massey's thesis of a global sense of place provide an important epistemological basis for destabilizing the normative local-non-local boundary in order to realize a relational constitution of place-based cultural identity and subjectivity. Based on a social and political campaign against the state-led hegemonic language standardization, the 2010 language conflict in Guangzhou is a socially and culturally constructed process in which the Guangzhou locals' imagination and representation of place and identity are reproduced within a local geometry of social relations involving the state language policy, the local community and the city's migrant population. Both exclusionary and progressive discourses of place identities have been articulated in this process of re-negotiation and re-imagination of place-based identities. This paper acknowledges that some place-bounded politics may demonstrate a counter-hegemonic dimension and therefore not inherently regressive. But we also contend that any place politics needs to ask which elements are to be welcomed and which can be excluded in a fluid regime of politics within specific networks of social relations. The cultural boundary of insider/outside must be constantly re-negotiated and rendered relational with an inescapable dimension of responsibility.

### Spatial Formation of Advertising Industry in East Asia

*Zhengyuan Zhao (University of Tokyo)*

This study involved 1) a quantitative analysis to clarify the spatial distribution of the advertising industry in East Asian metropolitan; 2) a qualitative analysis of interviews of respondents from local advertising agencies in Shanghai and Tokyo to examine the motivation of CBD concentration, and its impact on creativity and income. Some researchers have suggested that creative actives, such as production and circulation, are more concentrated in global cities. The study first analyzed the Economic Census data of China and Japan of the past two decades and verified the tendency towards



concentration using ArcGIS. The second finding of this study is that in both China and Japan, the advertising agencies, similar to other professional service industries (e.g., law firms, accounting firms and consultant firms), are more likely to be located in downtown area near headquarters of big corporations or major media groups. This is different from North American and Europe where advertising industries are sometimes concentrated in a specific zone, like Soho area or Madison Avenue. Our interviews revealed a possible explanation of this unique concentration: in East Asia, the personal connection between advertising creators is extremely weak. In China, local advertising agencies benefit from the vicinity to global network agencies by learning idea and information from their foreign competitors, especially big four advertising and communication service groups (e.g., Omnicom, WPP, Interpublic and Publicis). In Japan, the role of transnational advertising groups always accomplished by Dentsu and Hakuhodo, the Japanese monopoly agencies.

## C08.07-06 - Cultural identities 2: Historical places in East Asia

*Chair: Je-Hun Ryu, Shangyi Zhou*

### From Monarchical Space to Ritual Space

*Xiaofeng Tang (Peking University)*

The paper documents four phases of the imperial capitals: (1) the pre-imperial and Qin (221-206 BC) dynastic capital of Xianyang; (2) the early Western Han dynasty before and during the reign of Han Wudi (r. 141-87); (3) the late Western Han (after Han Wudi, and especially during Han Chengdi, r. 33-7 BC); and (4) the Wang Mang interregnum. In the first period, he shows that some aspects of the Qin capital of Xianyang anticipated later developments in Chang'an, insofar as the capital increased in size and came to dominate the landscape of the region "within the passes" (Guanzhong). After the establishment of the short-lived Qin capital at Xianyang, we see other architectural developments that prefigure the logic of the later capital at Chang'an. The First Qin Emperor essentially remade the capital, which was built on an axis. During the second phase in the early Western Han, Chang'an (built on the site of a Qin "traveling palace") went through a process of transformation, from the actual residence of the emperor to a ritual space; this process marked the consolidation of imperial power and the increasing ritualization of the empire. City planning undertaken during the first five reigns nevertheless can be thought of as variations on the older palace system, a system predicated on very personalized notions of imperial power. Before the reign of Wudi, the Martial emperor, the capital of Chang'an only had three palaces. Wudi, however, busied himself with the construction of several new palaces. The new palaces connected by covered walkways also came to encroach upon the clear boundaries once established by the walls of the palace and of Chang'an city itself. The emperor, keenly sensitive to the ritual and ideological implications of space, still did not make the capital his ritual or sacrificial center. In the third period, that of Emperor Cheng, we move a step closer to a true articulation of the capital system. At the same time, the palace complexes ceased to be the most central feature of the capital, because the ritual centers assumed a new prominence. The largest change, however, occurred during the fourth phase, that during Wang Mang reign. In this period, the person of the emperor and the imperial capital for the first time acquired a transcendental character.

### The representation of Beijing's historic districts and their identity groups

*Shangyi Zhou (Beijing University)*

The culture of a city is diverse. The typical areas that were represented in historic record are mostly chosen as the city's cultural heritage or historic area. This is a process of place construction. But the city's new residents can't understand the meaning of city's cultural

heritage, neither the residents living out of historic area. It causes the significance or meaning of a historic area could not be identified by most residents. The city will lose the dynamic of cultural heritage protection and the meaning of a cultural heritage will die, if the city's heritage is neglected by new generation of its residents and immigrants. The identification process of a historic area is the identity process a local culture by the local people and other people, is also a process that a small-scale culture becomes into a large-scale culture. The process is different from that of cultural diffusion. This article takes Beijing as its research area. It analyses the difference of some groups' identification for the cultural heritages, which were represented in text. Beijing's old city has 25 historic areas, including residential, commercial, royal palace, and religious areas. This study investigated the protection willing of local residents, old Pekingness outside of historic areas, the city's new immigrants and people from other cities or provinces. This article concludes that the identification for a historic area's meaning of four groups are vague. Four groups identify the Beijing's culture represented by mass media. The new immigrants and people from other provinces and countries are difficult to identify the local culture that is not represented in formal text.

### Production of Place Identity with World Heritage Registration movement -A Case of Nagasaki, Japan

*Keisuke Matsui (Univ. of Tsukuba)*

A significant phenomenon, which could be called a World Heritage site boom, has occurred in recent years in Japan. There are great expectations for positive impacts on the regional economy to occur from World Heritage site registration, with some people regarding it as a trump card in their regional rehabilitation via the promotion of tourism. Registration as a World Heritage site significantly increases the information available globally on a site from a variety of media, including tourist magazines and guidebooks, TV, the Internet, etc.; thus, the expectation that an increase in tourists will occur in association with the registration. The expectations of the tourist industry for an increase in tourists, and of local municipalities and economic organizations wishing to use it to trigger promotion of their region has led to a movement of more and more World Heritage site registrations. Commodification of places considered sacred is not a contingent phenomenon. In modern Japan, attempts have been made to commodify sacred places with ulterior motives through the activities of actors that include administrations and other related organizations, mainly with a political, economic, or social context, and in connection with regional revitalization, tourism promotion, etc. How then are such attempts conducted, and are there any problems that arise in the sacred places which are consumed? In this paper, the focus will be on the World Heritage movement involved in attempts to register sacred places and the tasks involved in the cultural heritagization of sacred places, which is closely related to the World Heritage movement and tourism commodification. This paper takes these approaches from the two points of view stated below. The focus will first be on the actors that are promoting the heritagization of cultural

landscapes, including sacred places. The problem of the politics involved in the promotion of heritagization is considered from the point of view of the ulterior motives of the actors concerned and the movement for the realization. The creation of a 'locality' is an important technique frequently used in World Heritage movements related to sacred places. The heritagization of sacred places can be seen as a move to place value on the uniqueness of the place, the lives of the people that live there, and the climate and history behind them, and not the actual religious facilities or subject of worship themselves; hence, these movements will be considered using specific examples. Secondly, in the link between the heritagization of sacred places where their value is 'discovered' or sometimes 'created' and tourism is considered, along with ways in which the commodification of sacred places can affect the lives of the people who look after them.

### **The presence of Catholic churches of 19th century in contemporary urban center as symbols of globalization and evolution of urban identity**

*Kyu Won Kim (Korea Culture and Tourism Institute)*

From the end of 19th to the beginning of 20th century, two catholic churches (one is cathedral) built outside of city wall. Until recently they were symbols of western globalization and, now they became urban landmarks. One lies at the preserved traditional urban district where symbol of religious globalization and traditional identity overlaps, at the center of city, Jeonju of 240,000ha. The other church also situate where the international CBD area and vernacular urban landscape meet in Seoul, city of 10 million habitants. The cases of two symbols of late globalization of nearly 100 years ago show different evolution of urban landscapes and situations. In this paper I would like to identify the harmony and competition between changing identity and globalization in urban centers. One of the representative types of traditional means of globalization in human history is the Religion and missionary works. The Christianization of European continent in early days and islamization in African continent shows a powerful globalization in culture, economy and administration. In Korea from 19th centuries, the missionary works of Catholic were concentrated then 20th century follows Protestant missionary works. The influences of missionary, are not only spreading the Religion but also introducing the same values and cultures as western world as a true globalization. In 1866 four French priests from 'Mission étagère de Paris' were martyred. After then it was mostly French missionaries from 'MEP' who worked as missionary. From the 1890s catholic missionaries (mainly MEP) were absorbed in building churches in major cities of Korea. At that period, it was hardly possible to build churches inside city walls (intra-muros). Consequently, many early churches in major cities were built in adjacent to exterior of city walls, as in Seoul, Daegu and in Jeonju. The Ayakhyun catholic church in Seoul is the first western style edifice built in Korea with its gothic style and brick structure. The Jun dong Cathedral in Jeonju is the first western style edifice in south-western region of Korea with its renaissance style of brick structure. They were all built on the execution ground outside of city wall. The village near Jundong Cathedral became

actually Jeonju city's traditional urban heritage district with traditional housings and urban form. On the other hand in Seoul, the ex-execution ground became a memorial park for martyrs near Yakhyun Church. And from the park the major rail road station of Seoul Station, the most concentrated CBD of Seoul and vernacular urban districts locate in neighbor. The situation in urban landscape and the symbolic values are different. And it is these differences in urban identity that I would observe and explain in geographical ideas.

## C08.07-07 - Cultural Identities 3: The urban and rural places of East Asia

*Chair: Je-Hun Ryu, Shangyi Zhou*

### The Landscape Presentation of the Sense of Place in Different Authoritative Dai Villages

*Chen Yapin (Yunnan University)*

Applying community mapping and GIS, the research takes a cultural space perspective to look at correlation between the landscape implication and authority structure of the sense of place. The research conducts a case study of Dai villages in Xisuhangbanna to demonstrate development of the sense of place among the Dai villages of different authority sharing, as well as the spatial structure and place identification among different places. The research also discusses the landscape presentation of the sense of place, reveals the factual demonstration of local emotions, and associates social authority and power with contextual landscape, spatial loading and spatial reconstructing. The research has the following findings: 1. As a means of showing people's sense of belonging, the sense of place can highlight the spatial characteristics of regional emotion when it is spatially contextualized to some degree. 2. The landscape with local emotions serves as a medium through which the regional authority and power is demonstrated and spatialized. 3. The landscape perpetuates the sense of place, and the sense of place diversifies the landscape. 4. In order to build up harmonious villages, it is constructive to honor and harmonize the senses of place of all holders of rights among different minority nationality villages in Yunnan.

### Tourism developing and preservation of traditional culture of ancient village in Huizhou – A perspective from cultural identity

*Xiang Kong (East China University)*

The traditional culture of ancient village in Huizhou Area, which has been preserved and lasting from the period of Ming Dynasty in China history, contains a lot of positive things as achievements of farming culture in the period of which the human-environment relationship is balanced. A relatively closed geographical environment contributes a lot to the preservation of traditional culture of ancient village in Huizhou. However, with the tourism development of these ancient villages, traditional culture will face the impact of culture diffusion and may lost its authenticity since it has to adapt the need of the 'other'. In this context, the cultural identity of the inheritors of the local culture will have great value to the culture preservation. This study, based on relevant researches on identity of local culture, takes Xidi, Chengkan and Xucun three ancient villages with different levels of tourism development as working objects and is mainly intended to get to know the local

residents' culture identity and to find out its influencing factors and then to analyze the relationship between tourism developing and preservation of traditional culture of ancient village in Huizhou. It is showed that tourism developing will not only provide financial support to ancient villages' preservation, but more important, it will profoundly affect the cognition and emotion on traditional culture. Therefore, promoting depth cultural exchange between tourists and local residents will be conducive to the formation of positive interactions between tourism developing and traditional culture preservation which will have important value to cultural tourism.

### The Production and Consumption of Urban Space: Making of Jing'an District, Shanghai

*Xiaohong Zhang (Fudan University)*

The relationship between production of urban space and consumption of space image is an important issue in urban geography. Based on historical data, this paper discusses the role of production and consumption of urban space in the making of the Jing'an district, western part of Shanghai City. Since opening in 1843, the traditional rural society began to change to modern urban one in Shanghai. The authors find that the production of urban space of Jing'an district was based on the logic of capital accumulation which was strictly limited by the Land Regulation and was deeply influenced by the development policies of the Municipal Council. Before 1899, the threshold for living outside the Foreign Settlement was so high, as there were much more wars and disasters in China that time, that only top-class had ability to live the area around Jing'an Temple. Meanwhile, the quiet Chinese rural landscape attracted many rich people to build their mansions there. After 1899, Jing'an district became the western side of the Foreign Settlement. Because the threshold for living there lowered, the district started on converting suburb where the middle class could and would live in. Targeting this social group, consumption of the space image of the area, formerly used as exclusive residential district, became an important strategy the businessmen implemented to develop the area. Some western-style modern entertainment facilities, such as cinemas, theaters and cafes were built up there. Until middle of 1930s, Jing'an district had been successfully transformed from rural landscape to modern urban space. This case study exemplifies the important role the space image played in production of urban space in colonial Shanghai. It means that the consumption of space image not only enhanced the formation of urban landscape but also characterized the reproduction of its urban space.

**D'un territoire agricole au territoire de loisirs: changement de l'identité territoriale vue à travers l'évolution de la pratique musicale au Jeolla-do en Corée.**

*Sujin Lee (Université Paris)*

Depuis la fin du XXe siècle, on assiste à un renouveau de la pratique musicale régionale en Corée. Ce renouveau est apparu pour promouvoir la musique locale dans la province de Jeolla, qui essaie de valoriser son identité territoriale à travers la musique traditionnelle depuis 1997, date marquée par l'octroi de l'autonomie municipale. Situées à l'extrémité du pays, cette région a été longtemps rurale et profondément religieuse, ce qui fait qu'elle garde encore aujourd'hui des traditions bien souvent disparues ailleurs dans le pays. Les modes de vie dans la communauté agricole se sont formés à travers la pratique musicale ; la musique jouait un rôle intermédiaire entre l'homme et la divinité : les travaux agricoles se déroulaient suivant les rythmes donnés par les musiciens : les événements de vie étaient rythmés suivant la musique et la musique était un moyen de faire connaître les tragédies et les injustices de la société. Cependant, depuis l'industrialisation au niveau national en Corée dans les années 1960, l'Etat mène une politique culturelle qui vise à désigner les genres artistiques comme patrimoine immatériel. La mise en place de cette politique s'explique par une disparition rapide des cultures régionales face à la modernité : l'urbanisation, la mécanisation de l'agriculture et l'exode rural massif durant plus d'une trentaine d'année au niveau national. Enfin, à travers la mondialisation, la culture musicale régionale se transforme en un vecteur important pour le tourisme et les loisirs. En effet, les acteurs locaux ont choisi la musique comme un atout régional pour fonder un patrimoine culturel commun pour la préservation et le renforcement de l'identité territoriale. Les communautés agricoles se transforment en communautés de loisirs. De nombreuses manifestations musicales, festivals et concours en témoignent. Ces pratiques musicales s'exportent dans le monde en représentant le territoire dont elle est issue dans des échanges internationaux. La désignation par l'Unesco comme Patrimoine Culturel Immatériel aide à promouvoir ces cultures territoriales. Le marché du disque propose davantage, par ailleurs, des musiques représentant une identité territoriale, véritable emblème de la promotion des territoires dans la civilisation de loisirs.



## C08.07-08 - Multilocality: symbolic and material constructions of space in societies of mobile individuals 2

*Chair: Mathis Stock, Michaela Schier*

### Transnational professionals and their socio-behavioral and spatial-behavioral patterns in a multilocal and mobile environment

*Sakura Yamamura (University of Hamburg)*

Research on transmigrants has been so far more focused on the 'migration from below', which takes the mobile lives and living spaces of the less privileged under closer scrutiny. The migration of highly skilled and highly mobile transnational migrants, on the other hand, who can be regarded as being representatives of the globalizing movement 'from above', is still a rather under-researched field. This study presents research done on transnational financial professionals who were once or still are based in Tokyo and have work experiences in multiple locations in the world. Semi-structured interviews were carried out with over thirty professionals of the managerial level in trans- and multinationally operating corporations of the financial industry. The individuals of this kind of mobility group have gathered experiences of geographical mobility and multi-local lifestyles both in their occupational as well as private lives. They, thus, tend not only to share the working practice in a transnational and highly mobile environment, but - over time - they also tend to share social practices, values and behaviors as they have adapted to such mobility and multilocality in private, too. Their identities are increasingly shaped by the experience of being mobile in multiple locations, - irrespective of the differences of the actual locations they have experienced -, and an according formation of a specific social grouping of such transmigrants can be observed. Furthermore, the results show that they have not only adapted certain socio-behavioral patterns throughout their multilocal work and living experiences; they also show specific spatial-behavioral patterns in their daily lives. On the one hand, this study sheds new light on an under-researched group of transmigrants, providing data on the specific social practices and attitudes of transnational financial professionals. First results show that such highly mobile transnational professionals can be subdivided along specific socio-behavioral as well as spatial-behavioral characteristics, and categorized in at least two sub-groups. On the other hand, the research in a selected urban area, in this case Tokyo, the actual geographical patterns of these transmigrants which accompany their behavioral characteristics, - i.e. the transnational space(s) of highly skilled and mobile transnational professionals -, could be concretely nailed down and characterized. These geographical patterns illustrate the differences in spatial and behavioral preferences of the sub-groups within the transnational professionals' community.

### Life in the multi-local space of the family by the example of Russian au pair migrants in Germany

*Caterina Rohde (Bielefeld Graduate School in History and Sociology)*

The au pair migration programme was originally founded to promote the exchange of cultures by arranging a one year sojourn of foreign young people in a local host family. Nevertheless, recent publications assume that au pair mobility sometimes is used as a 'springboard' to immigration (compare for example Hess 2006). On the basis of 17 biographical interviews with young Russian women, who have worked as an au pair in Germany and thereafter settled permanently in their receiving country or returned after some years to Russia, I would like to discuss in my paper how young women manage the relationship to their families of origin, especially their parents who are living in Russia. The sudden spatial separation from the family is a crucial experience for young women and marks a moment of change with regard to their role and position in the family. It requires young women to construct and practice the role of a 'transnational daughter'. In my paper, I want to discuss following questions concerning this phenomenon. How are intimate relationships practically maintained in spite of spatial distance? From former research it is already well known that transnational relations very much depend upon the use of modern communication technology. I aim to further investigate in which ways the telephone, internet, skype, letters, etc. are used for maintaining the relationship to parents. Furthermore I want to take a look at the meaning of mutual visits (daughters going back to Russia, parents coming to Germany) for the transnational family. How is the role of a daughter re-interpreted due to her absence? The role of the daughter is transformed in the process of au pair migration due to the two interplaying dynamics of maturing and migration. First, au pair migration takes place in the crucial life phase of young adulthood, when typically children attain autonomy from their parents and create a more equal relationship to them. Second, due to physical absence transnational daughters are not able to provide direct care to their family members. The sending of remittances represents this change of familiar roles: The daughter adopts the role of a family provider and remittances allow her to practice care for parents in spite of physical absence. 3) How do au pair migrants legitimate absence and cope with the trauma arising from the family's separation? To explain and legitimate why they left their country and their family normally is an important issue in the biographical constructions of au pair migrants. Many hint to their parents' support for their migration process because of poor life chances in the context of origin. They use the notion that their parents want them 'to live a better life'. Others explain that they aim to bring over their parents and other family members to the receiving country or explain that they believe to return to Russia later in life.

## Families Living In/Between Multiple Localities across National Borders: Fractured Identities or Reinforced Feelings of Local Belonging?

*Yvonne Riaño (Department of Geography)*

The spatial separation of family network members living in multiple localities across the globe is a reality of today's society of mobile individuals. As individuals move to other locations to work, study or other reasons, family networks are confronted with the reality of living geographically separated. These new forms of life have often been interpreted as « problematic » as they supposedly involve a loss of social cohesion and fractured identities. This paper argues that such an interpretation is too simplistic and proposes that transnational multilocal life also bears the potential of strengthening family cohesion and personal identity. The argument is based on an empirical case study of six transnational family networks whose members live in multiple localities across Colombia, Ecuador, and Switzerland. Transnational family networks are not a new phenomenon for Latin American societies as international migration has long been a main feature. However, in recent decades the phenomenon of transnational family lives has dramatically increased, and become more complex, as the numbers of Latin American migrants have multiplied, and the destination of many migrants has moved beyond United States, to also include European countries. The empirical study for this paper was carried out in 2010 using the methodology of « multisited ethnography », which consisted of conducting interviews and ethnographical work in various localities of Colombia, Ecuador and Switzerland with key members of six transnational family networks. The questions here addressed are: What are the multilocal practices of transnational family networks? What are social and personal consequences of such multilocal practices? The results show that a complex variety of multilocal practices exist, with implications for family life, personal identity and multilocal socio-economic development: transnational family networks create business links between localities in Colombia, Switzerland and Ecuador that generate employment possibilities for family members and widen investment opportunities for Swiss companies; they also carry the seed for transnational cultural exchange and multilocal identities. Individuals with multiple lives clearly have different identities to those in single localities. However, from the point of view of the interviewed individuals, multilocal identities are not negatively experienced but rather as a source of strength for feelings of (multi)local integration. Thus, we conclude that practising multiple places, and being embedded in multiple localities, does not necessarily imply fractured identities and local disintegration, but on the contrary reinforces feelings of local belonging, in both European as well as in South American localities. Such conclusions have implications for theories of (transnational) multilocal social space, (transnational) multilocal family lives, and social policies of migrant integration

## C08.07-09 - Multilocality: symbolic and material constructions of space in societies of mobile individuals

1

*Chair: Mathis Stock, Michaela Schier*

### Making Sense of Multilocality: Five Stories in Several Pictures

*Marina Richter (University of Fribourg)*

As geographers we are often tempted to map our data. Multilocal ways of living seem, therefore, an ideal field for geographical inquiry. They allow us to mark places on a map and think about concepts like distance and proximity, density and distribution, and other terms to describe the topography of such a multilocal web. In short, they invite us as researchers to make sense of other peoples' lives and their specific and also personal spatial constellations. Researchers have created and worked with various concepts to describe the spatial formation that emerges from multilocal ways of living. In migration research they have been termed transnational social fields (Levitt & Glick Schiller 2004) or transnational social spaces (Faist & Özveren 2004; Pries 2008). Others have rather focussed on the networks that link places (and people) far away (Featherstone et al 2007). Others again concentrate less on the multiplicity of places but conceptualise the multiplicity in the place itself. Such translocal places - most of the studies concentrate on cities - emplace 'communication circuits, organizational networks, economic linkages, and political projects that span national borders' (Smith 2011). Rather than opting for one of these concepts to analyse multilocal spatial arrangements of people, the paper asks for the concepts and meanings people construct themselves of their multilocal lives. Based on the findings of a larger project on transnational social spaces of migrants (first and second generation) and non-migrants, I will use the data of the second generation of Spanish origin in Switzerland to reconstruct how they make sense of their multiple connections to various places in Switzerland, in Spain, and maybe also elsewhere. The data that emerged from a mixed-methods approach consists of interview transcripts as well as of different kinds of visual data, such as photographs, network maps, geographical maps, and drawings. This allows me to tell the stories of five second-generation Spaniards through the visual material gathered: Five stories in several pictures. The visual material is particularly important as it addresses from different empirical but also conceptual perspectives, how multilocal spatial arrangements can become meaningful. The stories will deal with questions such as the temporality and development of the various linkages to the different places; the ways of dealing with presence and absence of, in particular, people, and the subtle intermediate stages that are enabled by technology and other means; the different ways of making sense of these spatial arrangements; and finally, what the multilocal spatiality means for them, regarding their position and positioning in society.

### The mobilities, immobilities and moorings of work-life on cargo ships

*Maria Borovnik (Massey University)*

This paper will explore the paradoxical dichotomy between the obvious mobilities and movements and the not so obvious immobilities and moorings of cargo-ships, articulated in the work-life of seafarers in contemporary globalisation. It will emphasise on the sporadic, highly temporal, multilocal work-life of seafarers, and the coping or anchoring social and geographical strategies applied to counteract against globally driven, limiting immobilities. Ships have been defined and symbolised as both spaces and places, but mostly as marginal spaces of in-between-ness, constituting relationships between routes and roots, movements and moorings. They have been described as cocoons, protecting passengers and cargo from a marauding sea (Bachelard 1994, 124 in Stanley 2008), and yet they seem also places of statelessness or lawlessness (Stanley 2008). Sanson (2003) refers to hyperspaces as they seem unreal, placeless, Foucault to heterospaces emphasising on their fluidity and marginality. Ships transverse (or crisscross) back and forward through territorialised national and deterritorialised international ocean-space. With such movements they create connections between different environments and societies. Not only are ships, and specifically cargo-ships assemblages in their functions of loading and unloading, but also in the way people are being sporadically put together and apart from each other. Similarly to ports, ships are therefore passageways of change and temporariness, places of connections, cosmopolitanism and coercive identities. This paper will address how seafarers deal with this mobile, yet immobilising work-life on ships and temporary multilocalities involved. Specifically it will explore how multinational ship communities get on with the social and geographical containment and limitations (immobilities), the enabling social and geographical 'anchors' (moorings), and the ebb and flow loops of ship to and away from port movements created by global trade and those of people boarding and leaving.

### Multilocality and urban practices in the Mediterranean cities

*Carla Tedesco (University of Venice), Clara Copeta (Università di Bari)*

During the second half of the XXth century, especially during the 1990s, the concept of the place (topos) as a single city, as a coherent unit, was criticized by many academics (Giddens, 1994; Harvey, 1993; Massey, Jess, 2001). Cities places had multiplied and fragmented. What is more, their 'soft', symbolic sides had started to be analyzed. Thus, places were acknowledged to be built up by urban practices giving them several successive meanings. Nowadays, due to both the increased individual mobility and globalisation processes people are present in many places. This raises new questions concerning both theoretical and empirical geographical research. Within this framework, the aim of this paper is twofold. On the one hand, it explores the notion of multilocality relating it to both Raffestin's theory of (human) territoriality (Raffestin, 1981) and reflections on urban rhythms and practices (Amin and Thrift, 2001; de Certeau, 2001; Lefebvre, 1958). It tries to understand if, how and to what extent can these theories help

us to shed light on multilocality as 'society of mobile individuals'. On the other hand, it aims at discussing some governance issues related to multilocality. In fact, in order to deal with the contemporary multicultural and multiethnic city, communicative or deliberative planning reject universalist top-down projects. New forms of planning practice, interactive and people-centered have been entered (Forester, 2009; Healey, 2010). However, it is not clear to what extent do 'spaces of deliberative opportunities' represent everyday life in cities as well as the practices of multilocality. This paper is based on field work carried out in some Southern Italy cities where these issues have specific features which can be somehow related to the peculiar urban rhythms of Mediterranean cities. References Amin A., Thrift N. (2001), *Cities. Reimagining the Urban*, Cambridge Polity Press; De Certeau M. (2001), *L'invenzione del quotidiano*, or. ed. 1990; Forester J. (2009), *Dealing with differences*, Oxford University Press; Giddens A. (1994), *Le conseguenze della modernità*, il Mulino, Bologna; or. ed. 1990; Harvey D. (1993), *La crisi della modernità*, il Mulino, Bologna; or. ed. 1990; Healey P. (2), *Making Better Places. The Planning Project in the Twenty-First Century*, Palgrave MacMillan, Basingstoke, UK; Lefebvre H. (1958), *Critique de la vie quotidienne*, l'Arche editeur, Paris; Massey D., Jess P. (2001), *Luoghi, culture e globalizzazione*, or. ed. 1995; Raffestin C. (1981), *Per una geografia del potere*, Unicopli, Milano; or. ed. 1980

### Mobile Borders: The Geographies of Migration Routes Management by the European Union

*John Pickles (University of North Carolina), Sebastian Cobarrubias (University of North Carolina), Maribel Casas Cortes (University of North Carolina)*

Recent policies of migration control on the part of the EU suggest an increasing mobility and trans-locality of borders. This paper is based on a multi-sited research project on current European policies of border externalization towards Northern and Western Africa. The process of externalization includes the outsourcing of border control to non-EU countries, as well as the spatial extension of where EU states can intervene, thus a literal expansion of the borderline. The latest EU strategy of border policy and migration control yet to be fully implemented is called 'the Migration Routes Management Initiative'. This strategy involves spreading checkpoints, migration control experts and other dispositifs of migration management along shifting migrants' itineraries passing through sending, transit and destination countries. The Migration Routes Management strategy suggests a broader transformation in the very notion of border and the spatial practices traditionally involved in migration control: from the militarization of state-to-state lines to the management of multi-local and fluid networks. Tracking the history of 'migratory routes management' has implied interviewing EU Commission officials, detailed review of EU budgetary documents, and field-visits to think-tanks involved in relevant policy development promoting this form of migration management. In particular, this paper engages a series of EU funding streams focused on border management in third countries. Besides providing budgetary data for border policy projects abroad, these

reports contain internal evaluations of these new policies helping to outline the conceptual history and institutional development of this distinct spatiality of borders. Our research suggests how the current configuration of border management is more than a straightforward 'pushing out' of state borders. Rather, it speaks to the emergence of a potentially unique and mobile space of governance, constraining and channeling individuals' and groups' mobilities in different ways.

## C08.07-10 - Spatialities of art: between policy and politics 1

*Chair: Anne Volvey, Myriam Houssay-Holzschuch*

### 'Creative City' Boom and Bust: Implications for Creativity-themed Urban Development

*Luke Binns (dit)*

In the first decade of the C.21<sup>st</sup> much urban economic development discourse has been shaped, or at least significantly influenced, by talk of 'creative industries', a 'creative class', and the related 'creative city'. Buoyed by the apparent success of a few 'creative city' exemplars, Richard Florida and other 'creative city' proponents have built and sustained a case for developing creativity-themed urban environments, and pitched this to increasingly receptive municipal authorities around the Globe. To create a successful urban economy, municipalities are advised to follow the example set by leading 'creative cities' such as San Francisco, Barcelona or in this case Dublin (Florida, 2002: 300). And the apparent success of these exemplars is in turn seen to fuel demand for Creative City policies which seek to marshal art, artists, and artistic creativity to the urban competitiveness cause. However, by basing the case for municipal authorities to 'get creative' on the apparent success stories of a few exemplars, Florida and co are pushing a risky, potentially precarious sales pitch. For, what would happen to their argument if one or more paradigmatic cities were to suffer a reversal in fortunes? Would demand for 'creative city' policies be affected? Could omission of references to 'creativity' from policy documents ensue? Might the idea and aspiration behind the 'creative city', which has held such a privileged position at the pinnacle of urban development professionals' agendas, be put at risk of imminent collapse? This paper, which charts the rise and fall in economic fortunes of Dublin, a city previously portrayed as a paradigmatic creative city, shows how the Celtic Tiger success story and the increasing potency of Florida-esque 'creative city' discourse were used to reinforce one other: leading to inflated convictions in the soundness of both. Then, with reference to the bursting of Dublin's property price bubble and an associated free-fall in economic fortunes amid disintegrating faith in 'creative' solutions, the paper considers the extent to which the fall from grace of this paradigmatic exemplar might be undermining wider discourse on the merits of the 'creative city'.

### Reconnecting places through art? Joubert Park and the Johannesburg Art Gallery in the inner city of Johannesburg (South Africa)

*Pauline Guinard (Université Paris)*

Created in 1906, Joubert Park is one of the biggest and oldest park in the inner city of Johannesburg, as well as the home of the Johannesburg Art Gallery, an art museum created in 1915. Even if the park - as the rest of the inner city - was very popular during the apartheid era, especially amongst Whites, it has been facing a cycle of decline from the late 1980s, marked by White flight, urban decay and violence. From then, two separate spaces made of different publics and practices have tended to emerge: the park itself on the one hand, and the gallery on the other hand, a separation further sanctioned in the mid-2000s by the construction of a fence between the two. Despite the spatial proximity of these spaces, the users and the uses of these spaces actually vary. In the park, there are people living or working in the neighbourhood, chess players, photographers or homeless people, that is to say mainly Black and poor people, coming there to relax, to meet friends or because they have nowhere else to go. On the contrary, in the gallery - except for school groups - there are only tourists, artists or art lovers, principally White and well-educated people coming to enjoy the exhibitions, and amongst them, only those who are brave enough to come to that park known as a rough place. These spaces are finally next to each other but, because of the general feeling of fear, they are set one against the other. As soon as the late 1990s, art performances have been organised in Joubert Park in an attempt to address the specific socio-economic context of the area and to reconnect the park with the gallery, and vice versa. The "Joubert Park Project", a local artists' collective, is particularly symptomatic of the "spatial turn" in South African contemporary art, since this initiative intended - according to its own words - to "take the urban context as a base material". In its view, art is indeed conceived as a response to a specific context, as a means to tackle socio-economic issues by considering space as a starting point, as a building material. Made with and by the public - and not only for a public -, art is perceived as a catalyst for urban change. But to what extent can art be a suitable tool to affect people's daily practices and perceptions of spaces? Is it possible to initiate a long-term urban change through art? How can these extra-ordinary moments influence the ordinary life of these spaces and people? Focusing especially on three art performances trying to make the publics from the park and those from the art gallery talking to each other, I will investigate the function of art as a tool to challenge socio-spatial divisions and to (re)build connexions between spaces and people. Ultimately, I will argue that art as a way to experiment space differently could be a means to change urban representations, and therefore to (re)invent the city.

## As seen from The Fringe – Creative city-making in Cape Town between policy, politics and practice

*Laura Wenz (Universität Münster)*

Despite its name, 'The Fringe' is not one of Cape Town's many marginalized areas. Located in the eastward precinct of the CBD, it rather constitutes a spatial flagship project of Cape Town's strive towards being a leading creative city of the South which recently saw its first culmination in the successful bid towards becoming the 'World Design Capital 2014' with the accolade awarded in October 2011. The creative city idea has unequivocally become a new planning orthodoxy, materialising itself in various shapes, forms and 'glocalized' narratives across the globe. The aim of my on-going research project is to scrutinize it's manifold meanings and consequences - in terms of policy, politics and spatial practice - for post-apartheid Cape Town, adding to the as of yet limited scholarship contextualising these issues against the backdrop of distinct urban experiences in the global South. In this, the paper tries to provide a common landing strip for both approaches proposed in the session outline: In discussing scenes from my recent qualitative research on the making of 'The Fringe - Cape Town's innovation and design district', I want to present a vivid example of how different levels of government, sector representative bodies, private institutions, artists and other artistically inclined individuals are involved in actively carving out spaces for creative industries in the post-apartheid cityscape. In connection, the artist as entrepreneur is seen as intrinsic dictum of the creative industry concept that has lead to the emergence of new social hybrids such as the "culturepreneur" (Lange 2007) that tries not only to mediate but also to merge artistic and economic production in his/her individual social and spatial practices. The emerging spatial economy of 'The Fringe' cannot be analysed without consideration of its surrounding urban context. Its position directly adjacent to the rehabilitation sites of former District Six, infamous for apartheid's rigorous mass-evictions in 1968, raises questions around appropriation of place, socio-spatial legacy claims and cultural representation. In order to address these difficult questions in a holistic manner and to provide an argument that critically revisits both approaches this paper will enter into a dialogue with the paper of Anne Volvey, who looks at individual art practices in the post-apartheid city through recounting the story of the District Six Sculpture Festival.

## When art claims the land in District Six (Cape Town, SA): principle and methodology of the politics of doing with space in today's contemporary art

*Anne Volvey (University of Artois)*

Within the proposed binary framework of the session's discussion, this paper aims at articulating and nourishing elements of the second stance: art should be no longer taken by geographers as an 'activity in space' or a 'function of the space' but rather considered as a 'doing with space'. The District Six Sculpture Project of 1997, Cape Town (South Africa), is the case study of the paper that deals, in concrete terms, with the politics of

doing with space in today's art. District Six is a late 'white group area only' of down town Cape Town (South Africa), that, once emptied from the population it housed, and pulled down, has remained an open tract of land and, as a consequence, a very symbolic one in post-apartheid South Africa. In 1997, six years after the end of the apartheid regime and its policy of spatial segregation, the District Six Museum that runs the process of returning the land to the displaced population, organized the District Six Sculpture Project 'an outdoors and in situ art event. Developed within the context of series of land claim processes, and of talks of the area being redeveloped, the festival is an impressive example of land claiming through art practices. It shows that the political dimension of the art lies in the arts of doing with multidimensional space, and underlines the spatial principle that makes work Bourriaud's relational perspective upon contemporaneous art. In consequence, the paper will focus on the festival's participative principles and methodologies, and understand the works of art within this prospect. Though held as a key moment in Cape Town public art, the festival had very little impact on connecting art to urban development in today's creative Cape Town. As the Fringe project demonstrates the urban planners rather adopt a 'spatial engineering' understanding of this connection 'art is an activity encoded, managed and located into the city by spatial engineering in order to market the territory in different ways', turning down the political effectiveness of it.

## C08.07-11 - Spatialities of art: between policy and politics 2

*Chair: Anne Volvey, Myriam Houssay-Holzschuch*

### Understanding the Relocation of National Museums of Fine Arts and Assessing their Possible Impact on Industrial Cities' Regeneration: A Network Analysis of Louvre Lens and Centre Pompidou Metz Foundation Process

*Guy Baudelle (University of Brittany), Gerhard Krauss (University of Brittany)*

The establishment of the Guggenheim Foundation in Bilbao (1997) has prompted a number of similar projects in other European cities hit by the decline of traditional industries, attracted by the supposed positive impact of this equipment on economic development - the famous so-called 'Bilbao effect'. Our presentation focuses on two national museums of arts recently designed in this spirit by the French Ministry of Culture in old industrial regions: the new Centre Pompidou opened in Metz (Lorraine) in 2011 and the future Louvre to be opened in Lens (Nord-Pas-de-Calais) at the end of 2012. These cities chosen among other candidates were considered as unlikely to welcome so famous museums due to their weak cultural orientation. So, our first objective is to clarify the genesis of these cultural projects by questioning the importance of the extent of social networks mobilized to support them. We identify the main protagonists of the political and cultural spheres involved locally and analyze their relationships with external actors. Indeed, our theoretical assumption is that only the creation of a sustainable social network dynamics makes the success possible: we interpret the cultural project as a trigger for setting in motion actors previously segregated. Our study confirms the necessity for the actors to be both embedded in local networks and open to wider external new relationships. Our two case studies contribute also to reassess some apparently well established conditions of the success according to the literature: 1) the need for an iconic, unconventional architecture to attract a large number of visitors and beyond to improve the city image; 2) the political use of art for a city global branding policy as these two museums have been launched by national institutions and are mainly funded by the regional authorities - how far the initial social goal of bringing museums to a local public culturally distant from the art can be achieved together with a global reputation management policy? 3) the need for global players 'world famous architects, museographers, planners and landscape designers' as a prerequisite to reach such a global strategy. Beside the question of the idea emergence and of its implementation, we also try to identify possible future spillover effects by creating links between players inside and outside the sphere of culture in order to outline the formation of a new economic system conducive to an overall conversion, in accordance with the expected 'Guggenheim effect'. We evaluate the initial relative importance of economic and urban revitalization objectives and the possible future impacts both on the urban regeneration

and on the local and regional economic revitalisation, especially thanks to the development of creative industries and districts in connection with the new museums of art.

### Art ateliers and studios: places for artists and/or for policymakers? The case of La Fabrique in the emerging creative arts district of Nantes, France

*Valérie Sauter (University of Neuchâtel)*

Urban policy strategies using culture and art for urban rehabilitation and economic growth have not always been beneficial for local communities and artists. Culture-led development strategies focusing on large cultural infrastructures have often led to gentrification and the eviction of artists in need of affordable workspaces. However, with new strategies aiming at developing « creative clusters », it has become interesting for policymakers to make « creatives » more visible and thus to promote places for innovation and artistic production (ateliers and studios). In this context, artists' and local municipalities' interests could potentially converge. This is what we will investigate with a case study of La Fabrique, located in the new creative arts district of the French city of Nantes. La Fabrique is a place built by the municipality to « support emerging artists and new forms of creation as well as to address the expectations of artists and creative people » and to « better [respond] to their needs in the areas of production and creation ». It is a project which « combines land planning and cultural networking ». How does such a project emerge? Do artists' interests converge with the city's aspirations, and, if not, what negotiations are taking place in this co-constructed project? What types of places are resulting from these partly shared aspirations? These are the questions to which my presentation will provide a series of possible replies. This paper, based on textual analysis, semi-structured interviews and non-participant observation done during recent fieldwork in Nantes, is part of a larger project dealing with the mobilisation of art and culture in urban project and aiming for a better knowledge of urban art regimes. Keywords: urban geography, cultural geography, culture-led regeneration, urban development

### L'artialisation-in-situ, vecteur et révélateur de la réappropriation territoriale d'espaces à forte valeur environnementale Regards croisés dans les moyennes montagnes de France et d'Afrique du Sud

*Sylvain Guyot (Université de Limoges)*

L'artialisation in situ peut être une des conditions de la valorisation environnementale et du développement territorial dans des espaces en déprise rurale. Dans ce contexte l'artiste est un acteur essentiel du processus de réappropriation territoriale. Il en est l'initiateur ou le révélateur. Dans le premier cas (initiative), l'artiste est un avant-gardiste spatial. Qu'il soit autochtone ou allochtone à l'espace considéré, il réside sur place et exerce une stratégie foncière. Son activité artistique, matérialisée par différentes formes



d'artialisation in situ, va permettre à un lieu souvent marginalisé ou oublié de se reconnecter à un système réticulaire englobant. Un artiste en attire souvent d'autres. Ces collectifs d'artistes constituent une tête de pont très efficace pour attirer d'autres partenaires engagés dans des actions de protection de la nature, de valorisation paysagère et touristique. Dans le second cas (révélation), l'artiste est convoqué pour redynamiser un espace en manque d'attractivité. Sauf à valoriser le travail d'artistes résidant déjà sur place, les artistes ainsi ciblés par la commande publique sont extérieurs à l'espace considéré. Leur activité artistique répond à une commande qui va s'inscrire de manière pérenne ou saisonnière et événementielle dans le paysage. On voit là tout l'intérêt que peuvent avoir les acteurs politiques, à différentes échelles, à instrumentaliser ces processus et à mettre ainsi en scène les lieux et les territoires. Je propose d'utiliser cette distinction (initiative/révélation) pour analyser deux exemples, en Afrique du Sud et en France. Le cas sud-africain (Hogsback, Eastern Cape) relève plutôt du premier processus d'initiative. Le cas français (Circuit des refuges d'art, Alpes de Haute Provence) relève plutôt du second processus de révélation. Dans les deux cas je cherche à comprendre quelle est la portée réelle du processus d'artialisation in situ en termes de développement territorial et comment il est instrumentalisé par des acteurs aux représentations souvent divergentes.

### The uneven spatialities of unconventional art festivals: The case of Paratissima

*Francesca Silvia Rota (Politecnico di Torino)*

The paper deals with the effects produced on (and within) the urban space by practices of contemporary art. Moving from the hypothesis that 'the arts' allow for the creation of uneven spatialities that are related not only to the physical place where the works of art are either installed or performed, but also to the ways the spatial practices of the artists, the visitors, the sponsors and the citizenships are influenced by these works, the paper aims at investigating both these dimensions of the spatial effect of the arts with reference to a specific type of practice: urban 'happening' exhibitions of contemporary art. In 'happening' exhibitions, in fact, often the urban space becomes a dimension of public practice that goes far beyond the aesthetic dimension. Particularly in the case of 'unconventional' festivals, criticizing the 'art world' for the way it encodes the arts and merchandises their products, new spatial practices that are either uneven or unintended are likely to arise. A reason for this is that unconventional practices tend to assume a more open, innovative and democratic format than their 'official' counterparts, giving larger space to the proposals and initiatives of everyone. At least, this is certainly the case of Paratissima, the happening exhibition of contemporary art yearly organised in Turin (Italy) by a local independent association to coincide with Turin's most renowned international art fair Artissima. As showed by the results of a interview-based survey with the various types of actors (artists, organisers, sponsors, visitors, residents...) involved in the 2011 edition of Paratissima, this exhibition had in fact the capacity to use the

spatialities related to the art works (i.e. specific ways of exhibiting, selling, using and consuming the art objects/performances) to create a specific 'sense of place'. Yet, as the paper aims at demonstrate, this effect was often limited to specific portions of the urban space and the urban society.



## C08.07-12 - The Uses of Art in Public Space 1

*Chair: Julia Lossau, Quentin Stevens*

### **The Non-use, Re-use and Mis-use of Public Art in the Vilakazi Street Precinct (Soweto, South Africa)**

*Pauline Guinard (Université Paris)*

Since 2007, the City of Johannesburg has been implemented a "Public Art Policy", designed to encourage the creation of artworks in public spaces. This policy is to be seen in a triple context in which art is conceived as a means: to support urban regeneration; to address the unbalances of the commemorating South African landscape, that is still dominated by a biased and partial vision of history as endorsed by the apartheid regime; and, to promote social cohesion. First experimented in the inner city, the "Public Art Policy" is progressively put in place in townships ' the previously deprived areas assigned to 'Non-White' population ', and particularly in Soweto. The Vilakazi Street Precinct (VSP) programme is one of these projects. Conceived as both a heritage and a tourist project, it aims - through art - at commemorating the history of the neighbourhood and at attracting tourists. Allegedly participative, the VSP project was supposed to be achieved not only for the inhabitants of the neighbourhood but also by or at least with them. Nevertheless the project had trouble involving them in the decision-making process. That implies a narrowing of their possibilities to "use" art - that is to say to appropriate it, to reclaim it or even to exploit it for their own interest - in this conception phase. Thus, one can wonder if this lack of engagement endangers the potential "use" of art by the inhabitants once the artworks created. The responses from the locals to the completion of the project in May 2010 seem indeed to vary from indifference to rejection, from 'non-use' to 'mis-use'. Thanks to observations and interviews realised in 2010 and 2011 in the neighbourhood, I will argue that it is possible to identify different types of attitudes to this public art project: - "non-use", that is to say disregard for the artworks, since most of the inhabitants do not feel concerned in any way by the project, but reclaims it only through the tourist figure and its potential economic outcomes. - playful or utilitarian "re-use" of public art, especially by children who use the artworks as a playground and sometimes collect the information contained in the heritage panels to do their homework. - "mis-use" or even "anti-use" of the project - understood as a rejection of it - that manifests itself: through the expression of a feeling of dispossession by some of the inhabitants; through a targeted vandalism aiming at defacing the outcomes of the project; or through the creation of new artworks by young people from the area, constituting a parallel and contesting artistic proposition to the official public art project. The VSP project is finally an interesting case study to understand the different "uses" of art at different stages of the project.

### **The Australian National Memorial at Villiers-Bretonneux: Monument, practice, meaning**

*Shanti Sumartojo (Australian University)*

National monuments are a particular form of public art rich with layered meanings. They bear the strong imprint of their creators and the symbolic language of the time in which they were built, whilst also seeking to appear 'timeless' and to collapse the national past and future into its present. They also have very specific narrative intent. Whether they commemorate war, political change or national cultures, they are designed to be unambiguous in their messages. However, as with other forms of public art, they are subject to public use, which does not always conform to their designers' intentions. This paper focuses on once such monument, the Australian National Memorial at Villiers-Bretonneux, the biggest of several Australian war cemeteries in northwest France. It explores the relationship between the national narratives of loss and memory evident in the Memorial's built environment and the use of the site by visitors. In doing so, this paper draws on Nora's (1989) notion of lieux de mémoire, sites of national memory where the past is explicitly evoked and represented, and which act as conduits for official versions of the past and seek to proscribe 'appropriate' public responses. It also examines the uses of the national past in the present, and the notion that such sites are as much about forgetting as they are about remembering or memorialising. This paper explores how the meaning and import of such monuments rely on their practiced nature, and are determined in the discursive relationship between hegemonic official narratives and public responses to such narratives. Such public and quotidian engagements occur in relation to powerful spatial narratives that different users must negotiate in different ways, not least because certain types of uses (and users) are inevitably privileged in any spatial structuring. In doing so, I seek to highlight the power relationships that are exercised and negotiated through the use of place, discussing the capacity of practice to shape the meaning of place, in a discursive, dialectical power relationship with dominant cultural narratives. Focusing on the preparation and observance of Anzac Day events at the Australian National Memorial in Villiers-Bretonneux, this paper examines the 'top-down' narratives at work during these national days. It also seeks to unpick the vernacular and quotidian uses of the sites. By examining the relationships amongst the practices to which these sites are subjected, it explores how the Memorial can act as a nexus between public art and symbolic narratives of national power on the one hand, and public quotidian practice and use on the other.

### **Curating and programming for change – urban transformation through temporary art**

*Bettina Lamm (Copenhagen University), Charlotte Bagger-Brandt (Raaderum)*

The scope of this article is to present and discuss the exhibition Urban Play that will take place in the transforming harbour of Køge, Denmark. Eight international artists and

architects are invited to create temporary installations on site during spring of 2012. Urban Play is developed by the authors - a landscape architect and a curator. Both curating and programming are significant as artists and architects commissioned are challenged with requirements for involvement opportunities, materials and location. LLaes fonetisk The aim is installations that stage and involve - responding both to the architectural context and inviting users to engage. The notion of play is significant as a way to invite visitors to inhabit the installations and hence the former industrial spaces. The theory is that embodied play can insert life, commitment and involvement similar to the qualities of art. The intersection between art and play has - as we see it - a potential for a dynamic way to inhabit public space and thereby contributing to the development of urban life and the quality of the urban sphere. The harbor is a major place for the shipping of wood. Also grains and sand is stored and transported on site. These materials will be incorporated into the art projects reflecting to local condition and contextualizing the art installations. They play a vital role in the narrative and tactile of the place bridging the past to the present. In this article the case of Urban Play is used as departure points for a reflection on temporary art interventions as part of urban transformations. A particular focus will be put on how the installations can contribute to the interpretation and reprogramming of site through materiality, play and embodiment.

of temporary public art as an important lens through which to examine dynamic responses by artists, arts administrators and policy makers to shifting imperatives for the articulation, measurement and evaluation of public art.

### Public Art and Evaluation: A Temporary Turn?

*Ruth Fazakerley (RMIT University)*

The formation of 'public art' as a distinctive category of cultural practice and policy in the late 1960s is linked to the emergent phenomenon of art as a special field of government responsibility, and to the widespread reassessment of art itself (its forms, functions and social relations). New practices of environmental, site-specific and installation art claimed the centrality of active audience experience; unsettling the 'proper' locations for displaying and viewing art, blurring the boundaries between art and other things, and between artistic production and reception. 'Public art' might equally be said, however, to have emerged in Australian cultural policy throughout this period as the result of 'supply-side' lobbying for models of 'advanced', professional art and artists; models that have tended to leave the traditional relations of art remarkably intact. These observations point to some of the ongoing tensions embedded in diverse institutional and professional rationales for placing artwork in public places, and consequently the very different criteria against which public art might be evaluated. This paper provides a brief overview of recent Australian local government public art programs and policy, examining some specific cases in detail. These are discussed with respect to both the rich academic literature on the evaluation of culture, and the ever-widening range of claims made for public art's instrumental and intrinsic benefits to cities, communities, citizens, artists and sponsors, frequently predicated on assumptions about the public benefits of active, audience engagement with art. In particular, the increasing attention within contemporary Australian public art programs and policy to issues of temporality, suggests the category

## C08.07-13 - The Uses of Art in Public Space 2

*Chair: Julia Lossau, Quentin Stevens*

### The Social Life of Artworks in Public Spaces

*Laurent Piché-Vernet (Institut national de la recherche scientifique - Centre Urbanisation Culture Société)*

Who are the publics of artworks in public spaces? When compiled, the contributions of art historians who have discussed these issues form a polarized typology of publics. On one hand, the notion of "the public" can be described as inclusive: discussions of controversies for instance tend to put all citizens under the same umbrella. On the other, the viewer's experience has been described using the singular form, analyzing his everyday life practice of the artwork. But, between "someone" and "everyone", could there be a spectrum of publics? I would argue that two interrelated factors have contributed to these framings of the public. First, since Rosalyn Deutsche's major contribution (1996), the meaning of "public" in "public art" has been defined according to Jürgen Habermas' conception of the public sphere: an ideological site between the State and society (1974). Second, while the public sphere has been used in art historical discussions of public art without being questioned, Habermas' public sphere has been hiding another kind of public space. This one can be found in urban sociology, and should not be confused with Habermas' site of debate. Parks, streets, squares and plazas are physical public spaces that serve as support for urban sociability: they are the sites where individuals express their individualities, and where they learn to live together. By using a definition of public spaces that is common in urban studies, the art historian opens a field of theoretical and, most importantly, empirical possibilities. Focusing on the social life in urban spaces is now possible in a concrete way, and it appears to be the first step towards the identification of publics. In his 1988 documentary film *The Social Life of Small Urban Spaces*, William H. Whyte shortly opened this door by filming how people use artworks in public spaces, and how they act and interact around them. Filmed observation still seems to be an appropriate and valid research method to study the publics. Unsatisfied by the theoretical discussions on the publics, and inspired by Whyte's movie, my doctoral research consists of filming the social life of artworks in Montréal public spaces. The notion of "uses" is here crucial because, as preliminary research has shown, it is the entry point to explore how the users actually become part of a public. During this conference, with the help of video excerpts, I would present my first thoughts on how uses of artworks can be analyzed, and how they can lead to the identification of publics. Bibliography Deutsche, R. 1996. «Agoraphobia ». In *Evictions. Art and Spatial Politics*. Cambridge and London : The MIT Press, p. 269-327. Habermas, J. 1974. « The Public Sphere : An Encyclopedia Article (1964). » *New German Critique*, no 3, p. 49-55.

### Aural ethnography: Experiencing sound art

*Angharad Saunders (University of Glamorgan), Kate Moles (Cardiff University)*

Aural Ethnography: experiencing sound art Angharad Saunders (University of Glamorgan) Kate Moles (WISERD, Cardiff University) Over the past decade there has been a growth in sound art projects (Cardiff, 1999; Butler, 2006). Part of the motivation for these projects has been the desire to destabilise the privilege we accord to the visual by revealing how sound and soundscapes encourage us to experience and understand place in alternative ways. While academic responses to sound art are growing (Pinder, 2001; Butler, 2006; 2007) there is, as yet, little sustained analysis of the everyday experiences of more popular interactions with sound art: how does sound art affect us; how do we interact with it; how (if at all) do we create meaning from and through our experience? This paper begins to explore more popular engagements with sound art through an aural ethnography of a community audio walk project. In 2011 a group of young people came together to create a series of audio walks around their neighbourhood in Cardiff, South Wales. These walks were part of a project called 'Sounding the Way' that sought to give voice to groups whose knowledges of the world are traditionally marginalised. On the launch of this project local people were invited to 'take a walk' along the audio trails, and share with us their thoughts, feelings and responses to the walks as sounds art. The result is an aural ethnography that gives us insight in to way sound art can shape and affect our understanding of, and engagement with, place.

### The Ergonomics of Public Art

*Quentin Stevens (University College London)*

This paper is a theoretical and empirical exploration of the different kinds of direct bodily encounters that occur between people and public artworks. This is a geographical study at a very small scale; the focus is on how well the material forms of public artworks fit to the size and movements of the human body. Whatever the intentions of their clients and designers, public artworks are often good for sitting on, leaning against, lying down on, using as a table for work or leisure activities, to rest bags or other objects on, to stand on to see something better, or, more generally, as play equipment for pedestrians, cyclists and skaters. The paper analyses the different postures and movements that occur on and around public artworks, to identify particular characteristics of scale, material, surface and form that appear to allow or encourage specific actions, in line with Gibson's (1979) concept of environmental affordances. My use of the term 'ergonomic' to characterize the relations between these classes of objects and actions is ironic, because ergonomics relates specifically to workplaces, to the optimisation of narrowly-defined work-related functions, and to designing equipment that helps in conducting those activities efficiently, safely and comfortably. In the examples illustrated in this paper, neither action nor object seeks to be efficient. The actions illustrated often seem to be unintended by the artworks? designers, and by definition, art is rarely optimally practical. The actions largely ignore the discursive aspects of artworks; they emphasise materiality and touching rather

than representation and viewing. While in some cases, people do make contact with artworks to be more comfortable at rest, a wide range of uses of public art appear to involve exploration and risk. Observation of people's bodily encounters with public art reveals two groups whose actions are particularly varied: young children who are just starting to explore the world, and young men who are approaching the height of their physical prowess. The paper examines the ways these groups test out the material affordances of public art.

### London Playing Fields

*Nicolas Whybrow (Theatre and Performance Studies)*

'The Uses of Art in Public Space' International Geographical Congress, Cologne, August 2012 (panel convenors Dr Quentin Stevens, UCL, UK/RMIT University, Melbourne, Australia and Professor Julia Lossau, Humboldt University, Berlin) London Playing Fields Dr Nicolas Whybrow School of Theatre, Performance and Cultural Policy Studies, University of Warwick, UK The paper's point of departure is the phenomenon of play, which has experienced an increased practical application recently in a number of ways within different art forms. More often than not, these instances are dependent, first, on the quotidian city as 'play-ground' and, second, on 'participating publics' whose roles vary. Noticeable, so the paper will argue, is the way there is a highly fertile, if only implicit, dialogue taking place between 'unofficial public practices' such as flash mobbing, free running and other forms of 'underground' art making (or, as the case may be, political activism), and those of high-profile artists such as Antony Gormley, Marc Quinn, Mark Wallinger and Martin Creed. Thus a highly-determined public site such as Trafalgar Square in central London - arguably a theatre to the memory of imperialism and war - might reveal critical linkages between, for instance, a 'frozen mob' event occurring in 2008, nineteenth-century statuary (Nelson's Column et al), and the recent activation of a changing programme of artworks sited on the Square's so-called 'Fourth Plinth': Quinn's sculpture Alison Lapper Pregnant, which retained its position there for almost two years between 2004 and 2006, or Gormley's 'collective, democratic portrait of the UK', One and Other, which, in the summer of 2010 witnessed a rotating occupation of the empty plinth by selected members of the public on an hourly basis, 24-hours a day for a period of one hundred days. The latter in particular brings into play issues around the creation of narratives of national identity in urban space in the way it seeks to position a form of fragmentary, improvised 'popular stage' in immediate counterpoint to the rhetorical assertion of 'secure national history' projected by the 'elevated heroism' of an Admiral Lord Nelson or, indeed, the neo-classical National Gallery that dominates the Square's northern side. The paper's purpose, then, is to show, first, how artists are incorporating aspects of 'the street' and developing playful visions or articulations of urban space in the work they make and, second, how the public's engagement with such artworks increasingly takes the form not merely of reception but participation.



# C08.08

## Dynamics of Economic Spaces

## C08.08-01 - Emerging Economic Spaces in Globalizing Worlds

*Chair: Neil Reid, Christine Tamasy, Mike Taylor*

### Territorial knowledge dynamics between path dependency and path plasticity

*Simone Strambach (Universität Marburg)*

The changing nature of innovation processes is a significant feature of the global structural transformation towards knowledge economies and knowledge societies. What is widely acknowledged about innovation processes is the growing importance of external knowledge which requires the collaboration of a variety of actors outside the focal firm, located in different technological, sectoral, regional and national contexts. Even though several innovation approaches such as distributed innovation (Coombs, Harvey, Tether 2003), open innovation (Chesbrough et al. 2006; Cooke 2005), or the organisational decomposition of innovation (Schmitz, Strambach 2009) put emphasis on the increasing significance of external knowledge, the underlying knowledge dynamics which form the basis for innovation have so far received little attention. While technology-driven innovation, the growing importance of user involvement and the co-creation of values with customers indicate the increase of non-technological knowledge as a driving force for innovation, the hidden qualitative shift in knowledge dynamics towards combinatorial knowledge has not been reflected in more detail in innovation research. The geography of these knowledge dynamics on the micro level is at the centre of this contribution. Traditionally socio-economic development has been seen as reflecting path-dependent cumulative knowledge dynamics characterised by parallel co-evolution of technological innovation and social institutions that results in 'new developments' being primarily incremental adjustments of existing practices. Geography influences knowledge dynamics not only through the mechanism of proximity but also through the mechanism of path dependency and place specific institution building (Martin/Sunley 2006, Oinas/Malecki 2002). Knowledge cannot be transferred easily either among actors or combined randomly due to its inherent tacit dimension, its context sensitivity and its process character. As collective learning processes are territorially situated, institutional and organisational characteristics are potentially important to understand how knowledge dynamics unfold in time and space. However, paths are not coherent and there is always a degree of path plasticity (Strambach 2010), i.e. scope for variation in time and space within similar institutional settings. The scope for path plasticity has been increased by the growing importance of combinatorial knowledge within economic development which in turn has widened the field within social actors can innovate. The contribution intends to explore the ways in which space and place shape cumulative and combinatorial knowledge dynamics by proximity economies and the institutional embeddedness of actors, and in turn reshape territory and territorial configurations of actors. Knowing more

about these interrelations may provide an improved basis to understand the production of emerging economic spaces.

### Airports reconsidered. An emerging knowledge-economy-based space

*Sven Conventz (University of Munich), Alain Thierstein (University of Munich)*

Following Castells (2000) seminal work on space of flows societies are centered around all kinds of flows: financial flows, flows of information, knowledge, technologies, flows of images, sounds, and symbols. Through their capability of concentrating different kind of flows - from local to global spatial scale - airports have advanced to key nodes within the networked economy. In recent years airports have rapidly become new urban growth generators, hubs of information and knowledge exchange and centers of competence. At the beginning of last decade Gueller (2003) stated 'airports are not just airports anymore'. Indeed, airports have morphed from pure large-scale technical infrastructure facilities into multilayered real estate sites for commercial, retail and leisure activities and their impacts on rewriting the metropolitan geography have been tremendous. Successively, knowledge-intensive companies have settled their regional, national and sometimes supranational branches in close spatial proximity to airports. Despite the deep impacts of airports on shaping the metropolitan geography little is known about the spatial drivers of this new economic entity. It seems to be that changed locational requirements and reajusted locational behavior of advanced producer services and high-tech companies is one key in understanding the new spatial articulation around airports. The paper reflects the first empirical results of an ongoing research project using the cases of Amsterdam, Munich, Frankfurt, Duesseldorf and Zurich. The contribution asks the following questions: What do we know about the complex interplay between a punctual network-infrastructure such as an airport and their impacts on the spatial restructuring process? Which role plays the knowledge generation of firms and their need for geographical and relational proximity? What role plays the airport within the value chains of knowledge-intensive companies? What role plays an airport within a multi-branch multi-location firm's decision making process about locating activities? First empirical results indicate that the airport is not primarily perceived as a transportation node but as an advantageous business location that supplies a rare competitive advantage: accessibility. With changed locational requirements of the knowledge economy and thus perception and evaluation of airports a new urbanizing space is emerging.

### Multinational enterprises, globalization and labor division in semiconductor industry

*Egor Yablokov (St. Petersburg University)*

Digital revolution with all its electronic devices and gadgets would not be possible without the invention and constant development of transistors and very-large-scale integration circuits (VLSI) or, more easily, integrated circuits (ICs). Every IC is a result of

semiconductor industry work, one of the most complicated industries in modern world. Every year this industry generates a revenue of approximately 280 billion dollars and creates many thousands workplaces around the globe. Semiconductor industry spatial development is impacted and formed under the influence of technological, economic, political and some other factors. The structure of the industry is presented with stages of research and development (R&D) activities, differentiated manufacturing stages and some logistics and specific market-orientated activities. Semiconductor industry is one of the industries where currently there are no more than a few 'local' players. It's an industry where all stages - from R&D to manufacturing and to after-sales support - develop according to the interests of multinational enterprises (MNEs). MNEs control every stage of supply chain and form a unique geographical spread of the industry. An average customer of gadgets, e.g. smart phone, built by Samsung at one of its Korean, Chinese or even European plants, may even not to suspect that the central part of this electronic device, making possible all its amazing functions, - a small piece of a silicon, containing a few hundred millions transistors, named 'system on a chip', - was produced in Austin (US) using intellectual property of a medium-range UK firm, that even don't have any manufacturing facility. At the same time a lot of electronic devices and computer components in our days are made by the MNEs, that don't produce anything at all. Anything except technology and intellectual property. US-based Qualcomm, manufacturer of the core components for a huge percent of all cell phones and smart phones, Nvidia, whose graphic chips make all the visual experiences in modern PCs possible, its rival AMD (also produce central processor units), Broadcom, creator of communication and multimedia chips, - all of these MNEs, generated more than a few billion dollars of revenue every year each other, - don't manufacture ICs at all. But why are they listed among the world's largest semiconductor manufacturers? The answer is because they take advantage of globalization, economy on scale and specific division of labor in the semiconductor industry. All their production take place at fabrication facilities of Taiwanese MNEs like TSMC, UMC and some others or - even more curious example - Global Foundries, a truly called MNE, due to its global presence, manufacturing facilities in Dresden (Germany), Singapore and Saratoga County (New York, US), and core investments from Abu-Dhabi state-owned fund.

### Emerging Economic Geographies in the EU: Spatial Patterns and Determinants of Turkish Direct Investment in the European Union

*Nuri Yavan (Ankara University)*

After Turkey was officially recognized as a 'candidate country' for European Union (EU) membership in 1999, European foreign direct investment (FDI) into Turkey has received a great deal of attention from scholars and policy makers. Indeed, the question of Turkish accession provokes intense debate in every part of the EU and Turkey. Therefore, many studies have focus on EU FDI in Turkey. On the other hand, one of the most important features of today's global economy is the growing outward FDI (OFDI) by multinational

firms from some developing countries and in particular firms from Turkey. Recently, UNCTAD defined Turkey as 'a leading source of FDI from West Asia, emerging OFDI countries'. Indeed, over the past decade, many Turkish firms have begun to invest abroad and thus Turkey's outward FDI has increased impressively. Even though there is a growing literature on European FDI in Turkey, so far no study is available on Turkish outward FDI in EU. In this context, this paper examines spatial distribution of Turkish outward FDI in Europe with emphasize on location choice from a geographical perspective. Using both regression analysis and geographic information system techniques, we test our hypotheses employing official Turkish outward FDI data collected between 2001 and 2010. Our descriptive analysis indicates that, spatially, the favorite targets of Turkish FDI firms have been the Netherlands, Malta, Germany, United Kingdom and then Romania but significant agglomerations of Turkish investments can be found in western parts of the Europe. On the other hand, our empirical analysis suggests that the locations of Turkish firms have been heavily biased toward the largest Turkish population in European cities. Additionally, Turkish direct investments in EU countries are most attracted to countries with large amount of FDI agglomerations, countries that are well-established trading partners with Turkey. We also find that both geographic and cultural proximity as well as patent and exchange rate are significant location determinants. As a result, we can argue that Turkey has already integrated with EU regions at least in terms of economic space. Key words: Economic Geography, Turkish Outward FDI, Location choice, EU, Multinational Firms



## C08.08-02 - Universities, Clusters, and Industry Emergence

*Chair: Neil Reid, Christine Tamasy, Mike Taylor*

### The emergence of Toledo's solar energy industry: A new industry in an old economic space

*Neil Reid (University of Toledo), Michael Carroll (Bowling Green State University)*

Toledo, Ohio is a classic example of an old industrial city that is struggling to find its place in a rapidly changing global economy. The traditional industries of glass and automotive are in decline with the result that the city is facing the challenges of population decrease, high unemployment, and the associated social problems that economic dislocation brings. In response to these economic challenges the city (and the broader region of northwest Ohio) has invested a considerable amount of resources in developing a viable and sustainable solar energy industry. This initiative has met with considerable success. Led by the region's major research university (the University of Toledo) the region has become an internationally-recognized center for cutting-edge research in second-generation solar panel technology. This research, conducted by university scientists, has resulted in a number of spin-off companies that are beginning to employ workers displaced by other industries. The region has also begun to attract foreign direct investment as overseas investors are attracted to the regions emerging and growing solar energy cluster. In this presentation we will outline the growth of northwest Ohio's solar energy industry, describe the strategic processes employed by the region in growing the industry, and conclude by looking at the challenges that are facing the region if it wants to maintain its current growth trajectory.

### The Influence of Architectural Innovation on the Spatial Configuration of Industries: The Example of On-shore and Off-shore Wind Energy

*Pascal Sommer (University of Hamburg), Max-Peter Menzel (University of Hamburg)*

Theories describe the spatial evolution of industries usually in connection to the sequence from radical/product innovation to incremental/process innovation (Storper and Walker 1989). However, studies show that industries are regularly disrupted by what Henderson and Clark (1990) call 'architectural innovation'. Architectural innovation describes not a change of the different components that make a product, but a change in the relation between them, i.e. the product architecture. The effects of architectural innovations on industry incumbents are comparable to those of a radical innovation. Despite the effects architectural innovations have on industries, their influence on the spatial configuration of industries is somehow ignored. What misses is how architectural innovations affect the

spatiality of industry relations, the established locations of the industry as well as on the larger geographical scale the pattern of center and periphery. The proposed paper shall be a first step to fill this gap with the example of on-shore and off-shore wind energy industry in Europe. On the first glance, off-shore wind parks require wind turbines comparable to traditional ones, with the addition of a special fundament and cabling. However, only few firms were able to successfully install off-shore wind turbines. Additionally, these firms split off their off-shore business from on-shore business. Furthermore, new production sites for off-shore wind industry emerged, mostly outside the established centers. By using the framework proposed by Murmann and Frenken (2006), we could define off-shore wind energy as architectural innovation. As one component of wind turbines, their fundament, developed from a peripheral to a core component, the whole architecture of wind turbines changed. We argue that this change, especially the new importance of the fundament, result in new spatial requirements of industry relations and thus a spatial reconfiguration. We analyse the spatial differences between on-shore and off-shore wind energy production using an original data base, which contains data on the plant level regarding business segment (on- and offshore, final assembly supplier etc.), location, time of entry and exit for 750 sites from 1974 till 2011. Henderson, R. M. and Clark, K. B. (1990): Architectural Innovation - the Reconfiguration of Existing Product Technologies and the Failure of Established Firms. In: Administrative Science Quarterly 35(1), 9-30. Murmann, J. P. and Frenken, K. (2006): Toward a systematic framework for research on dominant designs, technological innovations, and industrial change. In: Research Policy 35(7), 925-952.

### University Scientists Bridging Geographical Scales of Knowledge Production – Two Perspectives, One Approach

*Marcel Vojnic (RWTH-Aachen), Martina Fromhold-Eisebith (RWTH-Aachen)*

Economic geographers and regional economists, as well as agents of socio-political development, have ascribed various roles to universities. Beside their basic activities of research and teaching, positive effects of academic activities on the regional economy have been put centre stage. Universities carry the mission to generate knowledge, information and technology and to transfer it to the benefit of the regional economy. Apart from interacting with local partners, however, universities are further characterized by their integration into national and global knowledge networks. The ability to link between geographical scales and to participate in world-spanning networks of information exchange is one of their fundamental and outstanding attributes. Yet, it is not 'the university' that actively operates this way, but the individual scientists who interconnect between scales in fairly individual ways. Attempts that aim at investigating knowledge networking at the micro-level are rare and rely either solely on quantitative or on qualitative data. Up to now, there has been no investigation that systematically combines both approaches. Quantitative approaches, on the one hand, capture a broad range and amount of data on the issue, but are not capable to produce deeper insights beyond



scratching the surface. Qualitative approaches, on the other hand, allow creating an in-depth picture of scientific collaboration patterns and motivations. However, they cannot depict the whole spectrum of relevant information across large samples. Based on these preliminary theoretical considerations, we have applied a combinatorial strategy of the two methodical approaches in order to capture both quantitative and qualitative data on the knowledge networking behaviour of university scientists. In addition, drawing on a 'matched pairs' setting, we have made scientists subject to a comparative analysis who represent different application oriented scientific disciplines at two different universities (RWTH Aachen and TU Delft). This approach aims at the frequently neglected micro-level of the individual in its local embeddedness, and it analyses their ego networks in terms of scale-bridging (regional/ national/ international) interactions with knowledge collaboration partners in the same epistemic community and beyond. Moreover, in order to depict the innovation network centring on the scientist as accurate as possible, university-industry linkages merit specific consideration. The suggested presentation will depict theoretical underpinnings as well as first empirical findings of this DFG/NWO-funded project. It fruitfully combines the perspectives, methods and heuristics of different scientific disciplines and is currently collaboratively conducted by economic geographers and innovation economists at the Technical Universities of Aachen and Delft.

### **Industrial Restructuring and the Cluster Evolution: The Case of Seoul Digital Industrial Complex**

*Yangmi Koo (Seoul University)*

The purpose of this paper is to analyze the paths of industrial restructuring of Seoul Digital Industrial Complex (SDIC). The SDIC, located in the southwestern part of Seoul, has led industrial development as the only designated industrial zone in Seoul. New industries and related focal firms have been generally created in Seoul metropolitan area and then diffused to other regions at growth and mature stages. Under the broad framework of industrial evolution in the Seoul metropolitan area, this study will especially focus on the SDIC, which has played an important role as the first national industrial complex in Korea. Path of industrial development in the region was the renewal of the existing industries and diversification into related industries. New path of the region was also created by indigenous development or external transfer of new technologies and industries. In this paper, these restructuring processes will be explored with relation to the evolutionary perspective of economic geography. The SDIC, originally called as the Korea Export Industrial Complex at Guro, started with an export-oriented industrial strategies focusing on labor-intensive industries in the 1960s. In the late 1980s, this complex faced with the first industrial restructuring by high labor costs, frequent labor conflicts, and hollowing out of manufacturing sectors. Since the late 1990s, Guro as a traditional low-tech industrial complex has experienced the second industrial restructuring. It has been changing into a high-tech cluster by attracting technology-intensive small and medium-sized firms and knowledge-intensive service firms. The major actors of the industrial

development or restructuring have changed from national government in the 1960s and 1970s to private firms and real estate developers after the late 1990s. Throughout the industrial changes of the SDIC, path dependence and path creation processes have been coexisted because of the diverse developmental path of industries and firms.

## C08.08-03 - Resource-based Economies

*Chair: Neil Reid, Christine Tamasy, Mike Taylor*

### South-South economic relations and the role of natural resources in Chilean exports to Asia

*Johannes Rehner (Universidad de Chile)*

Increasing 'South-South' relations are changing the spatial patterns of global trade and financial flows. Asia has become one of the most relevant trade partners of Latin American countries, in particular Chile. Given the rapidly growing Chilean exports to Asian countries, the specific contribution of international trade and its prospects in the medium and long term are critical to regional development. Nevertheless the composition of Chile's bilateral trade with Asia is not necessarily generating higher benefits than north-south trade does. Oriented by international trade theories, certain elements of the 'resource course' thesis and some theoretical approaches to foreign direct investment (FDI) the paper contributes to the discussion of trade policies and economic development. Due to the increasing importance of FDI and its complementarity with foreign trade, an analysis of FDI flows is included. In terms of methodology, this paper presents a quantitative analysis of trade relations for the period 1990-2010. The analysis is based on official trade statistics between Chile and PR China, Japan, Korea and India, complemented by FDI data. Applying different indices it examines structural features and trends of Chilean exports to Asian countries. The prominence of some Asian partners changes the spatial export structure without providing a clear diversification of export products. In some cases it has deepened export specialization in raw materials and products based on mining and agriculture. We expect increasingly unbalanced benefits and impacts of foreign trade in Chile and also that FDI from Asian countries in Chile are still focused in Chilean export sectors or are related to the distribution of Asian imports in Chile. Therefore they potentially enhance the productive development of export regions, increasing development gaps. With Japan there are traditional commercial ties, both in terms of Chilean exports, and Japanese FDI in Chile. Although often related to mining these show a higher level of diversification. The commercial link between Chile and Korea shows some similarities to the case of Japan. In its relation to China, Chile recorded a positive trade balance, but its export structure is extremely focused on copper and fueled by China's demand for primary products. As for the structure of Chilean trade with India are found a trade surplus but high concentration on the export of copper and its derivatives. However, it should be considered as one of the most promising Asian partners. Even though Chile's financial benefits from foreign trade are evident and the role of Asian countries is increasing, from a sustainable development perspective, there are obvious constraints of a strategy based on the exploitation of raw materials, so it is still necessary to discuss its implications on regional development and evaluating strategic trade alternatives.

### Creating a New Domestic Niche Market for Merino Lamb Meat in New Zealand: A Case Study of Small Company Experimentation.

*Michael Roche (Massey University)*

Widespread State sector restructuring and economic deregulation in New Zealand in the 1980s and 1990, locally labelled 'Rogernomics' after its domestic architect provided New Zealand geographers with an unprecedented opportunity to contribute theoretically and empirically to studies of Neo Liberalism in action, in which the agrifood sector has featured large. But as an isolated export dependent economy, a situation deepened by the development of refrigeration and the beginning of large scale dairy and meat exports in the 1880s, in New Zealand 'internationalisation' and more latterly 'globalisation' have arguably long been part of an academic frame of reference. Historical links to the UK and early connections with US geography have also meant that New Zealand geographers have tended to relate their work to the world of Anglo-American geographical scholarship. This paper consciously explores the new forms of economic organisation in the local setting; the bulk of sheep meat is exported and local meat consumption has tended to be overlooked by New Zealand geographers, even though it is the 'normal' context, in which many other agrifood workers are situated and in which they produce theoretical and substantive work. A small scale Merino lamb producing company based in the Central Otago region of New Zealand's South Island provides the specific context for this presentation which looks at the meat commodity production chain in New Zealand. The Merino breed has typically been valued for its fine wool rather than its meat. The paper concludes by discussing what a consideration of New Zealand's 'local' conditions can add to the wider field.

### Facteurs géographiques et naturels de la croissance au sein de l'Union Economique et Monétaire Ouest Africaine (UEMOA)

*Atsé Alexis Bernard N'Guessan (Université de Cocody-Abidjan)*

Résumé Organisation économique régionale en Afrique de l'Ouest, l'UEMOA regroupe huit Etats membres et couvre une superficie de 3 509 600 Km<sup>2</sup>, pour une population de plus de 80 millions d'habitants. Ces Etats sont pour la majorité d'anciennes colonies françaises qui ont appartenu au grand ensemble de l'Afrique Occidentale Française (AOF). Le territoire de l'organisation s'étend sur des espaces aux caractéristiques géographiques et naturelles diverses. Les structures économique et démographique au sein de l'union se dessinent dans le même sillage pendant que des différences se présentent au plan naturel. Le taux de croissance de l'ordre de 5,9% par an au sein de l'union de 1995 à 1999, a fléchi pour atteindre 2,8% par an de 2000 à 2009, une période pourtant plus longue que la première. La présente étude veut mettre en relief les déterminants géographiques et naturels qui interviennent dans cette croissance, somme toute controversée, et proposer des options pour une contribution optimale de ces facteurs à la croissance. Une revue des conditions naturelles et géographiques montre

que les Etats ont des potentiels à même d'impulser un développement plus accru au sein de l'union, mais qui sont insuffisamment ou mal exploités. Une analyse approfondie de la situation indique que la mise en place de politiques adéquates peut apporter une participation plus grande de ces facteurs à la croissance et au développement.

### **The sustainable development and Romania's energetic resources potential**

*Costela Iordache (Universite de Craiova)*

The natural resources represent the natural capital, a constituent of Romania's richness. Turning to account the natural resources by exploiting the irreproducible raw materials as well as the reproducible ones and their process to obtain goods determines the level of economic and social development of the country, the situation of the environment and population's conditions of life. The economic and social evolution of our country depends directly on the energetic resources. Romania has a richness of lean resources, with a rapid exhausting the known resources of oil and natural gas, with considerable no qualitative and inefficient stocks of lignite and swell, with weak capitalized hydraulic and nuclear energy. After 1995, Romania became an importer of row energetic resources and the existing production technologies are considered dirty, intensive pollution and expensive. The loss and intensity (the row resources consumption on energy production ratio) are unfavorable due to some false price and many subventions, a wrong extensive industrial and economic policy.

## C08.08-04 - Emerging Economic Spaces in Europe

*Chair: Neil Reid, Christine Tamasy, Mike Taylor*

### **“Cognitive Economic Geography” – evolution of regional strategies in emerging economic spaces**

*Piotr Pachura (Czestochowa University)*

The aim of this article is to present the role of cognitive approach in economic geography based on theory evolution as well as the case of regional development strategies evolution for an old industrial region in Central Europe. In the first part, the theoretical approaches will be presented as an overview of economic geography theories in the regional development process. The second part, as case study will focus on practical issues of the evolution of regional innovation strategy - 'from chaos to cognitivism'. The cognitive approach to regional innovativeness will be analyze like a 'new paradigm' in economic geography. The research methods used will be based on: desk research; the historical-comparative analysis, qualitative analysis and practical observations and experiences of the author's work on regional innovation strategies.

### **Absorption of the cohesion policy funds vs. emergence of growth and stagnation areas in Poland**

*Pawel Churski (Adam Mickiewicz University), Robert Perdal (University Poznan), Anna Borowczak (Adam Mickiewicz University)*

Pawel Churski Anna Borowczak Robert Perdal Institute of Socio-Economic Geography and Spatial Management Adam Mickiewicz University One of the fundamental goals of the European Union is to create conditions conducive to sustainable growth in the Union's entire territory. The need for economic and social cohesion has been emphasized since the early years of the European Community. Lamentably, the successive accessions of new member states have further accentuated the internal developmental differences. This, in turn, has led to tightening up intervention measures aimed at an effective improvement in cohesion and extension of the content-related range of this concept. This process has resulted in the present change in the focus of the European Union's regional policy on the cohesion policy. In the current financial perspective, the major goal is to achieve the highest possible level of cohesion in as many as three dimensions: economic, social and territorial. The attempt at boosting the competitiveness of the EU economy on a global scale has been a very important conditioning of the cohesion policy, now even gaining in importance. Europe lost its dominant position in the global economic competition after World War II. In the face of China's and India's economic growth and the excessively social policies administered by the members states, with the Union plagued with a high unemployment rate and an inconsistent financial policy regime, it has become even harder to regain that dominant position. This

has led to a heated dispute over the future of the cohesion policy and its focus. Involved in this dispute are supporters of continuing the compensation model and its opponents who highlight the need for inclusion of polarisation models into intervention measures. They also emphasize the legitimacy of underpinning growth extremes, giving them an opportunity to gain a global competitive advantage and positively affect their environment. This article's goal is to identify the relations between the scale of intervention as part of the cohesion policy and the emergence of economic growth and stagnation areas in Poland by regions and sub-regions. The research process consists of two stages; at stage one, areas of economic growth and stagnation in Poland are identified as a result of a cluster analysis on the NUTS-2 and NUTS-4/LAU-1 level. Stage two includes an analysis of relations between regional and sub-regional diversities in the structural funds intervention and the distribution of economic growth and stagnation areas in Poland. Here, factor analysis methods are employed. This article is an element of summing up of stage one of a research project conducted by the National Science Centre (NN306791940): Socio-economic growth vs. development of economic growth and stagnation areas handled by a Team headed by this article's author.

### **The role of the business environment in regional development in Poland**

*Joanna Dominiak (Adam Mickiewicz University)*

Keywords: business environment, regional development, Poland, innovative environment In the modern transformation of the socio-economic environment shaped the economic activity is an important factor of development. Business environment can be defined in a narrow or wide range. In the literature most often refers to three main components of the business environment: institutional infrastructure, innovative environment and social climate. Business environment is one of the major factors activating the region's development in modern economic transformation in Poland. Properly shaped, the business environment on the one hand is a factor in business location, on the other hand - determines the dynamic socio-economic development. Influence of business environment on the development of the region can be analyzed in many ways. Business institutions have an impact on the investment attractiveness of the region, the level of its competitiveness. Through the relationship of innovation - the industry contribute to the development of high technology industries, innovativeness in the region, and also to the formation of knowledge-based economy. These institutions also directly support economic activity in particular small and medium-size firms, providing support information, advisory and training (training and consultancy) and financial (loan and guarantee funds) for doing business. Taking an active part in networks of relations of science and business practices allow the formation of the modern economy of the region This article aims to analyze the level and dynamics of development of the business environment in 2000-2009 in a regional context and the characteristics of the relationship between the level of development of business environment and the level of socio-economic development of regions. This article is an attempt to answer the following

questions: (1) what is the regional differentiation of business environment development in Poland, (2) what was the dynamics of business development in the regions in 2000-2009, and (3) what is the relationship between level of development of business environment and regional level of socio-economic development. Characteristics of the level of development of business environment in the Polish regions conducted in the system is the most important components of the business environment: innovation environment - institutional and commercial equipment business services. The result of this analysis is the classification of regions on the scale level of development of the business environment.

### **Non-metropolitan industrialization in the EU periphery: the case of Poland**

*Boleslaw Domanski (Jagiellonian University)*

Non-metropolitan industrialization is a phenomenon which became a popular theme in the United States more than 30 years ago. It was accounted for, on the one hand by growing costs and other disadvantages of industrial location in metropolitan regions, on the other by the endogenous development of small and medium-sized enterprises in non-metropolitan areas, e.g. in the postfordist approach. At the same time, industrial growth in the emerging economies was mainly connected with major urban agglomerations which offered bigger market, skilled labor, better infrastructure and accessibility. As a result, it was largely believed that industrialization processes in emerging economies contributed to growing urban agglomerations and regional disparities. This could be explained by various theoretical concepts, among other things, product life cycle theory, cluster approach and innovative milieu. In this context, it is interesting to explore the processes of industrialization in the eastern periphery of the European Union. Non-metropolitan areas of Poland, Eastern regions of the country in particular, are regarded as one of the poorest and least industrialized parts of the EU. Moreover, they have suffered from large out-migration for more than 60 years and lagged behind fast growing metropolitan areas in the post-communist period. The aim of the paper is to provide new insight into the mechanisms and effects of non-metropolitan industrialization of the peripheral areas of the EU. The authors take a long-term perspective, that is the contemporary processes are analyzed and interpreted in the context of the economic and social development of these regions since the nineteenth century. These processes include: the fall of some traditional industries, e.g. the 19th century textiles and the armaments production from the Cold War era, the successful restructuring and exports-oriented growth of some other sectors, from furniture and milk products to advanced aerospace components, as well as the rise of entirely new clusters, from standard plastic products to innovative women's underwear and automotive parts. There are significant differences in the role of foreign investors, large domestic enterprises and the local firms in various sectors. The positive effects of local industrialization are found most of all in the case of indigenous producers, giving support to the theoretical concepts putting emphasis on endogenous development. On the whole, the non-metropolitan eastern

regions of Poland have proved surprisingly successful in manufacturing in the last two decades, in contrast to their relatively poor performance in services and agriculture, that is the sectors generally recommended for these areas in regional policy. All this shows a highly complex picture of reconfigurations of local and regional economic spaces affected by the historically embedded local conditions and capabilities on the one hand, and the global forces on the other.

## C08.08-05 - Emerging Economic Spaces in Asia

*Chair: Neil Reid, Christine Tamasy, Mike Taylor*

### Inside Indian IT spaces: reading one global change by the major role of State(s)

*Divya Leducq (University of Lille)*

This paper aims to compare two trajectories of economic spaces in order to demonstrate that State still has - and maybe more than never before in the mid-term slowdown of economy - a strong role to play in shaping innovative and resiliency capacities in the globalized world. Taking as example an emerging giant, India is a country which slowly became one of the most global players within Information Technologies sector - and more specifically in software conception, after the different level of public decision undertook some policy and drawn some agenda to strengthen their scientific, technological and commercial environment. This issue illustrates more than an academic controversy lying in Indian economic literature, but also a main debate dividing the political sphere and the contemporary business class. Firstly, we would like to show that addition and regular evolution of policies, undertaken in a reform context at the central and regional level, are the first point of a clustering dynamic in an under-industrialized country. The second point of the paper would like to underline the main actors and bifurcation times in the construction of the sector. Of course, State(s) government - either initiator, either facilitator - are not forever the main actors of multiscaled clusters. If the policy frame gave enough confidence to the private sector, then appear the key figures of entrepreneurs and stakeholders networks within a promptly changing context. Those various actors enter in the systemic production of emerging economic spaces. Moreover in case of sector crisis, we argue that is the most important point of the resiliency capacities of a territory. In fact, the deep involvement of entrepreneur and scientists in social, scientific and professional networks implements good conditions for the innovative spatial systems evolution. So, our two studied cases, the regional state of Maharashtra and the regional state of Kerala, represent some interesting and quiet different labs - one communist and the other neo-liberal - to observe cumulative effects of the technopolitan process. Based on my thesis, this paper mix some quantitative and qualitative analysis of turnover and efficiency factsheets, official documentation, direct interviews with public and private actors and direct observations. Key-words Cluster - Innovation - Information Technologies - Evolutionism - India References (short list) Leducq D., 2011, Geography of innovative spatial systems of software in urban India. Learning from the cities of Pune, Thiruvananthapuram and Kochi, PhD Thesis: Economic geography and Town planning, University of Lille 1, 435 p.

### Dressing the World - Integrating Bangladesh's Ready Made Garments Industry into a Global Market

*Elvira Graner (South Asia Institute), Mahboob Elahi Akhter (University Dhaka)*

The integration of so-called developing countries into the global economy is often depicted as a vital remedy in order to overcome 'structural' disadvantages. Yet, many scholars from social sciences question such an optimistic interpretation, pointing out to processes that increase rather than overcome regional and social disparities. These ideas have been outlined by the German geographer Scholz in his model of 'fragmenting development'. Thus, he depicts such places as 'globally integrated urban frag-ments' (ibid. 2000, 10) and epitomises the integration as ephemeral and fragile. In a similar line of argument, the French economist Pierre Veltz has characterised these economies as 'économie d'archipel' (1996). While such a metaphor might be quite appropriate for a country like Bangladesh in the age of Climate Change, such a term is usually confined to natural phenomena, but not applied to the economy. Empirically, our research project is based the Ready Made Garment (RMG) industry and the integration of Bangladesh into the 'global' economy. This sector has been set up during the late 1970s and Bangladesh has rapidly advanced as a major production site. With growth rates that still reach nearly double-digit figures, this has contributed decisively to bringing about a moderately affluent middle class. On the other hand, developments, or rather the lack of it, for the vast labour force, have given rise to strong concerns, worldwide. Until today, wages range at global minimum levels, and stiff competition to China and Vietnam is usually taken as an argument why wages can not be increased. While low costs of living have allowed the 4-5 million workers to achieve modest levels of living for quite a while, the highly inflationary costs over the past decade have threatened the livelihoods of many workers. Our study aims at conceptualising and analysing these economic developments from the vantage point of institutional economic theory. When doing so, the rules and regulations at any given locality are understood as the outcomes of (re-) negotiation processes among the key agents, from the public and private sectors and civil society. Our core argument is that the power positions of these stakeholders are distinctly different, and that the 'rules' (such as wages) reflect these positions of power and powerlessness. Of particular interest is the role of the state in supporting some stakeholders. This research project is based on a series of key informant interviews with core stakeholders during the past few months, at the national, local and 'global' level, including policy makers, industrialists, buyers, workers, and NGOs who are engaged in this field.

### **The Spatial Characterization for Regional Disparity of Tourism Development: A New Perspective**

*Rui Liu (CAS), Lihua Li (CAS), Wei Tang (Institute of Mountain Hazards and Environment), Difei Fu (CAS)*

Despite there having been large number of researches concerning the regional disparity of tourism development, few of them have been conducted from the perspective of spatial characterization. In this paper, we attempt to study regional disparity in tourism development by simulating the position of 'spatial balance point' of 'tourism economy force' and its temporary-spatial transfer, rather than by statistics-based index system. To this effect, we use the Center-of-Gravity Model to study the regional disparity of tourism development, employing 'Economic Center-of-Gravity' as the spatial balance point. The model is applied to Sichuan, a southwestern province featured with tourism of China. In this way, we study the degree of regional disparity in tourism of Sichuan, in terms of annual tourism revenue and number of tourists. Finally, we analyze the characteristic and mechanism of the spatial distribution and temporary-spatial transfer of 'Tourism-Revenue Center-of-Gravity' and 'Number-of-Tourists Center-of-Gravity'.

### **Spatial Organization of Multinational Corporations in China**

*Canfei He (Peking University)*

Facing considerable institutional uncertainties and lacking local knowledge, multinational corporations (MNCs) would sequentially invest multiple times on an activity-by-activity basis in transitional economies like China. Sequential investments allow MNCs to accumulate local knowledge through their own prior investments or learning from others, especially those from the same country of origin, leading to the intra-firm clustering and the country of origin agglomeration. Using data on investments in China from fortune global 500 MNCs based in Japan, United States and European Union during 1979-2008, this study found that MNCs have gradually expanded their functions and geographies within China and have indeed invested sequentially in different activities ranging from regional headquarters, R&D centers, business services, to production and marketing and sales. Statistical results suggest significant intra-firm clustering resulting from sequential investments. Japanese MNCs considerably benefit from country of origin agglomeration while the spatial clustering of American and EU affiliates are largely due to the intra-firm clustering. The disaggregated analysis found some evidence of functional agglomeration and co-agglomeration of MNCs, however with significant impacts of country of origin effects.



## C08.08-06 - Emerging Economic Spaces Europe

*Chair: Neil Reid, Christine Tamasy, Mike Taylor*

### Hungarian Industry and its Crisis

*Kiss Eva (HAS Research Centre for Astronomy and Earth Sciences Geographical Research Institute)*

After the change in the political system relevant changes (structural, organisational etc.) have taken place in the Hungarian economy. The spatial pattern of industry has also transformed in the 1990s. Industrial parks which are the new scenes of industrial production, are especially important because they have played an outstanding role in it, and because they concentrate the most important industrial enterprises. Beside old, traditional branches of industry some new ones (like car industry) have also appeared after 1989, and nowadays they are the most dynamically developing branches. The different branches of industry are separated in space depending on many factors. Based upon different data and empirical researches the main purpose of the presentation is to reveal the differences in the impacts of the recent economic crisis on the new and old branches of industry. It is also analysed whether there is any relationship between the "shape" of the crisis and in its spatial manifestation. The crisis has mostly affected the new branches of the industry because they are integrated into the global economy the most.

### Between Transition and Globalization: The Impact of Privatization Processes on Spatial Disparities in Serbia

*Andreas Winkler (University of Bamberg)*

Various fragmentations and disparities have to be identified when dealing with the socio-economic developments of the past two decades in Southeast Europe. According to this approach, such disparities are strongly affected by the transition into a market economy, in particular by processes related to the privatization of state-owned enterprises. The economic transition and the global economic integration of Serbia - as often as it has been interrupted and delayed - deserves to be examined as a unique case and is one of Europe's last examples of a current highly active privatization process. The socio-economic fragmentations, which emerged or were intensified during this process, are reflected in the spatial scale and lead to spatial disparities. In Serbia, these huge development inequalities traditionally exist between north and south, urban and rural as well as central and peripheral areas. Getting to the bottom of these spatial differences and their current trends is one of the fundamental scientific and planning challenges of the region. For the Serbian case, this research adds the aspect of privatization in transition to the field of research in regional disparity. Furthermore, it provides basic knowledge about the spatial relevance and geographical aspects of privatization to the

numerous economic studies on restructuring state-owned firms in transition states. Thus, the crucial question of this paper is: To what extent can changes in Serbia's socio-economic disparities be explained by privatization processes? This approach to underdeveloped areas is examined on the basis of quantitative and qualitative analyses. A first design step was a GIS-based spatial analysis of secondary statistical data of the Serbian territory. The intention thereby was to identify spatial disparities and to characterize and categorize them. A second step was a statistical and qualitative examination of the recent privatization progress and its regional distribution. As a result, this paper shows how privatization has changed, and will continue to change, the traditional spatial disparity picture of Serbia.

### Directions and Determinants of Spatial Transformation of the Manufacturing Industries in Russia in the 1990-2000s

*Igor Pilipenko (Moscow University)*

The Russian economy managed to achieve a rapid GDP growth during 1999-2007 rebounding after the 1991-1997 contraction and the 1998 financial crisis. Despite the overall negative impact of the 1998 financial crisis on the Russian economy as a whole and, particularly, on standards of living of the population, the manufacturing sector was among the biggest winners, because the sharp depreciation of the national currency during 1998 made Russian enterprises price-competitive at both domestic and foreign markets. Eventually, the manufacturing sector became one of the driving forces along with the booming mining sector on the back of the rising oil and commodities prices that determined the economic revival in the first half of the 2000s. However, in the course of 2002-2007 the manufacturing sector experienced a massive employment contraction worsened by the financial crisis of 2008-2009 totaling ca. 2.7 million jobs lost. On the one hand, it evidenced the continuous decline in both price/quality and cost competitiveness of the Russian manufacturing industries and the reallocation of labour into the services sector. On the other hand, it was an objective process of adjusting during the transition from the planned economy with large and often overstaffed plants to the market economy with more efficient use of available labour resources. The current financial crisis affected negatively the growth rates of manufacturing activities, but the other side of the coin is that it might stimulate a new restructuring of the manufacturing sector thus improving its quality and cost competitiveness. This paper focuses on spatial aspects of the manufacturing sector transformation during 1998-2009 that varied greatly across industries and regions in Russia. We seek to find answers to the following questions: (1) how did employment and output change in the manufacturing industries in 1998-2009; (2) how did the regions perform in the manufacturing industries in comparison to the national average; (3) how did specialization of regions in the manufacturing industries change; (4) did the manufacturing industries become more/less spatially concentrated; (5) what is the degree of industrial concentration of the manufacturing industries in Russia in comparison to the advanced market economies; (6) what factors determine trends in



spatial concentration of the manufacturing industries across Russian regions; (7) what are the patterns of productivity differences across the manufacturing industries and regions? We use the employment and output data for 97 three-digit manufacturing industries according to the Russian Classification of Economic Activities in 82 regions of Russia over 1998-2009. To study the spatial patterns of manufacturing development we employ the economic geographical and regional economic analysis techniques coupled with the econometric analysis to reveal factors affecting spatial concentration and productivity in the regions.

### **An innovative breakthrough in the less developed regions on the example of Eastern Germany's Federal states. The search of adaptive model for Russia.**

*Ekaterina Romanova (Moscow University)*

After two decades of reunification Eastern Germany still lags behind in economic development from the West. Nevertheless, some regions in the East demonstrate even higher rates of innovation development than in Western Germany, besides world-class clusters are located on their territories, for example, in microelectronics and photovoltaic, optical mechanics (Saxony, Thuringia). Why some regions are developing dynamically, while others are stagnant or in decline? The essence of new economic policy lies in the special role of science, which turned into the highly competitive field of activity in the highly developed countries. German businessmen didn't reduce volumes of R&D investment even under conditions of economic and financial crisis. The share of R&D expenditure in Germany is about 2,8% of GDP (2009). That is the best indicator for the period after reunification. Furthermore, two-thirds of R&D spending in Germany financed by business sector investment, which accounts for about 55 billion euros per year. It operates mainly in the practical research area. The state furthers the development of competitive profiles of industry and science in the regions in framework of regional policy, contributes to economic growth and successful development of new innovative enterprises, prevents the outflow of young professionals and creates favorable conditions for the development of talented young people. A key objective of accelerating economic growth is the development of advanced technologies. There are those innovative areas that have significant potential in the future and may have complex effects on the economy as a whole. Eastern Germany can now re-export its experience of innovation support to Western Germany, as the challenges of global competition are facing all regions of the country. German experts positively assess the achievements in economic development after 20 years of reunification. New special research programs can no longer be a basis for the current regional policy; rather the decision of the general structural and political problems in the East may provide a framework for further positive development. Russia has chosen the way of innovation development of economy. This need was realized particularly acute during the recent financial crisis, in which the dependence on price fluctuations in raw materials markets led to a significant economic downturn. In carrying

out the modernization of production and development of innovations Russia may use experience of other countries basing on new technologies to overcome the crisis. Russia's share in world R&D expenditures is less than Germany's - in 3 times. The scope of high-tech exports reduced significantly. Russian researchers continue to move to the West. The successful experience of Eastern Germany is interesting not only for Russia, but for many developing countries under a catching-up strategy.

## C08.08-07 - Economic Geographies of Entrepreneurship

*Chair: Neil Reid, Christine Tamasy, Mike Taylor*

### Multilevel Analysis of Entrepreneurship Determinants

*Christian Hundt (Universität Bochum)*

Business start-ups are an essential key component for the economic development of regions and nations. The goal of this study is to contribute to a deeper understanding of the driving forces behind new firm formation. For this purpose, more than forty national, regional and personal determinants of entrepreneurship are derived from appropriate theories and concepts and are tested on data with up to 22 innovation-based economies. A specific accomplishment of this study is to integrate the hierarchical structure of the influencing factors (multilevel perspective) and the gradual emergence of new firm formation (process-related perspective) into one consistent analytical framework. The existence of different levels of influence is explicated by Giddens' structuration theory (1984), while the procedural character of business creation is explained using Ajzen's theory of planned behavior (1991). The empirical part is based on logistic multilevel regressions using data of the Global Entrepreneurship Monitor (GEM). This helps to make use of two crucial advantages: First, the data provides information on almost 390,000 individuals based on representative telephone surveys from 2002 to 2006. Thus, the data allows for the inclusion of an adequate number of regions (105) and countries (22) as an important precondition for reliable multilevel analyses. Second, unlike aggregated data the micro data of GEM enables to constitute the hierarchical relationship between the individual entrepreneur and the regional and national context that he or she does belong to. Results show that both context levels contribute significantly to the explanation of new firm formation. Additionally to the influence of the individual level, the regional and the national environment can be regarded as two autonomous dimensions of influence. Likewise, the results show interactions between the determinants of the context and the individual level. In that way the study confirms a central assumption of Giddens' structuration theory, whereby the individual micro and contextual macro level are not isolated but interrelated dimensions. In terms of optimal entrepreneurial framework conditions, the empirical results suggest that start-up activities especially do benefit from a liberal national economic policy, a prosperous regional economic environment and also from the entrepreneurial skills and attitudes of the respective individuals. Also, the impact of these determinants varies during the process of new firm formation and for different types of start-ups. In order to encourage those types of business start-ups which are likely to contribute to employment growth and economic development, policy makers should concentrate on the consolidation of market forces and principles, including the improvement of incentive structures for entrepreneurial actions, the creation of efficient economic spatial structures and the well-directed support of competent and ambitious entrepreneurs.

### Does Social Commerce boost Small Private Businesses?: The Socio-Spatial Impacts of Korean Internet-based Collective Buying Business

*Kee-Bom Nahm (University of Seoul)*

Does Social Commerce boost Small Private Businesses?: The Socio-Spatial Impacts of Korean Internet-based Collective Buying Business Kee-Bom Nahm (University of Seoul) Social commerce is an emerging trend in which sellers are connected in online social networks, which have made a significant impact on how Internet users communicate, search for and share data today. One of the fast-growing social commerce model is the 'Collective Buying Business' such as Groupon, LivingSocial, Timon (Ticket Monster), and WEMAP (We make price). The business has gained enormous popularity over the past years because of a steadily increasing demand for user participation in the whole web sphere. One of the societal rationale for the business is argued that it can promote petty merchants and small businesses which don't possess adequate marketing tools and networks. Another urban spatial meaning of the business is claimed that it can expand urban consumers' shopping area, which in turns means it can broaden the range of goods for the small businesses. This paper investigates these two hypotheses using sales and customers's data and demonstrates the socio-spatial impacts of Korean internet-based collective buying business. To suggest a more collaborative and 'social' shopping model, conventional social commerce as well as selected best practice cases were analyzed in detail. To meet the demands of modern consumers and social responsibility of the business, some suggestions are presented in the final part.

### Branding and networking: Hotels as creators of new economic spaces in post-industrial towns

*Ida Andersson (Stockholm University)*

This paper has its starting point in the hotel sector as an economic catalyst in post-industrial towns in the western capitalist world. One of the main arguments is that hotels increasingly are given the role of 'flagships' in place branding activities carried out in towns, and through the branding work, also functions as generators of 'community building' boosting local sense of belonging and networking. The paper discusses how investments in hotels connect the local economy with the global one through flows of investments and visitors, making post-industrial towns emerge as new economic spaces. Through the challenges brought on by globalization and economic re-structuring including the growth of the service economy, the tourism industry has developed as a way forward to break new economic grounds in many post-industrial towns. New hotels have been constructed to function as the hub of the local economy and are given spectacular designs and luxurious standards. Hotels have become not only means for former industrial economies to develop as tourism destinations but also a way for local businesses to put their innovation capabilities and technological know how on display for

visitors. Globalization and structural changes in the world economy is also said to create and increase competition between post-industrial towns.

### **The new spatial configuration of luxury trade in the city of São Paulo - Brazil**

*Jeferson Hugo Pacheco de Rezende (University of São Paulo), Tabata Pistori (University of São Paulo)*

During the last decades, Latin America has undergone major structural changes in different fields which gave rise to the emergence of a new spatiality. The main change, namely the growth of a new class of consumers in the region, usually defined by international media as the "new middle class", preferably is described as a 'new consumer layer on the rise'. Institutes such as the UNCTAD and ECLAC published documents showing that the amount of new rich people has grown in the world. Brazil, in particular, is highlighted in these studies. Currently, the European and American markets remain important sources of income for the sector of luxury goods, but in the so-called 'BRIC' countries, formed by Brazil, Russia, India and China, the best results in sales and profit are observed. Nowadays, important Latin American cities have luxury trade shops, with São Paulo, being the main pole of luxury goods consumption in the continent. This research starts by investigating data from the late 1980's, a period that coincides with two other important events to understand the current socio-cultural and economic situation in São Paulo: the era of globalization and the progress in the "technical-scientific informational means?". Authors such as Santos, Carreras, Sassen and Lemos will describe this period and its impact as a landmark that marked the transition from the production model as seen in the industrial city towards a model based on services. This has led to the development of new spaces, which Santos et al., defines as 'spaces of territory prepared for the development of these new functions'. Thus, the specific research objectives are: A) To examine the expansion of the 'new consumer layer on the rise' in São Paulo and the endogenous and exogenous processes which have led to this development; B) Identify the spaces produced by these new consumers and the structural changes the zones that accommodate the luxury stores nowadays have undergone. The major theoretical sources are studies of globalization and a recent research on trade and urban consumption, by researchers of the University of Barcelona. The theoretical-methodological foundation is given by the previously cited authors and also by other important authors, such as Smith, Allères, Baudrillard, Bijou-Garnier, Harvey, Mombeig, George, Sombart, among others. At the end of the research, we hope to be able to understand the world-wide formation of new spaces embedded in the urban fabric to meet the demands and needs of the new consumer layer mainly formed by people in high positions and professionals who are successful in their careers. They transformed into the new yuppies of consumption related with the processes of globalization and the opening of the Brazilian market.

## C08.08-08 - Global Value/Commodity Chains and Economic Governance

*Chair: Neil Reid, Christine Tamasy, Mike Taylor*

### Compressed development and the adaptive state in contemporary India

*Bill Pritchard (University of Sydney)*

The concept of 'compressed development' has recently been advocated as a successor to 'late development' models of economic and social transformation. This concept is claimed to reflect conditions in which economic change takes place not through a sequencing of transitions, but via uneven, simultaneous 'stacking', of changes as particular segments of an economy are incorporated as modular components within global value chains. The net effect is to create highly disjunctive, and apparently contradictory, economic landscapes. To date, compressed development has been explored and applied most extensively with regards to East Asia, and especially, China. This paper extends its empirical remit to India. It contends that the concept sheds relevant light on the contemporary Indian experience of economic transformation, however cannot be translated unproblematically from its East Asian origins to the very different settings of South Asia.

### Patterns of collective interpretation changing economic spaces: Global value chains and regions

*Martina Fuchs (University of Cologne)*

The social construction of the spatial world and spatial imaginaries have become central topics in economic geography and related fields. In sociology, a specific discussion on patterns of collective interpretation has generated considerable dynamism. The idea is that perception and interpretation can be analyzed on the subjective as well as the social resp. collective level. Patterns of interpretation direct action and interaction and help to explain the relations between institutions, routines and activities. Thus, patterns of collective interpretation can serve as a bridge between converging and diverging approaches and 'turns'. The concept refers to the daily action of social actors in constructing markets, firms and economies, as well as to the system resp. structural level, where it includes institutions as frameworks for (re-)producing meaning, action and interaction, and routines as recurring patterns and sequences of action. While routines refer to observable behaviour, patterns of collective interpretation also emphasize cognitive-interpretative facets. Patterns of collective interpretation help to explain why institutions do not lead directly to specific action, but are transformed in the 'gap' between structure and action. The paper will elaborate on the concept of patterns of collective interpretation. It will show two examples of the relevance of patterns of collective interpretation: First, the paper will demonstrate their importance for

reconstruction of global value chains after the catastrophe in Japan 2011 with the tsunami, the earthquake and the nuclear reactor accidents. Second, the paper will explain their significance for regional activities to overcome the financial crisis 2008/2009 in selected German regions. Both examples are taken from metalworking industries and regions coined by metalworking industries.

### Bringing the economic geography perspective back in: Global cities, global commodity chains, and the geography of economic governance

*Christof Parnreiter (Inst. f. Geographie)*

Since the development of the 'interlocking network model' (INM) by the GaWC-group (Taylor 1997, 2004), measures of cross-border connections of cities through an analysis of big data sets on the global inter-firm networks of producer service firms or of transnational corporations have become very popular. Yet, despite the undeniable merits of these studies, this quantizing approach has turned away research from the economic geography spirit, which has guided the seminal works on world / global cities (Friedmann 1986; Sassen 1991). Due to its exclusive focus on the (assumed) intra-firm flows in the producer service sector, the INM ignores the flows between producer service firms in global cities and other firms operating in global commodity chains. This neglect has important conceptual consequences, because it implies that the INM does not take into account the theoretical core of the global city paradigm, namely the fact that global cities are places wherefrom the world economy is managed and controlled. The INM does, therefore, not allow to address the issue of the governance of global commodity chains, wherefore little is known about how firms in global cities actually exercise management and command functions. This flaw undermines the strength of the global city argument. Moreover, the INM entails the risk to divert research from the analytical focus (the function of cities in globalization processes) to a description of rankings. If being used to assess the geography of economic governance, the empirical results of the INM might even be misleading, because the INM does not distinguish between the sub-sectors of the producer service economy. Such differences do, however, exist: A minor office of a global law firm might have more bearing on how resources are allocated within (specific segments of) a global commodity chain than a mid-sized office of an accountancy firm in the same city. Thus, it is risky to equate gross network connectivity values with governance functions. In light of this critique, I suggest returning to the original economic geography perspective. In particular, I propose to add a) further geographical scales (in particular the national and sub-national ones) to scrutinize producer service flows and b) further firms as recipients of producer service flows. This extension can be based on quantitative information (e.g. input-output analysis), but in many cases it will entail qualitative research to uncover the inter- and intra-firm relations of a city's producer service sector firms. Friedmann, John: 1986 The World City Hypothesis. In: Development and Change 17, 69-83. Sassen, Saskia: 1991 The Global City. New York, London, Tokyo. Princeton. Taylor, P. J.: 1997 Hierarchical tendencies amongst world cities: a

global research proposal. In: Cities, 14, 323-332. Taylor, Peter: 2004 World City Network. A global urban analysis. London.

**The “geography of uncertainty” in the Italian most-important cities. From the economic crisis to the governance of the territorial processes.**

*Alessandro Ricci (University of Rome)*

The economic crisis that the Western States are living it is not only financial. In fact, it has also an heavy impact on the territorial dynamics. In particular, the crisis has affected some of the most important Italian cities, especially the ones that represent the national economic, social and strategic centres. The starting point of this analysis is the consideration that the economy represents one of the most important point of reference of contemporary society. Economy is one of the 'interest centers' (using the words of Carl Schmitt) of the 'post modern' society. For this reason economy plays a crucial role in the territorial strategies, and in the redefinition of the administrative priorities and local policies. From the geographic point of view, it is important to understand which is the impact of economy on the territory, especially in a period of crisis, and the concerning perspectives of Italian cities. Moreover, the concept of uncertainty, more often used in the sociological and economic 'dictionaries', can be also associated to the geographical dimension, and in particular to the difficulties in the development of the cities and to the uncertainty of the territorial evolution. This analysis will not only consider the geographical aspects, but also the social and economic ones, starting from an international scale and then focusing on more specific Italian cases. By doing so the analysis will try to contribute to the commission's topic with a study that will analyze the local scale, discussing the consequences of the economic crisis on the territorial processes. In this perspective, the structural elements that from financial economy have an impact on the strategic choices of the local administrations will eventually emerge. The problems, the critical situations, and the positive perspectives in this particular and difficult moment will be taken in consideration while also pondering the fluctuations, the off-putting movements of European and Western economics.



# C08.09

# Environment Evolution

## C08.09-01 - Human-Environment Interactions and Evolution in the Late Pleistocene and Holocene 1

*Chair: Andrei Velichko, Loukas Barton, Fahu Chen, Bernhard Weninger*

### Stages of human settlement in Northern Eurasia (Eastern Europe and Siberia)

*Andrey Velichko (Russian Academy of Science)*

There are two principal stages recognizable in the human society evolution and in that of environments within the studied territory: Palaeolithic epoch and subsequent stages. The Palaeolithic was predominantly epoch of hunting which reached then its peak. At the end of the Late Pleistocene an impact of primitive communities becomes quite distinctly seen in the environments. The most significant event in the Early man history dated to the end of Pleistocene (12-10 ka BP) was disintegration of a single zone of appropriating economy and the onset spatially differentiated zones of productive economy. The late glacial/post glacial transition dated by radiocarbon at 10 300 BP is generally taken as the Holocene lower boundary. At that time a drastic restructuring of the East European landscapes occurred, and a hyperzonal type dominated by periglacial landscapes was replaced by polyzonal type, various forest zones coming into being. During the Holocene, the area of productive economy gradually expanded over Eurasia, the earliest urbanistic and proto-urbanistic civilizations appearing in some regions. Some forms of appropriating economy, however, persisted for long time in the vast boreal zone, where such economy was most effective. The Mesolithic stage in Northern Eurasia is considered to be a transitional stage, when the Man and his economy became adapted to a new, more differentiated, structure of natural landscapes. Two principal cultural and economic regions developed within the limits of the East Europe. A stable pattern of settlement was developed in the course of the Mesolithic time: rather large base winter sites were mostly located on elevations protected from cold winds, while relatively small summer campsites concentrated along water streams. Bronze Age cultures are attributed to late Subboreal. There are several cultures of the Bronze Age found within forest zone of the East European Plain and dated at the 3rd-2nd millennia BP.

### Ecological theory, paleoenvironment and people: Prospects for moving beyond correlation

*Loukas Barton (University of Pittsburgh), Robert Bettinger (University of California)*

The purpose of this session is to explore different ways of improving our ability to evaluate the relationship between environmental change and human evolution. Opinions in ecology

and paleontology are divided over the importance of environmental change in speciation, extinction, and the derivation of novel physical attributes. And for each of these issues, blanket correlations between global patterns of environmental change and patterns of biological evolution, are insufficient for proper evaluation. In each case, models that view change through time and space for its effects on meta-populations get closer to the issue, and highlight the appropriate scales of data necessary to test the hypotheses about environment and evolution. Likewise, anthropologists, geographers and historians argue over the role of environmental change in human cultural evolution, including the development and collapse of complex urban polities. Yet the case clearly isn't closed, in part because even the simplest correlations can fall apart under the microscope, and because even the best correlations lack processual modeling that would permit evaluation of cause and consequence. Here we present a simple model articulating resource abundance, human behavior, and technology. When combined with the right kinds of paleoenvironmental and archaeological data, we can begin to evaluate the impact of environmental change on human populations. Case studies of prehistoric hunter-gatherers from northern China and western Alaska illustrate the limitations of the model and the data, and provide avenues for improving the analytical framework of these questions.

### How Neolithic and Chalcolithic people occupied the northeastern edge of the Tibetan Plateau

*Fahu Chen (Lanzhou University), Guanghui Dong (Lanzhou University), Xin Jia (Lanzhou University)*

The Tibetan Plateau is one of the places in the world that have the harshest environment for human colonization. How ancient human occupied the Tibetan Plateau has been intensively studied. Archaeological studies indicate that human began to occupy the Tibetan Plateau during the Late Pleistocene, but extensively inhabited the high Plateau in Neolithic and Chalcolithic periods, mostly in east Qinghai Province located at the northeastern edge of the Tibetan Plateau. This hypothesis has also been confirmed by mitochondrial genome studies. In order to study how Neolithic and Chalcolithic people occupied the northeastern edge of the Tibetan Plateau, we investigated more than 100 Neolithic and Chalcolithic sites in this area and collected floatation and dating samples. Various plant remains and 30 AMS radiocarbon dates directly on charred crop seeds were obtained. Based on these data, we studied the spatial and temporal variation of human settlements and agricultural development in east Qinghai Province during Neolithic and Chalcolithic periods. We also reviewed mid-late Holocene climate change studies in Tibetan Plateau, to examine how climate change influenced human colonization of the northeastern edge of the Tibetan Plateau in that period. Our results show that Neolithic people first widely occupied the northeastern edge of the Tibetan Plateau around 5000 Cal a BP, and reached the upper Yellow River valley and Huangshui River valley below 2500 m a.s.l, when millet agriculture spread to this region synchronously. Favorable

climate in this period probably promoted Neolithic human occupation in the area by facilitating agricultural production. Climate deteriorated evidently in east Qinghai Province after 4000 a BP and the coldest climate occurred around 3000 a BP. During 4000-3000 a BP, barley and wheat that originated in West Asia diffused to the region but foxtail and common millets were still the most important crops. During this period, site density in this region obviously dropped. But evidence shows that human extensively migrated westward and occupied high regions after 2800 Cal a BP, though climate during this period was still much cooler and dryer than that of 5000-4000 a BP. Naked barley became the most important crops in Chalcolithic sites above 2800 m a.s.l., suggesting late Chalcolithic people recognized that naked barley could grow in high elevation and cold environments and adopted this crop as their main plant resources, which guaranteed them to permanently settle down in the high Tibetan Plateau and adapt to the plateau environment. We argue that, though climate change probably promoted human occupation in the northeastern edge of the Tibetan Plateau in Neolithic and Chalcolithic periods, agriculture diffusion and development, and advancement of human ability to adapt to climate change were the key factors that enabled Neolithic and Chalcolithic people to widely and permanently occupy the northeastern edge of the Tibetan Plateau.

### The Archaeology of Rapid Climate Change during the Holocene in the Eastern Mediterranean

*Bernhard Weninger (University of Cologne)*

This paper discusses the impact of Rapid Climate Change (RCC) sensu Rohling et al., 2002 and Mayewski et al., 2004 on prehistoric communities in the Eastern Mediterranean during the Early and Middle Holocene. Focus is on the societal impact of a specific set of climatic RCC-anomalies that are caused by major polar air outbreaks into the eastern Mediterranean due to expansion and intensification of the Siberian High. For archaeological RCC-studies, due to its high dating resolution we use the Greenland GISP2  $\delta^{18}O$ -record (Mayewski et al., 1997) as proxy to delimit a) the time-windows for which strongest RCC-events may be expected and b) the climatically most sensitive geographic regions (Weninger et al., 2009; Clare and Weninger, 2010). In certain cases the atmospheric RCC-conditions can be further intensified by synchronous (or partially overlapping) changes in the North Atlantic ocean circulation due to abrupt freshwater influx (e.g. 10.2 ka calBP event, 9.3 ka calBP event; 8.2 ka calBP Hudson Bay outflow). The present paper puts focus on Near-Eastern and S-European archaeology during the following RCC-intervals: ' 11.6 ka calBP: End of Younger Dryas; foundation of (unexpectedly) large Protoneolithic domestic settlements (e.g. Körtektepe, Hallan Cemi) and of major religious sites (Göbekli Tepe) in SE-Anatolia. ' 10.2 ka calBP: End of the Golden Age of the Pre-Pottery Neolithic (PPNA), followed by major expansion (and later abrupt desertion) of PPNB-sites, most notably in Jordan (where desertion leads to following probably slow accumulation of deep rubble layers), in-phase with major oscillations of Dead-Sea lake levels (Migowski et al., 2004). ' 8.6-8.0 ka calBP RCC-

Interval: migration of farming communities from Central Anatolia to the Turkish West Coast; following the end of RCC: the spread of early farming to SE-Europe. ' 6.2-5.2 ka calBP RCC-Interval: The end of the SE-European Copper Age, with widespread desertion of multilayer tells in Greece, Bulgaria and Romania at the onset of the RCC-interval, with again abrupt re-occupation of the tells at the end of RCC. ' 3.05-2.98 ka calBP RCC-Interval: temporary desertion of many long-inhabited major Bronze Age settlements (e.g. Thessaloniki Toumba, Agios Mamas, Troy) in-phase with RCC-conditions (decadal-scale dating resolution).



## C08.09-02 - Human-Environment Interactions and Evolution in the Late Pleistocene and Holocene 2

*Chair: Andrei Velichko, Loukas Barton, Fahu Chen, Bernhard Weninger*

### Late Paleolithic Records and Human Adaptation in Western Chinese Loess Plateau

*Dongju Zhang (Lanzhou University), Fahu Chen (Lanzhou University), Robert Bettinger (University of California), Christopher Morgan (Utah University), Loukas Barton (University of Pittsburgh)*

The subject of human adaptation during Late Pleistocene is vital to understanding human behavioral and biological evolution, a period of time when environments changed rapidly, modern humans evolved or appeared throughout Africa and Eurasia, and Upper Paleolithic technological innovations revolutionized the way humans operated in ecological context. Except for a few human fossils and a small number of excavated sites well dated to this period, very little is known of these adaptations in East Asia. Within this context, this paper presents results of research on China's Western Loess Plateau, where archaeology, geochronology and paleoenvironment are well studied at 76 Paleolithic sites located in a 400 km<sup>2</sup> study area. The chronological framework built with absolute dating results and loess-paleosol sequence comparison shows that humans first appear in the area during MIS5, may have abandoned the area in MIS4, reappeared in MIS3 and continued thereafter. A comprehensive study of 3727 pieces of stone artifacts shows that a flake-tool-tradition is dominant through most of the Upper Pleistocene and microblade technology appeared and prevailed after the LGM. Combined with paleoenvironmental reconstruction, settlement patterns indicate that Upper Pleistocene hunter-gatherers in the region exploited multiple landforms during MIS 3, while more central-place strategies were employed beginning during the LGM. The high resolution chronology established in the area indicates that Chinese Paleolithic core-flake technology persisted since at least the middle of MIS3 and coexisted with microblade technology after around 18 ka BP, possibly indicating that modern humans from elsewhere arrived in the region during or immediately after the LGM, substantially altering technological and settlement patterns as they did so.

### The impact of subsistence strategy variety and climate change on human settlement, in Qinghai Lake area, northeastern Tibetan Plateau, China, during late Pleistocene and early-mid Holocene

*Guanghui Dong (Lanzhou University), Fahu Chen (Lanzhou University), Xin Jia (Lanzhou University), Dongju Zhang (Lanzhou University)*

How ancient human occupied and adapted to the harsh environment of the Tibetan Plateau has been increasingly concerned in recent years. In this paper, based on the application of floatation and radiocarbon dating at five sites of Qijia culture (2183-1635 BC) and Kayue culture (1600-600 BC) around Qinghai lake that locate in northeastern Tibetan Plateau, China, we studied human subsistence strategies during late Neolithic and Chalcolithic period in the area. The archaeological and paleoclimatical records in Qinghai lake area are also reviewed to further study the prehistoric human settlements in the area and their adaptation to the climate and environment change in northeastern Tibetan Plateau during late Pleistocene and early-mid Holocene. As shown in the results, animal resource procurement including fishing, herding and hunting was the primary food procurement strategy for human, while utilization of plant resources probably was an auxiliary strategy in Qinghai lake area during 4000-2900 Cal yr BP. The adopted animal and plants include sheep, cattle, marmot, rodent, bird and barley, common millet, and caper. Paleolithic hunter and gatherers occupied Qinghai lake area during 15000-12500 Cal yr BP and 9000-5000 Cal yr BP, when warm and wet climate and better vegetation during those periods probably enabled human's inhabitation. Climate remarkably deteriorated during late Neolithic and Chalcolithic periods in Qinghai lake area, however, the introduction of domestic sheep and the fishing-herding-hunting strategies guaranteed ancient human successfully settled in Qinghai lake area during that period, although climate was cold and dry.

### Migration of Neolithic settlements in the Dongting Lake area of the middle Yangtze River basin, China: Lake-level and monsoon climate responses

*Tao Liu (East China University), Zhong Yuan Chen (East China University), Qian Li Sun (East China University)*

The vast Dongting Lake in the middle Yangtze River basin, China, was occupied by Chinese Neolithic settlements starting 10,000 yrs ago, and rice cultivation there is probably the earliest in the world. The numerous Neolithic settlements identified by previous archaeological surveys represent the five major Neolithic cultural stages, i.e. the Pengtoushan (9000-7900 cal yrs BP), Zaoshixiaceng (7900-6800 cal yrs BP), Daxi (6800-5500 cal yrs BP), Qujialing (5500-5000 cal yrs BP), and Shijiahe (5000-4000 cal yrs BP). Using sedimentological and geoarchaeological approaches, this paper analyses the drivers of basin scale settlement relocation in relation to lake-level fluctuations and monsoon climate variations in the Holocene. The relocation of Neolithic sites around the lake shoreline and on the adjacent floodplain, together with radiocarbon-dated

stratigraphy, clearly indicates that the shape of the lake basin was an incised and elongated valley occupied by a lake in the early Holocene, which became a broader and shallower depression in the mid- to late Holocene. The established lowest habitable base of the settlements positioned on the lake shore assists reconstruction of the change in lake level from 22 m at 9000 cal yrs BP to 26 m at 5500-4000 cal yrs BP, although higher and lower lake levels occurred during the intervening cultural stages. The pollen spectra reveal a warming trend throughout Holocene with at least 4 major temperature cycles, driven by monsoon variations between temperate- and warm-humid conditions. In the early Holocene the climate changed from cool-dry to warm-humid, and this played a key role in developing the earliest Pengtoushan culture in the region. Subsequent climate fluctuations fit well with the advance and retreat of the lake shore, also coevally with Neolithic site movements in the lake region. In this study we show how geoarchaeological evidence can be used in environmental reconstruction during the Holocene. Keywords: Neolithic, river-basin, settlement relocation, lake level, monsoon climate, Yangtze River

### **Cultural Responses to Climate Changes at Xiaohuangshan Site (8-10ka BP) in the Lower Valley of Yangtze River, China**

*Fei Hu (University of Science and Technology of China)*

The transitional period from Paleolithic to Neolithic ages has got worldwide archaeologists' attention because they intend to study the origin of crops cultivation and domestication of animals as well as their dispersal routes by use of the particularity of this period. Abundant prehistoric remains and cultural relics related to ancient human being have been found in Xiaohuangshan site, 8-10ka BP, which located in the lower valley of Yangtze River, China. Based on the analysis of artificial storage pits, potteries, stone objects (millstones, grindstones and so on.), abundant rice phytoliths examined in the cultural layers and a great variety of starches extracted from the potteries and stone objects, we know that effective adaptive adjustments have happened on the aspect of gathering or cultivation of rice and other crops responding to the climate changes contrast with other Neolithic sites such as Xianrendong site etc. Therefore, Xiaohuangshan site will play an important role in understanding the evolution of archaeological cultures in the lower valley of Yangtze River, China. By comparing the distribution characteristics of clay mineral assemblage, geochemical data and magnetic susceptibility determined in cultural strata at Xiaohuangshan site with the ice cores, loess and sea level records during the late Pleistocene and early Holocene, the authors find climatic fluctuations happened in the sequence of heating up, cooling down, re-heating up till to the warm time of Holocene in Xiaohuangshan site. Based on the coupling between these climatic changes data and prehistoric archaeological materials of Xiaohuangshan site, the internal relation between violent change in climate and rapid evolution in prehistoric culture of Xiaohuangshan site will be clarified, which will provide us with some innovative thoughts for human responses to climatic changes.

### C08.09-03 - Human-Environment Interactions and Evolution in the Late Pleistocene and Holocene 3

*Chair: Andrei Velichko, Loukas Barton, Fahu Chen, Bernhard Weninger*

#### Origin and Dispersal of Rice Cultivation Agriculture in the Valleys of Yellow River and Huaihe River

*Juzhong Zhang (University of China)*

Global climate has changed severely for many times since the last glaciation and Megathermal, and ancient human beings also changed their lifestyles from hunting and gathering which lasted for millions of years to primitive agriculture in the tremendous climate warming process of the last deglacial. Just as the area along Great Wall, the valleys of Yellow River and Huaihe River also located at a climatic transitional zone between the north and South China. Although the valleys of Yellow River and Huaihe River were not as sensitive as the Great Wall zone to environmental change, it played a determinative role in shaping a new surviving mode of ancient human living in this zone. The development process of human society was continuous and also abundant information about gathering, fishing, hunting and agricultural activities which were kept in the valleys of Huang River and Huaihe River since the beginning of Holocene. Furthermore, this region was the concentrated and intersection area of rice cultivation and rice-millet mixed agriculture, as well as the interlaced distribution belt of prehistoric rice cultivation and dry farming agriculture. Simultaneously, this zone was also the main region of cultural clashes and fusion between Yangtze and Yellow River as well as three tribal groups of Huaxia, Dongyi and Miaoman. Therefore, the region had an irreplaceable role in studying the origin and development of rice cultivation agriculture as a consequence of its historic geological location. In recent decades, some important progresses have been made on the studies of the relationship between the origin and development of rice-dry farming agriculture and the paleoenvironment in this zone. However, some important scientific problems still exist, for instance, where did the rice cultivation agriculture concept come from? When did the origin of rice cultivation agriculture happen? What were the causes and mechanisms of this transmitting? How did the rice cultivation agriculture dispersal responding to the climate change? What was the relationship amongst the migration and activities of human, paleoenvironment change and the development of rice cultivation agriculture? How did the rice cultivation agriculture influence the surviving mode of ancient people living in this zone? What was the relationship between the changes of the rice -dry farming agriculture and the climate change? And how did rice cultivation agriculture influence the development of human society? All this scientific problems are still eagerly necessary to be explored. This paper is intended to discuss the origin and dispersal of the rice cultivation agriculture in the valleys of Yellow river and Huaihe River, and we also try to put forward some thinking on this problem.

#### Plants and Food Production of Neolithic Southeastern Shandong, China

*Xuexiang Chen (Shandong University), Hui Fang (Shandong University)*

In Shandong province, eastern part of China, the currently accepted archaeological cultural sequence for the Neolithic is Houli culture (6500-5500 B.C.), Beixin culture (5000-4100 B.C.), Dawenkou culture (4100-2600 B.C.), Longshan culture (2600-1900 B.C.). The archaeological and environmental data show that during the Neolithic Age, climate in Shandong Province was warmer and more humid than today which is similar as the present Jiang Huai area. Earliest food production evidence in this area reported was from the Yuezhuang site, Jinan city of Houli culture. Thanks to the flotation samples, archaeologists recovered rice, broomcorn millet and foxtail millet at the site, and other plant and animal remains from wild resources. However, there is no site of Houli culture found in the Southeastern Shandong. Earliest Neolithic finds were from Beixin culture. The full-coverage archaeological survey organized by Shandong University, Field Museum and Yale University revealed changes in regional settlement patterns in this area. Based on the survey of 1995-2006, scholars suspect that the agricultural colonization of this coastal region occurred primarily during the later half of the Neolithic and was rapidly followed by the development of a four-tiered settlement hierarchy with two primary centers during the Early Longshan period. As part of the survey, flotation samples from 12 sites were collected. The assemblage of carbonized plant remains covered a time span between 5000-1900 B.C., from Beixin culture to Longshan culture. The plant remains document a long sequence of crops, weeds, and other plants in the area. Broomcorn millet (*Panicum miliaceum*) from Nantunling site of Beixin culture was the first domesticated crop when the population was really small. The site is located in a piedmont zone and there was possibly water place nearby since one lotus (*Nelumbo nucifera*) seed was present in the sample. The specimen was found throughout the sequence but significantly less important in Longshan culture. It appears that the Late Dawenkou populations that entered this coastal region arrived with an established agrarian economy and social hierarchy. In the Dawenkou samples, the crop assemblage included broomcorn millet, foxtail millet (*Setaria italica* subsp. *italica*) and rice (*Oryza sativa*). Settlements situated in both alluvial and piedmont settings supplied environmental supports for both dry-land and wet-land agriculture. During the Longshan period, the pattern of settlement shifted dramatically as the number of sites increased to over 400. The number and frequency of crops of Longshan sites are much higher than that of previous cultures. Wheat was added to the crop assemblage and plants such as legumes, perilla, might have been cultivated as well. The sequence suggests that both dry crops (broomcorn millet, foxtail millet, wheat) and rice were import food in this coastal area. Weed assemblage diversified through time and indicated landscape changes.

### Impact of Shifting Cultivation: A Factor of Environmental Degradation in North East India

*Manabjyoti Barkakaty (Gauhati University)*

North East India is a land where we find mountainous terrain, plateau and plains, criss-cross disproportionately divided by rivers and rivulets, bounded in the north by Great Himalaya and the Great Brahmaputra river has been flowing from the east to west. This is a distinct geographical entity having variegated natural landscape with diverse colourful ethnic groups. Because of heavy rainfall, the northeast India was clothed with forest having different types of trees for which communication was not easy and the area had to live in isolation in early days. North East India comprises seven states namely 'Assam, Manipur, Meghalay, Nagaland, Tripura, Arunachal Pradesh and Mizoram. Sikkim is lately incorporated within this region. It is inhabited by hundreds of communities including tribes and sub- tribes. The pace development of these communities is not uniform. Keywords: Ethnic group, communities, sub- tribes

remarkable broadening of the spectrum of questions and increased the scientific level of analysis. The strategies that have functioned for the Chalcolithic communities demonstrate a really different management from what is believed about their economy. The sharing of some kind of resources proved to be different and source areas were different than those presumed (under this can also be included the structure and characteristics of alimentary diet, existing strategies for managing economic resources, types of activities and their intensity at different times, etc.). It is clear that much of the surrounding area was part of these communities' social space. The sedimentological researches conducted in the zone of the tell revealed that the settlement is situated on an erosion remnant from the lower terrace of loess, with a relative altitude of approx. 5.40 m. Field research and archaeological survey have identified areas of occupation attributed to temporary or seasonal Neolithic settlements. A sedimentological coring survey, as well as multi- proxies analysis of soils and sediments, is carrying on in order to understand the evolution of this area with important alluvial activity from the Neolithic period until now.

### Human environment co-evolution during Chalcolithic in the wetland area of Balta lalomi'e

*Constantin Haila (National Museum of Romania History), Dragomir Popovici (National Museum of Romania History), Adrian Balasescu (National Museum of Romania History), Valentin Radu (National Museum of Romania History), Mihai Florea (National Museum of Romania History)*

The studied zone is situated in the "Balta lalomitei" meadow, a floodplain area between two parts of the Danube, the Old Danube and Borcea, which presents natural areas permanently or occasionally flooded and dammed areas with artificial or natural forests. Analysis of topographic maps showed that the area has undergone significant changes as a result of geomorphologic evolution, being affected by the draining and damming works of the last half century in a lesser extent than previously thought. The military map at 1:20.000 scale on the basis of measurements made at the end of the nineteenth century, illustrates a situation closer to the present, except for major changes caused by human interventions in the twentieth century. "Popina Bordusani" is the most important prehistoric settlement known so far in "Balta lalomitei". It is one of the largest tells in the south-eastern Europe under current archaeological research by a multidisciplinary team. The first communities who settled here were members of the Boian Neolithic culture (ca. 6500 years BP); they were followed by those of Gumelnita Chalcolithic culture and Latene Iron Age occupation. The occupation continued with some gaps in the classical period, up in the middle Ages until today. The Gumelnita occupation demonstrates the specificity of integration into the natural environment with a remarkable ingenuity of the solutions found for the management of natural resources. The structuration of the built space and the differentiation of passage areas between zones used for housing are just examples. The pluridisciplinary character of the research conducted at "Popina Bordusani" allowed a

## C08.09-04 - Human-Environment Interactions and Evolution in the Late Pleistocene and Holocene 4

*Chair: Andrei Velichko, Loukas Barton, Fahu Chen, Bernhard Weninger*

### Late Holocene vegetation and climate dynamics and human- environment interaction in the forest-steppe zone of the East European Plain

*Elena Novenko (RAS)*

The late Holocene dynamics of forest-steppe landscapes of Central East European plain and the history of its agricultural land-use have been reconstructed on the base of pollen, plant macrofossil and radiocarbon data from a number of sections in the Upper Don River basin (the Kulikovo Battle-Field). The mire Bolsheberesovskoe and two sections of flood plain have been sampled and studied. The reconstruction of main parameters of past climate (mean July and January temperature and annual precipitation) was carried out with the use of Klimanov's (1984) transfer function. The study of the key sections of the area of the Kulikovo Battle-field enabled us to follow up the evolution of landscapes in the forest and steppe ecotone in the Upper Don basin over the last 7 thousand years and also to assess the human impact on natural environment in the region. In the middle Holocene the territory was occupied by steppe landscapes. Significant changes in the plant cover of the Kulikovo Battle-field area are attributed to the termination of the Atlantic phase and the early Subboreal. The high biodiversity of the forest-steppe area made this region a very attractive for early human groups. Signals of anthropogenic changes in the vegetation and clearly pronounced in the pollen spectra since the middle Atlantic. Neolithic hunter-gatherers were fully adapted to natural environments, and their impact on the vegetation was negligible. During the Bronze Age, several indices of agricultural activities are appeared in the pollen spectra, however the human-induced changes in the vegetation are remained very small until the medieval period. Large-scale landscape changes and the degradation of natural vegetation became conspicuous only over the past two of three centuries. The present-day state of plant communities in the Upper Don River basin is totally controlled by anthropogenic factors. This work was supported by RFBR grant 11-05-00557.

### Seventeenth-Century Crisis in Europe: A Human-Ecological Disaster Induced by Climate Change

*David Zhang (University of Hong Kong), Harry Lee (University of Hong Kong)*

Seventeenth century was one of the darkest eras in European history characterized by widespread economic, social, demographic, and political chaos. Despite the historical significance of this incident, there is no consensus about its cause. In this study, we

proved that the seventeenth-century crisis in Europe is a human ecological disaster primarily caused by global cooling. Firstly, we proposed a conceptual model to illustrate the possible linkages from climate change to agricultural production, price, social stability, and population change. Then, based upon various fine-grained paleo-temperature and historical socio-economic data, we examined statistically the climate-society relationship in Europe in AD 1500 - 1800. Results show that when temperature dropped in the seventeenth century, European agricultural production reduced significantly. As European population size had been saturated during the time, such an agricultural shrinkage inflated cereal prices, resulting in wars, famines, epidemics, and political upheavals across Europe. Finally, population collapse followed. The crisis ended in the eighteenth century when the population size was reduced and climate became favorable. Our study confirmed that at the macro-scale, climate change was the underlying driver of war-peace cycles and also the trigger of 'positive checks' in recent history. This finding may challenge some well-accepted theories regarding historical war-peace cycles and demographic changes.

### Principles of the paleoanalogs' use for estimating the consequences of the global warming in the 21st century

*Andrei Velichko (Russian Academy of Science)*

The paleogeographic analog method has been applied to estimate changes in the state of the main components of ecosystems at three time intervals within the 21st century (the 2030s, 2050s, and 2080s). Two warm epochs of the past, the Holocene optimum (c. 5.5 kyr BP) and the Mikulino (Eemian) interglacial optimum (c. 125 kyr BP) have been chosen as the paleoanalogs; those intervals featured mean global temperature higher than at present by 0.7 to 2.0°C, respectively. Such ranges of global warming are close to those to be expected in the 2030s and 2080s, according to scenario B1 IPCC. As the main components of ecosystems have various characteristic rates of reaction to the climate changes, in the first decades of the 21st century the most probable vegetation changes will occur in the composition of herbaceous plants and tree undergrowth. Considering limitations imposed by migration rate of trees, it is only by the end of the century that the tree species penetration into new areas and shifts of zonal boundaries may be expected. The predicted increase in potential evaporation in Northern Eurasia (by 100 mm above the present-day values at the middle of the century) may result in reduction of wetlands and slower peat formation. Changes in the soil cover will be much slower. In the north of the East European Plain, soil-forming processes will presumably respond to warming mainly by accelerated humification. Somewhat intensified processes of litter decay and illuviation would be typical for the subzone of podzolic soils at the end of the century, bringing about the initial phase of sod-podzolic soil formation. The area of chestnut soils will show a tendency to decrease as compared with the present days.

## Human impact on soil formation and the change from natural to cultural landscapes in NW-Germany

*Eileen Eckmeier (University of Bonn), Peter Fischer (University of Mainz), Alexandra Hilgers (University of Cologne), Renate Gerlach (LVR-Amt für Bodendenkmalpflege im Rheinland)*

During Late to End-Neolithic (3500-2200 BC), agricultural practice in the Lower Rhine Basin (NW-Germany) changed from ploughless agriculture to a presumably fire-based livestock farming. These changes were connected to a strong human impact visible in nearly all terrestrial archives (e.g. extensive changes in tree species composition). The natural landscape was transformed into a cultural landscape. We found that those environmental changes were also recorded in soils. Dark soil horizons (Bht horizons, Luvic Phaeozem) are common features of the loess areas of the Lower Rhine Region, and they are always connected to man-made pits. We investigated these Bht horizons and pit fillings by combining methods from (geo-) archaeology (geographical distribution within the landscape, shape of the pits, soil texture), geochemistry (carbon, pyrogenic carbon, nitrogen and lipids), palaeobotany (species determination of charcoals), AMS <sup>14</sup>C measurements and luminescence dating. Dark soil horizons and associated pits occurred as a patchwork of kilometer-sized islands independent of natural conditions (e.g. slope, parent material). The soil material itself was characterized by specific patterns of lipid compounds and high contents of charred organic matter, which are relics of biomass burning. Considering its Holocene age, determined by radiocarbon dating, the occurrence of the finely distributed charcoal can only be explained by human-caused vegetation fires because temperate deciduous forests could not be easily ignited naturally. IRSL and OSL ages showed that the Bht horizons did not form in Pleistocene loess parent material, but in colluvial sediments that date to the Younger Neolithic (4400-3500 BC). Thus, the history of human induced soil erosion and the accumulation of correlating colluvial sediments in the investigated area started more than 1000 years earlier than assumed before. There is archaeobotanic evidence for sustained fire-based agricultural practices in the Baltic Sea area and the Alpine Foreland since ca. 4400 BC. We concluded that the investigated dark soils are relics of prehistoric agricultural burning activities in NW-Germany, possibly providing the basis for the change to a cultural landscape in Late-Neolithic. They are not, as was presumed before, relics of naturally occurring Early Holocene steppe-soils (Chernozems).

## C08.09-05 - Human-Environment Interactions and Evolution in the Late Pleistocene and Holocene 5

*Chair: Andrei Velichko, Loukas Barton, Fahu Chen, Bernhard Weninger*

### Yangtze delta-coast of China: Prehistoric water conservancy and early agricultural implications

*Yan Liu (East China University), Zhong Yuan Chen (East China University)*

This paper tends to discuss the archaeological findings as represented by the large-scale water conservancy facilities emerged on the inner Yangtze delta coast, and its relation to early agricultural implications. A set of higher dykes consisting entirely of earth (sediment) are about 9 km long, 20-30 m wide and about 10 m high above the adjacent delta plain. Dykes are immediately positioned in parallel to the mountains (ca. 300-500 m above mean sea level) to north, only about 200-300 m in distance. To the south, there occurred the famous Liangzhu ancient city (2 x 3 km) excavated recently, and dated archaeologically at 5000-4000 a BP. This area is also well-known for the early Chinese rice cultivation. Our preliminary dating result using OSL has shown that the dykes were built up at about 4000 years ago. Furthermore, our magnetic measurement (anisotropy magnetic susceptibility) has witnessed: 1) magnetic alignments (n=57) of the dykes are disordered in distribution, showing the nature of dykes through human construction, and 2) magnetic alignments (n=77) below the dykes are in general to be directed southward, implying the alluvial deposition. This has manifested the initiation of dykes in relation to the early agricultural farming on the Yangtze delta coast. Our pollen study of the study area has demonstrated the processes of cultivated rice and related farming habitation during the time period of 5000-4000 years ago. We reason that the emergence of the water conservancy of the study area was initially considered as the means for flood mitigation in association with the early agricultural civilization. This provides an example for better understanding of adaptation of Neolithic development on the megadelta coast of China.

### Observation of Spatial-Temporal Change in Erzurum and Surrounding (Turkey)

*Halil Gunek (University of Firat), Ilhan Oguz Akdemir (University of Firat), Veysel Kuscu (University of Firat)*

Urbanization is the developments in the city and its district as a result of population increase. Urbanization causes great changes in the land use. Since the natural vegetation and structure are occupied with pavements, streets and buildings due to changes in land use; cities have typically become dry lands being polluted impermeably, roughly and

intensively. These disadvantages cause natural environment change negatively in the city. Moreover it also causes climate change. We can determine land use and land change easily with the help of remote sensing system and GIS. In this study, the change of spatial and temporal land use was observed in Erzurum which was located in the east of Turkey at 1900 m elevation. By using remote sensing system and GIS techniques together, changes brought by urban housing on the land use in the last 25 years and its dimensions were defined. When the establishment of city is considered, the settlement which dates back to old-times is settlement of city which expands around the castle. When the first texture of the city is analyzed, it is seen that the city is composed of dense-textured, narrow streets and low-rise small houses. However after 1980's, a rapid urbanization has started due to new residential lands and housing possibilities. As a result of this suburbanization, an expansion was observed outwards urban inner areas and shack town. The development in this period was restricted with the population increase of the city, but a rapid expansion was experienced due to migrations from rural area and close areas. Shanty houses are generally established on unproductive and inclined land where there is much treasure land. However, new settlements are generally established on flat land. According to the results it is determined that the expansion of Erzurum towards plain base is not rapid. The expansion is rather towards South-west.

### The natural and anthropogenic causes of climate change and its consequences

*Christina Hakopian (Yerevan University)*

Numerous studies, based on paleoclimatic or indirect data show that climate change would take place in past, in all geological periods. Of the most significant climate alterations is the cycle of about 100 000 years, the ice ages, when the climate on the Earth was mainly colder compared with that in present, and that was followed by warmer inter-glacial periods. Those climate changes were caused by natural factors. Some of them would occur for relatively short periods of time. With the rapid industrial development at the beginning of 20th century, climate change processes also accelerated. From then, not only the natural, but also the anthropogenic factor fostered climate changes. Under the impact on human activity, the natural chemical composition of the atmosphere changed considerably (due to green-house gas emissions, such as carbon dioxide and methane). This change affects the global climate of the planet. The natural factors of climate change are: Earth orbit displacement and angle of incline (in relation to the planet's axis position), alterations in solar activity, volcanic eruptions and changes in atmospheric aerosol of natural origin distribution. The anthropogenic factors of climate change are: greenhouse gases, formed as a result of human activity, aerosols, changes in land-use, urbanization growth, and others. The climate changes that took place in the last 20 years affected all the components of the environment, and through them, influenced on human activity and health. In the last years, climate changes caused droughts and fires in some regions of the world, while some others suffered floods,



mudflows and landslides, etc. This resulted in both physical extermination of live organisms and humans, and caused traumas, made some diseases acute or caused some other misbalances. The natural and anthropogenic causes of climate change will be studied and analysed in this paper, with the main emphasis on the consequences of these changes, as well as measures of their mitigation.

### **Water balance of boreal forest ecosystems of the north-east of European Russia during the Holocene**

*Alexander Olchev (RAS)*

The temporal variability of the main components of water balance (e.g. actual evapotranspiration (E) and potential evaporation (PE) and annual transpiration (TR)) of mature forests grown in European part of Russia in the Holocene was reconstructed using a simple regression model. As input parameters the model uses the paleoclimatic and paleobotanical data (air temperature, precipitation, forest species compositions). The model is based on nonlinear approximations of annual values of E, TR and PE by the Levenberg–Marquardt method using the results of numerical simulations of E, TR and PE provided by a Mixfor-SVAT model for the forests with different species compositions under various thermal and moistening conditions. The results of E, TR and PE reconstructions for the Holocene show a large variability and high correlation with the air temperature pattern. Minimal values of E and PE are obtained for the Younger Dryas cold phase (10.2 – 9.5 14' kyr. BP) when  $\tau$  varied between 320 and 370 mm year<sup>-1</sup> and PE - between 410 and 480 mm year<sup>-1</sup>. During the late Atlantic periods of the Holocene (4.5-4.8 14C kyr. BP)  $\tau$  and PE reached maximal values (430-450 mm year<sup>-1</sup> and PE - 550-570 mm year<sup>-1</sup>). Obtained data can be used for better understanding of land use and vegetation changes in past epochs and for prediction of vegetation dynamics in future.



## C08.09-06 - Human-Environment Interactions and Evolution in the Late Pleistocene and Holocene 6

*Chair: Andrei Velichko, Loukas Barton, Fahu Chen, Bernhard Weninger*

### Focusing on the Major Function Oriented Zone: New Spatial Planning Approach and Practices

*Jie Fan (Chinese Academy of Sciences), Dong Chen (Chinese Academy of Sciences), Wangshu Hu (Chinese Academy of Sciences)*

Spatial planning occupies a prominent place in China's 12th Five Year Plan as Part Five of the Plan put forwards new initiatives in coordinated regional development and Part Six address the challenge of resources and environment. The paper by Fan Jie and his team explains the key policy concept underlying this latest thinking. Fan, a professor at the Chinese Academy of Science and the chief scientist of the research team on the project, proposed a major function-oriented zone (MFOZs) approach to regional development. His work explains how this concept comes about, the details of the multiple indices used and the methodology adopted. According to this approach, four kinds of MFOZs are identified in regulating land use in China: "development-restricted zones", "development-oriented zones", "development-prioritized zones" and "development-prohibited zones". Their team has undertaken the research and proposed this approach to the central government, which has then adopted it as a national policy framework in the 12th FYP. However, only two-fifths of the land in China will be covered by the national zoning, whereas zoning of the remaining three-fifths of land will be carried out by the provinces. Such a top-down approach in defining territorial functions through zoning has the advantage of slowing and stopping the rapid loss of arable land and areas endangered by industrialization and urban development. Unlike previous attempts, a detailed index system backed up by extensive research by Professor Fan's team will provide detailed guidelines and technical standards for zoning at the provincial level. Further, instruments such as remote sensing images, field monitoring and surveys, among others, will be employed to build up a data base under the supervision of the Chinese Academy of Science to offer a dynamic assessment of changes in national level MFOZs. This is also one of the few examples where scientific knowledge has been incorporated into national development and regional planning. Nonetheless, the complexity in this undertaking of zoning in a vast country like China and the political incentive of promoting economic and industrial growth by China's local governments pose challenges to the full implementation of such a far-sighted policy.

### Socio-Economic and Environmental Impact of Renuka Dam, HP: A Case Study

*Jagdish Chand (Govt. College, Chamba)*

Water and energy are indispensable for human sustenance. The demand for water and energy on a global scale is assessed to boost significantly in the future, in accordance with population growth and improved living standard. As such, in the 21st century are required to secure water resources and to introduce renewable energy sources that are environmental friendly. Throughout history, dams and reservoirs have been used successfully in collecting, storing and managing water needed to sustain civilisation. In this paper, Renuka Dam Project, which has proposed to be constructed across river Giri near Dadahu 400 m downstream of the confluence of river Giri and Jogar ka Khala, envisages construction of a concrete gravity dam of 178 m height (from the deepest foundation level) has been studied. The submergence area of the Dam reaches upto the Khairi Bridge, 35 km from Dam site. The dam lies in district Sirmour of Himachal Pradesh. The project has been designed for the purpose of water storage for the supply of the same to the state of Delhi. The study makes use of both primary and secondary data. Extensive field work has been done by conducting structured questionnaires, schedules, interviews and personnel observations in order to collect primary data. The proposed reservoir will be submerged an area of 1281 hectare of land consisting of 485 hectare forestland (including 49 hectare of sanctuary area), 313 hectare of revenue and education land, and 436 hectare private land. The details of affected families have been obtained through field survey conducted at household levels. The records of land likely to be acquired in different (project affected) villages have been obtained from the concerned Revenue Authorities and Himachal Pradesh Power Corporation Limited. The impacts on land environment due to construction of 'Renuka Dam project' have been evaluated and it was found that terrain around project site is going to have permanent and temporary changes in the landscape. The major impacts will be change in land-use leading to fragmentation due to submergence and construction of the project. Generation of additional muck and localized increase in erosion due to excavation of tunnel, powerhouse and other appurtenant components and other will be localized fall off temperature in and around reservoir. There will be lot of degradation/destruction of local natural fauna and flora of the dam site. The adverse socio-economic and environmental impacts of large dams can be mitigated through informed decision-making, transparency and engagement of all stakeholders. In all probability, the advantages and disadvantages of hydro-power structures, large or small, have to be discussed with people transparently. Based on the evaluation of baseline data and predicted impacts, suitable management plans to reorganize the negative impacts in the sphere of land, water, air, noise, biological and socioeconomic environments need to be formulated.



# C08.10

# Gender and Geography

## C08.10-01 - Gender and Geography 1: Everyday, home and mobility

*Chair: Robyn Longhurst*

### What About Women? Gendered Space and Human Security in Sri Lanka

*Ali Brown (University of Amsterdam)*

I intend to present findings on research conducted early 2012 on women's daily mobility patterns in relation to their livelihood strategies, natural resource use and perceptions of human security in a fishing village in Northern Sri Lanka. The social constructions of space have real implications on the patterns of daily life, especially for women in post-war areas. Social constructions, limitations and uses of space in a militarized area have implications for livelihood strategies, the natural environment and perceptions of human security. Many women have become heads of their own households as a result of the war and fishing activities have also been restricted, which decreases economic opportunity. As such, it is important to investigate the current perceptions and uses of space in building livelihoods and security in order to understand the possible impacts of development initiatives in the region.

### La ségrégation hommes-femmes dans le métro: Comment en arrive-t-on là?

*Marion Tillous (Université Paris)*

Il existe dans le monde dix réseaux de transports urbains ferrés (métros, trains de banlieue et métros légers) dans lesquels certains wagons sont réservés aux femmes, parfois seulement aux heures de pointe, parfois pendant toute la durée du service. Ces réseaux ne se trouvent pas dans une même aire culturelle (il en existe au Japon aussi bien qu'au Mexique, en Egypte ou en Inde), mais tous relient, dans leur communication autour de ces réseaux, la séparation homme-femme aux questions de sécurité. La compagnie Tokyo Metro indique ainsi sur son site : « Tokyo Metro has adopted "women-only" cars during the morning rush hour so that women, elementary school students and younger children can ride with a sense of security ». Tout se passe comme si, pour répondre à une vulnérabilité constatée, la solution la plus pertinente avait été de séparer la population à risque de l'aléa, en l'occurrence de l'agression par un homme. C'est ce déroulement dans la prise de décision que nous souhaitons interroger : comment le problème a-t-il été identifié - Par qui : la puissance décisionnaire ou la population vulnérable concernée - Pourquoi face à ce problème, la solution de ségrégation est-elle apparue comme la meilleure - A quelles autres solutions a-t-elle été confrontée au moment du choix - La décision a-t-elle seulement été prise pour répondre à un problème - N'a-t-elle pas par exemple été prise pour obtenir les faveurs d'un groupe (dans un contexte électoral, notamment) - Ou encore pour répondre à un code moral qui semblait

aller de soi aux décisionnaires - En d'autres termes : y a-t-il vraiment eu choix ? Pour répondre à cet ensemble de questions, nous avons choisi d'interroger les responsables des opérateurs et autorités organisatrices des dix réseaux concernés selon un protocole commun, visant à identifier le moment de la décision, le réseau d'acteurs impliqué et les controverses qui se sont engagées à la suite de cette décision. Pour pouvoir mener les dix terrains de front, nous avons pris le parti de réaliser ces enquêtes par échanges de mails. Des recherches dans la presse nationale et internationale ont permis de compléter ces informations.

### Home as productive space in rural Los Tuxtlas (Veracruz, Mexico)

*Isis Arlene Diaz-Carrion (Universidad de Madrid)*

In rural Mexico home is often considered not only a reproductive space but also a productive one; however, even though either men or women are used to performance productive work at home the use of time/space involves reproductive work mainly for women. As a result, for women, productive work at home is one of strategies used to make compatible their roles of caregiver and breadwinner. Through a qualitative approach (in-depth interviews and observation) quotidian life of women and men are studying in order to identify the differences in using private space in order to perform productive work as well as the limitations imposed by the reproductive one. Key words: gender, productive work, rural, Los Tuxtlas.

### Neighbourhoods on the making: Audiovisual recollections of gendered spaces in the barrio La Romànica (Barcelona)

*Rosa Cerarols (Universitat Pompeu Fabra), Antonio Luna-Garcia (Universitat Pompeu Fabra Barcelona), Fabi Díaz (University of Leeds)*

Our research topic deals with the social construction of place and daily life in a local scale, especially at neighborhoods. We are also very interested in urban transformations faced during last century at what we know now as the Metropolitan Area of Barcelona (MAB). In the beginning of 20th century most of the area that now is heavily constructed and populated was a vast extension of fields. From this starting point, we try to explain and understand from a geographical and social perspective the birth and growth of La Romànica, a tiny neighborhood of Barberà del Vallès, a MAB suburbial town. To understand the sense of place of this community is very important to combine historical inquiry of social and material neighborhood's evolution. Our approach goes beyond the official reconstruction of the neighborhood and wants to deal with local people contributions and their remembrances in place. To analyze its significance we will recover their memories using audiovisual methodologies. On the one hand we will follow up some local figures that can explain us how the place was, how it has changed and how it has been consolidated as a collectivity with a real neighborhood identity. On the other hand, we will try to figure out by video how daily life is now, considering age, class and gender.



Audiovisual methodologies are rich but complex. They allow creating and mixing diverse information that was not possible before. Through them, new discourses are elaborated, becoming a useful and powerful tool of analysis, but sometimes too demagogical. In our study, by using audiovisual methodologies we will try to give voice and empowerment to local people and to narrate their own history and lives, adding meaning to space as well as explaining the social construction of La Romànica.

## C08.10-02 - Gender and Geography 2: Work and society

*Chair: Joos Droogleever Fortuijn*

### Lived world of elderly people in Japan: Analyzing their life history

*Yoko Yoshida (Nara University)*

Human geography studies of the elderly in Japan have largely drawn from previous studies in the English-speaking world. However, it appears that human geography studies in Japan have taken a masculinist point of view. This approach has been widely criticized by feminist geographers. This has occurred because geographers, whether from Western countries or Japan, do not take into account their own positionality when conducting research. This study takes an interest in human geographical researchers' positionality when they do research into elderly people who have different social and economic backgrounds. The factors that influence the social history of a person include gender, class, ethnicity, disability, sexuality, etc. These factors contribute to the differences in lives that people lead. To date, very few studies of Japanese human geography have focused on the issues of gender, disability, sexuality, etc. However, some studies of elderly people have made reference to population distribution, residential mobility and surroundings, and behavioral patterns by taking into account varying income groups and physical conditions. Gender, disability, sexuality, etc. are factors which can contribute to inequality and exclusion in society. It is clear that employing a feminist perspective should be significant for a researcher (even if a female researcher unconsciously falls into a masculinist perspective due to the researcher's priorities) to analyze the life history of elderly person by conducting interviews. However, Japanese human geographers have not to date approached their research from a feminist perspective. The majority of the discourse in this area has taken a masculinist perspective. Thus this study emphasizes the social relations (including gender) which have been missing in the human geography studies of the elderly in Japan. This study attempts to understand a constructing process of identity for each elderly person from birth to today. It does this by focusing on the person's life history. In particular, the study looks at social relations (including gender relations) that an elderly person will have encountered in their life. Making a time-space matrix is one of the useful methods of understanding the lived world of elderly people who live in different places (a large city, the suburbs, an agricultural and fishing village). Many previous works concerning the elderly tended to focus on the present condition surrounding everyday life, but it is important that we also study the person's lived world (that is a constructing process of identity). This study presents some issues that the elderly face in their everyday life and points out their urgent needs, using the notion of time geography which looks at a person's past experiences and social relationships. My presentation will include detailed data.

### Female workers in the fishing industry in Rio Grande, RS, Brazil

*Susana Maria Veleda da Silva (Universidade do Rio Grande)*

This paper reports empirical results and reflections upon the situation of female workers in fishing industries in Rio Grande, a city located in the south of Brazil. Our premise is that this activity is influenced by the position that women still have in the patriarchal society, (re)producing the sexual division of work based on the gender relations that stigmatize them in the world of paid work. This study aimed at outlining the female workers' profiles in the sexual division of work and identifying resistance and emancipation strategies. Therefore, we chose a qualitative methodology from a feminist perspective. The operationalization consisted in the analysis/reflection upon the following categories: stigmas, family, sexual division of work, precarious work and empowerment. The research showed that the female workers in fishing industries have still been submitted to forms of exploitation that can be based on gender relations regarding management positions taken by male workers and tasks related to women's roles in reproductive work.

### Feminization of labor force in Japan and changing women's life course

*Yoshimichi Yui (Hiroshima University)*

After 1990s, globalization and relaxation of regulations in labor market have drastically changed working conditions in Japan. The revision to the Law for dispatch workers and the Law for Equal Employment Opportunity of Men and Women had increase part-time or non-permanent workers. Especially, female work turned to cheap part-time jobs or unstable dispatched jobs. And the economic depression force to push housewives to restart to work in order to subsidize their households' income. In this ways, the ratio of female workers is increasing. This means that feminization in labor market has progressed in Japan. Originally it was popular that women leave a job after marriage or childbearing before 1990. However this trend and women's life course have been changed. It is increased that young women continues to work after marriage and that married women restart to work on a part-time basis. Furthermore, the trend toward service economy need more cheap female part-time workers in service sector. Married women are convenient as flexible workforce for employers or business owners. This study tries to analyze the work and life of women's care workers and call center agents in order to clarify the feminization of personal service sector in Hiroshima and Okinawa. These service industries are typical growing industries in Japan and both industries depend on women's irregular employments. And reasons of selection of case studies are follows; one is that care service works are growing service sectors in Okinawa. And another one is that care service industries are important in rural regions because care service industry is only one industry in rural regions. Care service is the most feminized sector in labor market in step with the aging of the population. Most of labor force is women's part-time worker. That is why this service needs the experience of nursing work and flexible work. Usually care service is assembled with short segments of part-timers

works. So, their work is extremely flexible. In some case, care service women work in two specific days per week or in two or three hours in everyday. Married women don't want to get full-time job, because they think it is difficult to satisfy both of work and housework. However there is little assistance by their husband. Therefore, unstable and low income jobs force to change women's life course. Young unmarried women continue to work and keep their marital status. And married women tend to restart to work as part-timers. However their work is very serious without government assistances.

### **Gendered pathways into the labour market**

*Karin Schwiter (University of Zurich)*

In most countries women and men are disproportionately concentrated in particular occupations and in particular sectors of the economy. Men seldom become nurses, and only few women work as taxi drivers. Although many other indicators of gender inequality have decreased within the last decades, gendered occupational segregation has shown remarkable persistence. Its extent and patterns, however, vary considerably between countries. While gendered occupational segregation is comparatively low in the US and in Canada for example, it prevails especially pronounced in the German speaking countries (Germany, Austria and Switzerland). This paper aims at shedding light on the complex and intertwined mechanisms that contribute to the disproportionate concentration of men and women in particular occupations and on its patterns. After an overview of the existing literature, it presents results of a longitudinal Swiss study which followed the transition process from education to employment of a statistically representative cohort of young adults for ten years. The findings presented in the paper are based on analyses of this quantitative longitudinal data and of retrospective narrative interviews with a number of respondents from this sample. The paper will highlight and critically discuss the mechanisms which shape young adult's pathways into feminised or masculinised occupations in Switzerland and draw comparisons to other countries.

## C08.10-03 - Gender and Geography 3: Migration and transnationalism

*Chair: Janice Monk*

### Illegal immigration and the social representations of the Brazilian female professionals of sex in Spain

*Joseli Maria Silva (University of Ponta Grossa State)*

This investigation has as its main objective to analyze the association between the illegal immigration and the social representations of the Brazilian female professionals of sex in Spain. Thus, the intelligibility of the defining elements of the transcontinental female immigration for the practice of commercial sexual activity is constructed, and the relations among body, identity, Brazilian territory and sexual practices in foreign countries are contemplated in order to know the meanings constructed by Brazilian women on their socio-spatial experience of illegal immigration. The immigration routes, the immigrants and the actions of the organized groups in the commercial sexual activity have been the object of international researches showing that Spain and Portugal are the major destination countries and people in transit to other rich countries of the illegal immigrants and, also, of people being trafficked for sexual exploitation. Since 2007, the Brazilian government has made efforts to understand the complexity of these relations and outlined policies to fight against emigration of Brazilian males/females who have suffered exploitation processes and then started living illegally and in precarious citizenship conditions in rich countries. As a globalized world, it is up to Geography to contribute with the spatio-temporal comprehension of this phenomenon which has been object of many conflicts and international treaties. Keywords: illegal immigration, Brazilian women, commercial sexual activity

### Japanese Women in Hawaii

*Honami Kageyama (Sugiyama Jogakuen University)*

This paper will clarify the identity of Japanese women living in Hawaii after World War ' by analyzing the article in a Japanese journal published and distributed only in Hawaii. After World War ', many Japanese women emigrated to Hawaii for mainly four reasons: (1)they married to American soldiers and moved to Hawaii as 'War Brides'; (2)they followed their Japanese husbands, who were the representatives of Japanese enterprises; (3)they personally visited Hawaii then later married and stabilized there and (4)they came to look for a job. After moving to Hawaii, some of them started making their own social networks in order to acquire their 'home'. However, the way they built those networks was different from that in Japan. In Japan, many of them had to ask for permission from their husbands in order to attend some social communities whereas they did not have to do so in Hawaii. This means that they are free from the traditional Japanese family tie:they

can do what they want. Although it seems that Japanese women living in Hawaii have won their freedom, in reality they are still bound by the traditional image of 'Japanese women'. They tend to play their gender role as humble and submissive 'Japanese women' unconsciously because they think that they are expected to do so. In this way, they inwardly reproduce and reinforce an identity of conservative Japanese women. In this paper, I will analyze articles from a newspaper called 'East-West Journal' by focused on is 'Gambaru Hawaii no Shin-Issei (Powerful Japanese First Generation livin in Hawaii)'. There were 144 articles about this topic and 34 featured Japanese women living in Hawaii. Through analyzing these articles, I would like to investigate how they built their own 'dwelling space' in Honolulu: a space that has been culturally and socially created as a living space where its residents can live actively and creatively. 'The dwelling space' is an integrated place between 'production space' and 'reproduction space', and it is a place where 'residing' persons who are active in integrating production and reproduction can continue to act creatively in even living in the residential area.(Kageyama 2010, 2004).

### Gender and Circuits of Labor Migration: A Case Study on Urban Communities of Metropolitan Manila

*Makiko Ota (Osaka University)*

Studies of cities in developing countries have been conducted focusing on domestic rural-urban migration. Most studies have examined characteristic phenomena of dwelling and working in such cities, in both slums and informal sectors. They have been analyzed with respect to social and cultural continuities between cities and rural areas. However, these studies have not discussed the international labor migration in such context, although some developing countries have a large number of migrants to developed countries. Furthermore, women's migration has been overlooked, because the studies tend to focus on migration of heads of households, who are usually men. Recently, "feminization of migration", which implies the increase in the number of female migrants, is observed at a global level. In the Philippines, the number of women among overseas contractual workers has been increasing since the 1990s. Cities should be analyzed from the perspective of feminization of labor migration, since emigration has already spread as an option among women in some developing countries. In this presentation, I introduce two perspectives, gender and global migration, for an analysis of migration structure of urban low-income communities in metropolitan Manila, the Philippines. The presentation is based on data collected through a field study of households in the communities that send migrants overseas. I explore gendered circuits of migration from the communities by focusing on the effects of economy restructuring process and "feminization of labor" in Manila on each research community. The following data will be analyzed to verify the characteristics of emigration structure of the communities: gendered local economy, segmented labor markets, household patterns, decision-making process of female and male overseas workers, migration pattern of women and men from the province,

formation processes of the communities, and economic-cultural relationship between migration target countries and the analyzed communities. The circuits of migration are examined in terms of the continuities of rural-urban movement and overseas migration; both have been caused under the influence of the growth of the service sector and export-oriented economy in the Philippines.

### **Social Inequalities and the Habitus in Transnationalizing Societies**

*Nina Schuster (TU Dortmund)*

Social processes are closely associated to the bodies of the persons who are interacting in social practices. The body is shaped by many socially constructed differentiations, which are mould into social categories - like gender, sexuality, ethnicity, class, age, ability. A person's habitus, as Pierre Bourdieu calls it, is shaped by a person's social surroundings and circumstances when growing up, structuring her\_his social practices. It is built on a system of classifications and hierarchies that get incorporated and influence in the way in which a person uses her\_his body. As categories intersect, the habitus of a person is shaped by more than one of the categories named above. This dimension of social differentiation becomes extremely significant when people from different social and cultural contexts interact, as it is more and more the case in globalizing societies that are shaped by transnational mobilities, and, as a result, by tendencies of a social transnationalization. In this context, intersectional perspectives within social inequalities have to be studied carefully. One possible approach for this study may be the dimension of the body. My paper argues that the body represents a crucial, often neglected part of socio-spatial practice analysis in the context of the analysis of transnationalizing societies. If we share the ideal of a society that should be based on equal terms, it is crucial to be aware that there are diverse, hierarchically arranged habitus and thus diverging social orders represented in one place, in order to be able to reconceptualize transnationalized social processes. Social processes are especially susceptible to be misread if embodied social hierarchies, interwoven by power and dominance are not included into the analysis. As every global social process is rooted in local structures, an analysis coping with a local scale or a micro social perspective on space may be helpful. This local perspective has to consider the dimension of the habitus of people involved. This conceptual paper will discuss the role that intersectionally shaped social positions play in social processes within a wider focus of a concept of a transnationalized society. Bringing debates on social inequality and its bodily incorporations into the focus, it discusses how inequalities as well as discriminations and social exclusions are produced unwittingly, and often are not reflected as problems of unequal, hierarchical social structures.



## C08.10-04 - Gender and Geography 4: Planning and development

*Chair: Elisabeth Buehler*

### Feminization of social exclusion: a case of the transitional Ukraine

*Ganna Gerasyenko (Institute for Demography and Social Studies)*

Development of the concept of social exclusion was facilitated by a transition from the monetary approach to poverty studies to the deprivation approach, which suggests exclusion form a normal social life, common for a society. In this regard, gender analysis of inequality is particularly important, as women tend to be more discriminated against than men all over the world; women face higher risks of poverty and their poverty tends to be more intractable. Moreover, gender inequality affects also such poverty dimensions as opportunities, empowerment and security. An increase in gender inequality in terms of poverty and social exclusion has become a prominent feature of the transition period in Ukraine. The proposed paper provides a brief analysis of the recent poverty trends in terms of various criteria; it also presents the main poverty profiles formed by certain sociodemographic population groups, which are clearly gendered. A particular attention is paid to problems of poverty feminization, which are rather urgent in Ukraine, and analysis of the gender bias in social exclusion problems. The regional analysis of social exclusion in transition economies reveals a particular rural-urban divide in terms of access to public services, infrastructure, opportunities of leisure, etc. The state policy on incorporating of gender approaches to the poverty alleviating and social inclusion strategies are critically analysed; the respective policy recommendations are outlined in the conclusions. The paper is based on the results of the 2007 Social Exclusion Survey in Ukraine, which has been realized by Institute for Demography and Social Studies of the National Academy of Sciences of Ukraine; it also operates with data of household budget surveys.

### Background of Decreasing Fertility Rate in Japan Compared with the United Kingdom

*Eriko Ikeya (Kochi College of Technology)*

Low fertility in Japan is very serious. After World Health Statistics 2011 by WHO, rank of Total Fertility Rate in Japan was the 182nd among 191 countries in 2009. Other low rank countries were in South East Asia, Eastern and Southern Europe. Fertility rates are assumed to reflect not only thought of people about having children but also reproductive health rights situation and life conditions. And low fertility is feared to cause economic decline from shortage of demand and working age population and burden for young people in aged society. After previous studies, causes of declining TFR were explained as late childbearing and decreasing number of children per woman in increasing labor

participant opportunities. But, late childbearing is common in industrialized countries and some of those countries reveal relatively high TFR. For example, TFR of France is 1.99; the United Kingdom is 1.94 in 2009. So, I want to investigate backgrounds of low TFR in Japan by comparative research. As a country to compare with Japan, I selected the United Kingdom. The U.K. has similar size country to Japan and has history of industrialization. Comparing the TFR with the U.K., TFR of both countries decreased in 1950 to mid-1980s. TFR of Japan continued to decrease from 1.76 in 1985 to around 1.3 in the late 1990s and the 2000s. On the other hand, TFR of the U. K. kept around 1.7 and increased in the 2000s to 1.94. The backgrounds of these differences of TFR of both countries are thought as below. 1. Gender equality and Labor rights in the U.K. are more guaranteed compared with Japan. In addition, work life balance policy is more developed in the U.K. So, working female can have children not only in their 20s but also in 30s and 40s in the U.K. In Japan, 60% of female quit the job before or after giving birth, 26% of them had difficulties to balance work and life and 9% were fired or suggested to resign. 2. There are choices for child care in the U.K. They use nannies, child-minders, au pairs, nurseries and husbands or grandparents take care of children. In Japan, choices for child care are almost limited to use nurseries or kindergartens. Nursery seats cover only 33% of children in 2011 and especially seats for infants are insufficient. 3 years old myth that infants should taken care by their mother and Japanese-style Welfare policy of LDP prevented to establish enough nurseries. 3. Safety net plays important role in keeping fertility in the U.K. The U.K. has strong net compared with Japan as Welfare State. Economic security in everyday life declined heavily in Japan by globalization. Factories moved to Asian countries and prices collapsed, so young people could not get well paid, stable jobs. Working poor widely spread. Marriage and fertility rates of young are declining in this circumstance. Safety net in Japan is not enough. It should be enhanced.

### Territorial Structures of the Economy of the Pacific Russia – Tendencies of Dynamics and Inertia

*Petr Baklanov (Pacific Geographical Institute)*

In the respect of growing economic and geographic inclination of the eastern areas of Russia to the Pacific Ocean (to its natural resources and transit potential), and taking into account the state sovereignty over the sea economic zone, we called the Far Eastern region of Russia as Pacific Russia. Lately we studied the geographic factors and tendencies of changing territorial structures in this region in long-term perspective (till 2050). We consider territorial structures of the economy (ÖSEs) as two-level, two-layer formations (Baklanov, 1986, 2007): separate enterprises, companies, industrial nodes, the flows of resources and finished goods of the nodes and territorial zones of influence of separate nodes, social-infrastructure zones, resource-ecological zones, and also market zones within the framework of resource and consumer structures. In the framework of this approach, we consider the features of territorial structures of the economy within the limits of the Pacific Russia. One can allocate a number of properties

of territorial structures of the economy; the basic ones are as follows: dynamism, stability, inertia. A fundamental property of OSEs of any level is their dynamism; that is, the spatial-temporal variability of structures and their links, and inertia'the ability to keep invariable in some measure the basic structural features for a long time (years). We carried out generalized estimations of the main kinds of activity developed in the Far East of the USSR (within the Far Eastern economic district) in the 1970s; that is, with an approximately 40-year retrospective (a period equal to the perspective of 2010 up to 2050). Modern kinds of activity in the region, including the separate Far Eastern subjects of the Russian Federation, are estimated. Taking into account the tendencies involved in the strategy of social and economic development of the Far East and the Baikal region to 2025 and predictions of development priorities, generalized predictions are made of the possible kinds of basic economic activities that will be taking place in the region by 2050. On the whole, it is necessary to allocate some levels of the analysis of territorial-structural transformations of the economy: common regional levels, the levels of the Russian Federation subjects within the Far East, the levels of economic centers and cities, and the levels of the primary territorial structures formed by separate enterprises. The enterprises of specialized economic centers are chosen last. On this basis, it is possible to predict more strictly the transformation of territorial structures of the economy over the long term. Finally, predictive economic maps for certain areas of the Pacific region of Russia can be compiled.

### **Pattern of Social Change and Development among the Tribal Women in Assam (India)**

*Madhushree Das (Gauhati University)*

Social change, which is a multidimensional and complex process, occurs in all societies irrespective of their structure, compactness, integrity and stage of development. But for a change to be termed development, it must occur continuously in a desirable dimension and direction. These desired goals are specified by the values and needs of the society concerned. While change results in modification or alteration or replacement of the old by the new ones, development aims to achieve human well-being and enhance the quality of life. Like other societies, the tribal society of Assam, located in India's North East, is also witnessing the spurt of social change and development due to a variety of factors. Having diverse ethnic origins, representing racial stock from Proto-Austroloid to Mongoloid, with a distinctive socio-cultural system, own cultural ethos, and an unique way of adaptation to different ecological niches, these tribal groups seem to respond to processes of social change and development quite differently compared to other communities. In this context the role of women is vital as women are an active agent of change. However, the pattern of social change and development is no way uniform throughout the state. It is different among the women of different tribal groups and in varying spatial contexts. Besides, the effects of change also seem to assume different orders and pattern. Depending on historical background, locational factors, tribal and non-tribal interaction and

infrastructural base, the level of socio-economic development of women among the major tribal groups in Assam present a highly varied picture. It is in this backdrop, an attempt is made in this paper to understand the patterns of social change and various dimensions of Women's development among eight major tribal groups (Boro, Mising, Karbi, Rabha, Sonowal Kachari, Tiwa, Dimasa, and Deori) living here. The study is based on both primary and secondary data. While secondary data has been obtained from relevant Census of India publications for the period 1971-2001, necessary primary data have been collected through a field survey in the dominant pockets of eight major tribal groups (2009-2011). Further, to understand the pattern of social change and development among the women of the different tribal groups, quantitative techniques like Social Change Index, Composite Z Score and Principal Component Analysis have been used.

## C08.10-05 - Gender and Geography 5 - Panel Discussion: International practices in gender geography: bridges and barriers

*Chair: Maria Dolors Garcia-Ramon*

### International Practices in Gender Geography: Bridges and Barriers

*Maria-Dolors Garcia-Ramon (Universitat de Barcelona), Jan Monk (University of Arizona), Antonio Luna-Garcia (Universitat Barcelona), Susana Maria Veleda da Silva (Universidade Federal do Rio Grande), Joos Droogleever Fortuijn (University of Amsterdam), Ruth Fincher (University of Melbourne)*

International Practices in Gender Geography: Bridges and Barriers Jan Monk (University of Arizona)& Maria-Dolors Garcia-Ramon (Universitat Autònoma de Barcelona) This panel session will address three themes related to contemporary practices and challenges within and across national contexts in gender studies in geography. It will identify strategies that have fostered and could enhance communication and support for international work in this aspect of the discipline. The panel organizers will open with a reflection on the initiation and work of the IGU Commission on Gender and Geography offering some examples they have identified of the barriers, strategies, and progress in the development gender studies in geography internationally and in selected national settings. Second, they will take up the complexities of identifying and addressing Anglophone hegemonies in research publications and the significance of language in constructing thought and expressions. Third, they will report approaches to teaching in higher education that aim to foster students' understandings of international perspectives and identities. Following the introductory presentation, discussion groups led by members who are active in the leadership and participation of the Commission will address questions related to ways forward for advancing the field in diverse settings nationally and internationally. The session will conclude with short reports from the discussion groups.

### Panelists

*Jan Monk (University of Arizona)*

*Antonio Luna-Garcia (Universitat Barcelona)*

*Susana Maria Veleda da Silva (Universidade do Rio Grande)*

*Joos Droogleever Fortuijn (University of Amsterdam)*

*Ruth Fincher (University of Melbourne)*



# C08.11

## Geographical Education

## C08.11-01 - Education for Sustainable Development & Global Learning 1

*Chair: Yvonne Schleicher, Osvaldo Muñiz*

### Contributions of transdisciplinary teaching and learning strategies supported by Geographic Information Systems to Education for Sustainable Development – the point of view of the teacher

*Vânia Carlos (University of Aveiro), António Moreira (University of Aveiro)*

The need to educate citizens towards understanding complex problems as a demand of Education for Sustainable Development (ESD) gives prominence to transdisciplinarity and holistic learning (Unesco, 2009). The pivotal position of Geographical Education (GE) makes it an excellent space for transdisciplinarity (Haubrich, Reinfried, & Schleicher, 2007). GE also plays an important role in ESD (Haubrich, 2007) preparing students to think space and intervene in their local environment through spatial thinking (Bednarz & Kemp, 2011). The democratization of Geographic Information Systems (GIS) comes with the features of Web 2.0 allowing collaborative cartography and promoting transdisciplinary approaches (Lee & Bednarz, 2009). This ongoing study follows an action-research methodology and aims to contribute to the implementation of transdisciplinary teaching strategies, by answering: Do teachers consider transdisciplinary planning beneficial for ESD goals? What characteristics of GE promote transdisciplinary approaches in ESD? What are the main difficulties of integration of specific subject contents? Do GIS help support a more holistic teaching of ESD? It uses 2 groups of 5 teachers attending a teacher-training course. Data was collected from an individual questionnaire and a Focus Group interview, to reveal their representations before and after teaching (Cohen, Manion, Morrison, & Morrison, 2007), at the beginning and end of each of 2 action-research cycles, triangulated with class observation during the implementation of the teaching and learning strategies (McNiff & Whitehead, 2009). Preliminary results will be put forth on the teachers' reflections about their learning process and what changed in their perceptions on how to teach ESD through GE. We believe that this study can reveal qualitative changes in the practices of participating teachers regarding ESD. We will also discuss some reflections that we believe will motivate and prepare other teachers for ESD. Bednarz, S. W., & Kemp, K. (2011). Understanding and nurturing spatial literacy. *Procedia-Social and Behavioral Sciences*, 21, 18-23. Cohen, L., Manion, L., Morrison, K., & Morrison, K. R. B. (2007). *Research methods in education*: Psychology Press. Haubrich, H. (2007). *Geography education for sustainable development. Geographical views on education for sustainable development*, Lucerne, Switzerland. Haubrich, H., Reinfried, S., & Schleicher, Y. (2007). *Lucerne Declaration on Geographical Education for Sustainable Development. Geographical Views on Education for Sustainable Development*, Lucerne, Switzerland. Lee, J., & Bednarz, R. (2009). Effect of GIS learning on spatial thinking. *Journal of*

*Geography in Higher Education*, 33(2), 183-198. McNiff, J., & Whitehead, J. (2009). *You and your action research project*: Taylor & Francis. Unesco. (2009). *Learning from Each-Other: the UNECE Strategy for Education for Sustainable Development*.

### Best Practices about Education for Sustainable Development in Nursery and Primary School

*Sonia Ziliotto (University of Bozen)*

This paper abstract presents a part of the results from my doctoral thesis. The research subject is Education for Sustainable Development (ESS) from the point of view of geography, through an international comparison of Padua in Veneto (I) with Würzburg in Bavaria (D). In particular, the focus is based on activities and projects carried out by formal (nursery and primary school) as well as non-formal (associations and local authorities) institutions. The research starts with a questionnaire to examine the teacher's beliefs about geographical education. A part of the results shows that the connection of ESS to geographical education is seen by teachers as very weak. This result was confirmed through the continuation of the research, which focused on projects carried out with regard to 13 ESS themes, chosen from the literature and from international documents. The outcomes highlight the existence of ESS best practices, both in the formal and in the non-formal fields. In particular themes connected with Environment Education have been broached more than themes connected with Development Education. Furthermore, the themes tackled take in consideration first environmental, then social and finally economic aspects. Results showed interviewees to be quite confused and scarcely aware both of the meaning of sustainable development and of ESS. In particular, people working in associations are more informed about core principles of sustainable development, but they prefer to use the name "Environment Education" because they claim it is better understood by the community, whereas most teachers don't see differences between ESS and Environment Education. The analysis of school programs showed that there is confusion about what ESS is: in no case is ESS presented like a perspective different from Environment Education. On the whole, interviewees turned out to be more focussed on "practice" than on "theory". As a matter of fact, they dealt with interesting projects, but they don't know full well the theoretical approach that is at the base of ESS, which actually has several points of convergence with that of geography. In this sense, the research increases the value of the synergy between ESS and geographical education, because if on the one hand geography could give clear and meaningful theoretical remarks on ESS, on the other hand ESS could offer to geographical education the opportunity to be updated and to overcome its isolation from society, also in terms of a higher number of hours added to the curriculum.

### Education for Sustainable Development via geography and management: the right climate for change in South African schools

*Luiza de Sousa (North-West University), Barend Richter (North-West University), Schalk Raath (North-West University)*

Some four decades ago, environmental education (EE) was incorporated into the South African curriculum and formal school system with challenges. More recently, the goals of the United Nations' Decade of Education for Sustainable Development have not been fulfilled by the government and the Department of Basic Education (DBE) of South Africa, despite environmental issues having become important topics on world agendas. The DBE has, only as recently as 2011, called a workshop to discuss the best practice around education for sustainable development (ESD). It is only currently in the process of developing a policy for primary and secondary schools. Geography is the only subject that distinctively aims to develop a commitment towards sustainable development and sustainable living. The environment features in an integrated manner within the curriculum from Grades R-12, but the only reference to EE in subjects, other than Geography, is superficial and alludes to references of health and the environment. Research found that whole-school programmes that had implemented environmental management systems (EMS) as a means of ensuring that environmental principles were put into practice, was rare in South Africa. It was important to establish how the curriculum, management and all role-players in a school promote ESD when using an EMS. The paper will elaborate on how research has shown that Geography teachers through their resourcefulness and planning of the curriculum ensure that ESD materialises inside and outside their classrooms. The purpose of this paper is to report on how the curriculum, especially Geography as a subject, together with management are factors central to the success of promoting ESD when an EMS is implemented at a school. The paper will also make reference to an EMS framework designed for South African primary schools with the aim of using environmental management to promote ESD in rural, urban and township\* schools. The framework highlights how schools in rural communities, urban areas and townships can ensure a greater integration of the environment in Geography teaching and learning, and management practices, and create an awareness of sustainable living. \* A South African term referring to an underdeveloped living area built on the periphery of towns and cities. Keywords: education for sustainable development; environmental management systems; environmental education; management; primary school

### Fostering Systems Thinking in Education for Sustainable Development

*Stephan Schuler (Universität Frankfurt a. M.), Werner Rieß (University of Education)*

According to the Lucerne Declaration on Geographical Education for Sustainable Development (ESD) the geographic vision on ESD is based on the concept of the 'human-earth' ecosystem. Knowledge and understanding of the major natural systems

and the major socio-economic systems of the earth are considered to be important competences which are crucial for implementing sustainable development. In order to foster an understanding of these systems, the demand to promote the understanding of systems thinking in schools arises. This conclusion had already been reached in the fields of Education for Sustainable Development (ESD), Science education and Geography Education as well. The aim to promote systems thinking at school is based on the assumption that students can only actively participate in sustainable development if they are able to identify and understand complex, global relations. But how can teachers foster the system competence of their students in the field of ESD? Which competences do teachers require to plan effective lessons and how can they gain these competences? These questions are the point of departure for our research project 'System Thinking in Ecological and Multidimensional Areas (SysThema)'. SysThema is a cooperation project between biology education, geography education and educational psychology and is funded by the Federal Ministry of Education and Research in Germany (BMBF). Through several empirical and experimental studies with student teachers we want to examine how special university courses can help to develop both, the system competence of the student teachers and their ability to arrange system-thinking lessons in the field of ESD. Besides systems thinking also epistemological beliefs are an important part of our concept of system competence. The courses deal with different ESD contexts from local natural ecosystems (e.g. forests) to global multidimensional systems (e.g. syndromes of global change). The students shall acquire content knowledge of these contexts and pedagogical content knowledge of system thinking and ESD as well. Before presenting the theoretical framework and design of the SysThema- project we will report some findings of prior research on reasonable teaching methods to promote student's systems thinking in the field of ESD which are an interesting and important base to the new project.

## C08.11-02 - Education for Sustainable Development & Global Learning 2

*Chair: Anke Uhlenwinkel, Lex Chalmers*

### Climate Change in Geography Textbooks of International Selection. (Un)Sustainable Representations

*Péter Bagoly-Simó (Universität zu Berlin)*

Twenty years after the Rio Conference implementation of sustainable development continues to be an issue of (subject) education. Topics as globalization, climate change, poverty or urbanization are not only included in the Agenda 21 but are also central geographical themes. This paper deals with the question, how climate change is introduced in textbooks of international selection. For this study, textbooks for lower secondary education from Germany, Romania, and Mexico were considered. Mix-method content analysis was carried out and the curricular framework was also considered. The results show the individual understanding of climate change and its dynamics in three countries with different perspectives on geographical education. Differences in scaling, time perspective, and nature-society relationships are some of the paper's main findings.

### Education for Sustainable Environment in the Mediterranean

*Habib Ben Boubaker (Université de Manouba), Ftouhi Mohamed (Faculty of Pedagogy), Acoullous Michael (University of Athens)*

The Mediterranean region, cradle of important civilizations, is an exceptional eco-region. This is due to its geographical and historical characteristics, its natural and cultural heritage, but also to the feeling shared by its inhabitants of belonging to 'the Mediterranean world'. This Mediterranean has encountered much ecological disruption during the 20th century. Nowadays, it faces great challenges: A major recent sociopolitical restructuring in its southern and eastern shores, a deep economic crisis in the north. Will it be able to collectively find a pattern of development that could bring people together, share and save a common environment? The main condition is to guarantee a sustainable development, including economic vitality, justice, social cohesion, environmental protection and the sustainable management of natural resources, so as to meet the needs of the present generation without compromising the ability of future generations to meet their needs. To make this vision real, the Mediterranean Strategy for Sustainable Development (MSSD) recognises that education in the Mediterranean needs strengthening by introducing sustainable development, through a holistic approach, into educational curricula, from primary school right up to universities and graduate schools (MSSD, 2005). Indeed, education, in addition to being a

human right, is a prerequisite for achieving sustainable development and an essential tool for good governance, informed decision-making and the promotion of democracy. Therefore, education for sustainable development can help translate our vision into reality. Education for sustainable development strengthens the capacity of individuals, groups, communities, organizations and countries to make judgements and choices in favour of sustainable development. It can promote a shift in people's mindsets and in so doing enable them to make our world better, safer, healthier and more prosperous, thereby improving the quality of life and intergenerational equity. Education for sustainable development can provide critical reflection and greater awareness and empowerment so that new visions and concepts can be explored and new methods and tools developed.

### Environmental education: late adopters of the John Muir message in a national curriculum

*Lex Chalmers (University of Waikato)*

Environmental education: late adopters of the John Muir message in a national curriculum  
The rapid exploration and resource exploitation of the 'new world' in the eighteenth and nineteenth Century generated a considerable debate about preservation of wilderness, conservation measures and wise use of natural resources. George Perkins Marsh, John Muir and Aldo Leopold are all names associated with an increasing environmental awareness in North America, with Muir's work probably the most widely known. These pioneers are early contributors to environmental education at national and international communities, and their levels of current citation indicate that their concerns are enduring. Increasing pressure on resources and environments in the twentieth Century have meant international agreement on the importance of sustainable use of our resources is now established, acknowledged in a signal manner by the Brundtland report of 1987, the Rio Conference of 1992 and the declaration of the UN Decade of Education for Sustainable Development, 2005- 2014. Reportage of progress in the decade committed to environmental education is explored. This paper argues that international concerns about sustainable development are best introduced in the compulsory levels of formal education, and notes the strength of these arguments in a review of the literature on geographical education. Using a case study of curriculum development, it explores the case for cross curriculum teaching and learning in environmental education, with a particular focus on sustainable use of resources. Geography often claims to be the 'home' territory for sustainability education, with intentions to integrate economic, environmental and social sustainability approaches to the understanding of place. The paper then reflects on the visit of an early environmentalist to New Zealand, noting that the prophetic words of John Muir in 1904 have only recently been incorporated in national curricula dealing with environmental education and that teaching resources and assessment outcomes have yet to satisfy the core needs of environmental education in New Zealand.

## The Relevance of Place-based Education in ESD in Geography

*Johanna Schockemöhle (University of Vechta)*

The Relevance of Place-based Education in ESD in Geography One of the main ideas of ESD is that learners are supported not only to think globally but also to be locally relevant. In order to be able to have a directed influence on local issues, places and problem situations, it is necessary to possess a local situational knowledge, to feel connected to places at a local level and to bring in experiences arising from real actions. This contribution considers the question as to whether it can be a task of geography teaching to develop these competencies in students. For this purpose, the close connection between 'place' as a field of action on local level and the principally characteristics, objectives, contents and methods of geography teaching are first of all set out. In a second step, using the example of selected German curricula, the low level of attunement of the above-mentioned competencies to the objectives of geography education in Germany are presented. There is consequently a gap between one of the main ideas of ESD - to be locally relevant - and the competencies which are to be developed in geography teaching, at least at the formal level. The contribution focuses on the approach of place-based education (PBE) as a way of closing this gap. Central characteristics of this learning approach as well as empirical evidence for its ability to develop local situational knowledge, connectedness to local places and action experiences are outlined. On the basis of selected examples of practice, ways are shown in which PBE can be integrated into geography teaching. Finally, the findings are summarized in such a way to show how it can be an important task of geography education to support local action and to more strongly integrate learning approaches such as PBE into lessons.



## C08.11-03 - Education for Sustainable Development & Global Learning 3

*Chair: Anke Uhlenwinkel, Lex Chalmers*

### Environmental Education – Overview and Challenges: A Case Study of Schools in Mumbai

*Archana Thakur (Sheth N.K.T.T. College, Thane), Sudha Srivastava (University of Mumbai)*

In this study the researchers intend to focus on the issues related to environmental education and its implementation. The objective of introducing this curriculum is to augment the environmentally responsible behaviour, attitude and knowledge level of students concerning the environment. The aim is to find out whether there is noteworthy enhancement in environmental awareness among the students at secondary and higher secondary level (Class IX - Class XII). The methodology implemented in the study includes literature unearthing and analysis of results obtained from a survey conducted in different schools of Mumbai. Students were selected randomly from the above-mentioned classes and were assessed on the basis of their responses. The Likert type scale was designed in the questionnaires for obtaining data in the quantitative form. The data was analyzed by using basic statistical techniques and inferences drawn. This study highlights contrasting results, bringing out the variations in the impact of environmental education at different levels of formal education. The study exposes serious gaps in the implementation of environmental education and puts forth recommendations to make environmental education more meaningful with far-reaching effects so as to create an environment-conscious culture among the future generation so that they put forward environment-friendly development proposals to ensure sustainable development. Key words: Environmental Education, Environmentally responsible behaviour, Knowledge and Awareness, Sustainable Development.

### Education for Sustainable Development in India: Understanding complex factors of water supply through argumentation

*Stephanie Leder (University of Cologne)*

In the context of Education of Sustainable Development it is necessary to promote awareness as well as communication skills on interdisciplinary topics of future concern in geography class. Argumentation skills deepen the understanding of complex man-environment relations and enable students as future decision makers for societal participation to promote sustainable development. The distribution of drinking water as the essential resource for life is a globally relevant problem which can be explained through complex physical as well as anthropogeographical factors and their

interdependencies. Through interviews with scientists, stakeholders, students and teachers, the current status of sustainable aspects in the context of water education is investigated in the Indian city Pune. A matrix for thematic and methodological evaluation of teaching material under sustainability aspects is presented. Through the matrix, the different understandings of students in secondary high schools concerning the access to drinking water as well as class material on water issues used in Indian school books are examined concerning the central goals of Education for Sustainable Development. A concept for promoting the understanding of complex man-environment relations within aspects of sustainability through argumentation will be presented which can be transferred to other urban structures and cultural contexts. Furthermore, opportunities of water education as globally and locally relevant topic for Education for Sustainable Development are shown. The international concept of Education for Sustainable Development in the local context of drinking water supply in Pune and its international transferability is analysed critically.

### Expanding Worldviews

*Audrey Mohan (National Council for Geographic Education)*

Fieldwork is an important, and possibly the most essential, component to the academic training of geographers. To work within, live within, or experience another place or culture influences an individual's knowledge, perceptions, and worldview. While few would argue with these statements, it is interesting that this significant learning experience is lacking in the preparation of our geography teachers. Few teachers are able to travel extensively. For those who cannot travel, what they learn, and therefore teach, of geography generally comes from a textbook, limited coursework in geography, and vicarious experiences of other places (through TV, the Internet, or other people's experiences). However, for the teachers who are able to travel or conduct fieldwork, these first-hand experiences can transform their knowledge and practice in the geography classroom, motivate them to continue learning geography, and instill a sense of passion and commitment to the discipline. This paper discusses the experience of 14 geography educators who traveled and studied in Ecuador for four weeks on a Fulbright-Hays Group Project Abroad. Research includes results from pre- and post-assessments using the Intercultural Development Inventory and participant journals on their learning experience. Significant changes in the group's cultural worldview are noted, as well as changes in their knowledge of geography, culture, and sustainability (the three themes that guided the program). The paper discusses the importance of fieldwork, travel, and experiential learning in influencing what our teachers teach and how they teach it in geography classrooms.



## **Cognition of Multi-scalar Sense of Place and Identities, Practice of Social Equity and Environmental Justice as the Ecological Multiple Citizenship**

*Kwangtaek Sim (Chinju University)*

Learners' cognition of their sense of place and identities in social studies is the source of becoming good citizens. If learners recover their sense of place, they will empathize with others' sufferings. If learners recognize their identities of individual, society, nation, and world, they will understand the relationships between individual and the others. Ecological multiple citizenships in multicultural society of network stage help the learners bring up skills and attitudes based on cognition of multi-scalar sense of place and identities to practice social equity and environmental justice for ensuring lives of individuals and sustainable future of mankind. Key words: sense of place, identity, social equity, environmental justice, ecological multiple citizenships.

## C08.11-04 - Examples of Best Practice in Geography Education and Teacher Preparation 1

*Chair: Michael Solem, Christiane Meyer*

### Professional Development and Instructional Materials in Geography

*Audrey Mohan (National Council for Geographic Education)*

The National Geographic Society received a 2-year, \$2.2 million grant from the U.S. National Science Foundation to develop a strategic plan for improving geographic education for the nation. Entitled 'Establishing a Roadmap for Large-Scale Improvement of K-12 Education in the Geographical Sciences', this project brought together experts in geography, education, and research from across the U.S. to create reports focused on four key issues for educational improvement: instructional materials for students, education of teachers, assessment, and research. The four key issues were divided among three committees: the Assessment Committee, charged with developing a framework for assessing progress toward geographic literacy across the progression from kindergarten through high school; the Professional Development and Instructional Materials Committee, charged with making recommendations about approaches to the design of instructional materials and the education of teachers; and the Educational Research Committee charged with developing an agenda for educational research that lays out questions about learning, teaching, and educational change that must be answered to improve the effectiveness of geographic education into the future. The Professional Development and Instructional Materials Committee's task included:

- Synthesizing research on student learning, teacher learning, and the design of instructional materials focused on improving teacher education, professional development for teachers, and materials to support instruction in geography.
- Creating recommendations and guidelines for teacher educators and materials developers that will enable them to develop, share, and implement research-based programs in cost-effective manners. To accomplish this task, the committee conducted an extensive review of the literature on professional development and instructional materials, both within the discipline of geography and across related fields. The committee used the literature review to inform the development of recommendations and guidelines for the design, implementation and evaluation of professional development for geography teachers, as well as instructional materials that support teaching and learning in geography. These recommendations and guidelines have undergone an internal and external, public review. The committee met five times between January 2011 and May 2012, and consulted experts in geography, geography education, and educational research as part of this task. This presentation will highlight each of the recommendations for professional development and instructional materials in geography, and discuss the use of the guidelines for developing and evaluating professional development and instructional materials.

### Needs Analysis of Pre-Service Education for Geography Teachers in Turkey

*Eyüp Artvinli (University of London), Hsan Bulut (Ataturk University)*

The purpose of this study is to determine the necessity of pre-service training of geography teachers in Turkey. After geography curriculum has been changed in Turkey in 2005, pre-service training of geography teachers has become one of the most important phase in front of geography curricula. In this study, the situation of pre-service education of geography teachers in Turkey has been analyzed from the teachers' perspectives. Thus it has been applied a survey for geography teachers and the results has been analyzed by SPSS. In this paper it is presented how teachers are trained to teach geography and what are the main necessities in pre-service education of geography teachers. It is suggested that it must be developed a new approach within the curricula by the departments of geography education to educate students' teachers according to new standards of the ministry and geography curriculum.

### Current Affairs Teaching Styles in College Geography Courses

*Yael Sneh (Oranim College)*

This study will investigate the knowledge of current affairs among teacher trainers, knowledge that they employ when they integrate current affairs in their geography teaching. The study focuses on the subjects' stances on geographic content and ideas that are influenced by current affairs, and their perception of the students' grasp of current affairs and geography, as well as their attitudes regarding the preferred methods for teaching current affairs in geography. This study shows that the connection between familiarity with the country and knowledge of teaching geography may be stronger or weaker based on the use, mention, utilization and teaching of one-off, continuous, and/or cyclical current affairs events. The teaching of current affairs by the study's subjects comprises different styles, including teaching 'current events and phenomena' and teaching 'current processes.' Teacher trainers who participated in the study teach geography and current affairs at the college as part a study program that is flexible in respect to its content, goals and expected outcomes. Thus, it was to be expected that the study would reveal shared or similar teaching styles by all of its subjects. We chose the qualitative research method in order to study the inner world of the geography teacher trainers in terms of their stances and approaches to the integration of current affairs in their instruction. We will find that the topics, titles, and examples of current affairs that the study's subjects use in their lessons can be divided into the following teaching styles:

## C08.11-05 - Examples of Best Practice in Geography Education and Teacher Preparation 2

*Chair: Michael Solem, Christiane Meyer*

### Pre-Service Teachers' Attitude towards Teaching Environmental Education (EE) during Practicum in Malaysian Primary Schools

*Punitha Muniandy (Universiti Sains Malaysia), Habibah Lateh*

Environmental Education (EE) has been introduced in Malaysian Curriculum since 1992. Almost 20 years EE was implemented and integrated across curriculum in primary and secondary schools in Malaysia. At primary level, Geography subject is not included in curriculum. As a result they will learn EE and local studies in this stage. The importance of EE was highlighted in the National Policy on the Environment 2002-Green Strategies on "Education & Awareness". Related to that, EE was found as an important subject that must be known by the teachers, prior to teach EE indirectly in the classroom. Problems occurred while implementing EE in schools such as; less knowledge about EE among teachers, thinking EE as an extra burden for them to teach and etc. At Teachers Training Institute (TTI), EE is a compulsory subject due to complete their training. This study was carried out to identify the attitude of teaching EE among pre-service teachers in TTI. One hundred and twenty five respondents among pre-service teacher were analyzed and the reliability was shown (.712) cronbach alpha. Studies on teachers' attitude was important to identify willingness of teachers to transfer their skills, knowledge and values in teaching process while in classroom, which will strongly effect the students understanding and achievement. Previous studies showed that there were significance between teachers' attitude and behavior in classroom. Study about attitude as a component of affective which includes negative and positive feelings among teachers would be interesting to study about.

### Learning and teaching in an integrated geographical education: A project seminar on climate change

*Antje Schlottmann (Goethe Universität Frankfurt), Eva Noethen (Goethe Universität Frankfurt)*

Geography education for teachers at German universities suffers today from major difficulties: firstly, due to a poor level of integration of universities and schools in academic education and because of limited time resources for practice oriented concerns there are few possibilities for students to gather required teaching experience at an early stage. Secondly, due to an ongoing specialization in the scientific field and a growing gap between Human and Physical Geography, there are few offers of courses that deal with the unity of the discipline which teachers are obliged to represent in their future

professional performance. This seems all the more unfortunate as key problems of our time in the context of global change have an integrative character by nature and that geography could be the prior scholarly field to deal with them. Furthermore, it seems to be indicated to worry about how to acquire young academics for educational research. Our paper presents the concept for a teaching module that aims to meet these deficiencies. Against the background of a pilot project seminar on the issue of climate change we consider past experiences as well as future challenges. The idea of the module and its combined courses is a three stage educational process that integrates theoretical and practical education as well as it integrates physical and social dimensions of climate change (i.e. allocation of and entitlement to disposal of water resources). In terms of a transdisciplinary approach the students are first lead to identify, define and explore particular problems of climate change on a scientific level, in a second step they are advised on the development of a respective teaching unit by means of provided didactical methodology. In a third step the students get the opportunity to teach a class of a secondary school. The analysis of the fourfold feedback by the academic staff, the form teacher, the peers and, not least, the pupils allows for an empirically substantiated supervision. According to the concept of learning via exploring we intend to empower students to convey issues of global change in terms of a modern geography education and to arouse enthusiasm for educational research.

### Geographical Education in Time of Crisis – Some Reflections on Teaching Practice

*Manuela Ferreira (Universidade Aberta), Branca Miranda (Universidade Aberta)*

This paper address how the teaching of Geography can help young people to understand in an informed manner the economic, social and political crisis that Portugal is facing and can act as conscientious citizens and stakeholders in addressing the issues at global, national, regional and local levels. This implies teacher preparation and reflection. We propose the use of inquiry and problem solving learning in Geography in Secondary Education. The general causes of the current crisis are demographic: the low birth rate and consequent aging of the population that has serious consequences as population and labor force decline; economic and financial causes: the progressive abandonment of the activities of the primary sector, agriculture and fishing and consequently Portugal was progressively more dependent on imports of food and feed for livestock; the forest that is important in the Portuguese economy is poorly cared; in the secondary sector traditional industries are declining due to competition of the so-called "emerging economies" and the process of innovation is weak; tertiary activities have an excess of employees in the central and municipal government, the adjustment to the new currency, the euro, was too difficult, the population income is too directed to home ownership and consumer goods. Other causes concern education, social welfare, public administration and governance, unemployment. These are general causes but students should do an inquiry on the specific causes at regional and local levels. Geographical Education should also give a

global perspective of the society and give a contribution to understand the interdependencies between the global and the local. It is also necessary that students try to seek solutions for the regional and local problems by discussing them in an open and informed manner and if possible have some action at local level, which will help young people to become aware of the present realities and look for new perspectives for the future. In Portugal the Geography Curriculum for Secondary Education includes the study of Portugal and of the European Community, but is necessary an adequate management of the syllabuses in order to contribute to students understand the relationship between global and local issues, so to understand the causes and possible solutions to the current crisis. This implies a careful teacher preparation and reflection on action.

### **The geographical inquiry: Developing intercultural competences for sustainability**

*Branca Miranda (Universidade Aberta), Manuela Malheiro (Centre of Studies of Migrations and Intercultural Relations)*

In this paper is presented the strategy of geographical inquiry, its different phases and highlighted its contribution to the development of intercultural competences with a view to sustainability. The geographical inquiry should be structured in order to respond to a set of questions: What? Where? How? Why? How could it be? How will become? What decision making? What is the impact? What I think about it? What to do? (Roberts, 2003). These questions serve as a guide and requires that students have an active participation in the the construction of knowledge, expressing their opinions according their values. The Geographical Inquiry starts by questioning, the second phase is the collect of information, the third phase is the treatment and analysis of the collected information (students develop critical thinking and decision making competences) and finally students should develop a meta-analysis of the results and of the whole inquiry process. A proposal to develop a geographical inquiry about "how to live in society, respecting the other and the environment in the present and in the future will be presented". Sustainability will be a reality if it is reached a level of equitable distribution of economic and social wellbeing and if environmental conservation is a priority and if is taken into account the needs of present and future generations and the cultural differences. ( Roberts, M. 2003, Learning through inquiry, Sheffield, Geographical Association).

## C08.11-06 - Examples of Best Practice in Geography Education and Teacher Preparation 3

*Chair: Michael Solem, Christiane Meyer*

### Training geography teachers in times of change: Practices and problems

*Felisbela Martins (University of Porto)*

The Faculty of Arts of the University of Porto, through its Geography Department, has been involved in developing the initial training of Geography teachers since 1988. Even though over this almost quarter century this training has followed different models, such as integrated training, a specialisation course and currently as a Master's degree in Teaching, aggregated with History, it was taken into consideration at all times that the students, as future teachers, should be aware of the relevance and specificity of geographical education, dealing with issues such as curriculum management, teaching methodologies, and the analysis of students' learning processes. These themes have always anchored the conception of a teacher who is questioning and problem-solving, capable of thinking of and on his/her actions. Following on from these guiding principles, we are facing a new challenge arising from the fact that currently many students come from an undergraduate degree in History with a minor in Geography. That is, during their degree, their training in Geography is based on only 9 subjects selected from a set of 14 options. Despite these difficulties, the prime aim has always been to provide these master's students with pedagogical and didactical training, which will enable them to manage the Geography curriculum, both in Basic and Secondary Education, as well as encourage their development in future professional practices. This paper intends to introduce the instruments used to manage the curriculum, such as potential thematic scripts and guides, the planning of didactical modules based on educational situations, and the planning of classes. We will also explore how the practices are implemented and particularly the instruments used by teachers, such as, for example, class diaries, which can ultimately enable them to reflect on both specific actions and their own performance.

### Geography, history and landscape: An educational experience of knowledge integration within a field trip

*Hélder Oliveira (University of Porto)*

Given the new profile of the initial training of History and Geography teachers in Portugal and the need to promote an integral and inclusive education with each student, in the context of a society increasingly specialized, it was considered relevant to fulfil interdisciplinary teaching-learning experience, involving the disciplines of History and Geography. The theoretical work focuses on the problem of integration of knowledge and interdisciplinarity, regarding to an integral and inclusive education of the students. We believe therefore that is school function to seek to foster the integration of knowledge.

Developed in the context of initiation into the professional practice of the Master's Degree in History and Geography Teaching of the Faculty of Arts of University of Porto, this case fulfilled itself by carrying out a field trip, aiming the integration of Geography and History knowledge relative to seventh graders from the school E. B. 2,3 de Santiago - Custóias, where took place the study. It was therefore considered, as a fundamental strategy of operation of interdisciplinarity, the use of the educational potencial of the landscape. For the collection and processing of the data were instruments and methods of distinctive areas, in order to analyze the development of the learning carried out by the students, as well as the analysis to the content of opinions expressed by students regarding the field trip, intending to determine which moments stand out from the teaching-learning integrated experience. By analyzing the content of selected answers for the purpose, we tried to analyze more specifically the potential of direct observation of landscapes in teaching. The analysis of all these data revealed differences in the performance between the two groups, in terms of what they had learned, as well as losses in the learning process, especially in the afternoon period. From the analysis of the content of students opinions was confirmed their joining to the teaching-learning experience, due to several factors. It was also clear that the landscape presents numerous educational potencial, regarding history and geography as a resource for teaching-learning, because it is motivating and raises the development of learning content.

### Using mysteries to promote thinking through geography

*Joop van der Schee (University of Amsterdam), Jan Karkdijk (Calvijn College)*

Using mysteries to promote thinking through geography Geography teachers in many countries report that mysteries are popular in secondary education (Leat & Nicols, 2000; Van der Schee, Vankan & Leat, 2006; Vankan, Rohwer & Schuler, 2007). Many teachers report that these strategies are powerful to stimulate thinking geographically. However, how do we know that this is true? Empirical evidence is scarce. This contribution reports about an experiment using mysteries, one of the more famous Thinking Through Geography strategies (Leat, 1998). This article describes the outcomes of an experiment in which the effect of mysteries on the skills of students in relating phenomena has been investigated. A multilevel analysis on the results of the post test showed that students that used mysteries in geography lessons scored significantly more correct geographical relations than students who did not use mysteries. This article concludes with the advice to integrate mysteries more in geography teaching as training to reach a higher level of thinking in geography. In addition, complementary research in this field should be started to get a better idea about students' geographical thinking and learning. The question, however, still is what the crucial independent variables are to improve students geographical thinking. Teacher reports suggest that the student motivation evoked by a mystery is important but there is more. Reasoning has to be externalised. Many geography class room practices encourage superficial learning, concentrating on recall of factual or conceptual knowledge. "Mysteries lend themselves well to ascertaining the

degree to which pupils understand and can explain causes, processes, and consequences" (Leat & Nicols, 2000). Geography tells the fascinating and complex story of the changing world around us. Teaching geography is not easy if we want to give students a well-structured and up to date overview of differences and relations in and between regions. Mysteries can help us to think about down to earth issues within and outside the domain of geography as well as about learning goals and learning processes. Keywords: Mysteries, geographical thinking, empirical research, motivation

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### VideoANT as Web-based 2.0 Technology in Geography Micro-teaching

*Christo Van der Westhuizen (North-West University)*

This paper discusses the process and findings of a case study where web-based 2.0 technologies were implemented in the micro-teaching of fourth-year Geography student teachers. These technologies ensured adequate feedback and reflection, which in general is a shortcoming of micro-lesson facilitation. 'VideoANT' is a web-based video with timeline-based text annotations, and was imported into the university's web-based Learning Management System (LMS). The digital videos of students' geography micro-lessons on VideoANT not only produced easily accessible micro-lessons through the LMS, but more importantly, enabled students to assess fellow students' micro-lessons in a collaborative learning environment, as well as to do adequate self-reflection. Both qualitative and quantitative data were collected, and the results indicate that geography student teachers held positive views on the implementation of these technologies for reaching the outcomes of micro-teaching as well as for their teaching careers beyond their training. Key words: Micro-teaching and web 2.0 technologies, geography education and web 2.0 technologies, web-based technologies in micro-teaching, teacher training and modern technologies.



## C08.11-07 - Higher Education

*Chair: Péter Bagoly-Simó, Michael Solem*

**Which professional action skills should teachers have in context with education for sustainable development (ESD)? First results of a an expert consultation.**

*Gabriele Schrüfer (Universität Münster), Ingrid Hemmer (Universität Eichstätt-Ingolstadt), Michael Hemmer (Universität Münster), Gesine Hellberg-Rode, Péter Bagoly-Simó (Universität zu Berlin)*

To achieve an effective education for sustainable development (ESD) in the content-based teaching of the school system, specific professional actions skills are needed for the teaching staff. The success of the content-based teaching is mostly defined by the specific professional knowledge (content knowledge, pedagogical content and general pedagogical knowledge). On national as well as on international level, professional action skills are considered as a prerequisite for a successful teaching. Current studies about the quality of teaching see the analysis of teachers, differentiated into job-related knowledge and skills, as a key factor for a successful process of teaching. The success of teaching actions is mostly determined by specific professional knowledge especially in the spheres of content and context-related competences content and pedagogical content knowledge. The basic competence realizing ESD in class is usually postulated for teachers of all school types. Although, it cannot be assumed that all teachers achieved the needed competence via their teacher training. During a Delphi method different experts and protagonists (mainly in universities, schools, Ministries of Culture and NGOs) will be asked for their opinion related to the required competence of action skills in context with ESD. The first results of this Delphi method will be introduced at the presentation.

**Field trips in geography lessons: Promotion of competence in didactic of field trips in teacher training**

*Kim Pascal Miener (Universität Münster), Michael Hemmer (Universität Münster)*

Based on an overview of current concepts for student field trips in geography education and the required didactic and methodic competences that a teacher has to possess, the lecture will show up, how the training concept at our site in Münster uses field trips to gradually build and promote competence in didactics of field trips. For this purpose modular field trips (e.g. to Ruhr area, Spiekeroog or Berlin) for students in secondary school education (students aged from 10 to 18) were developed by our

**The Value of Geography in Professional Life: Insights from Geographers in Business, Government, and Nonprofit Organizations**

*Michael Solem (Association of American Geographers), Jan Monk (University of Arizona)*

Drawing on North American experience, this paper presents examples of contemporary geographic practice in private and public sector organizations and analyzes how geographers apply their knowledge, skills and perspectives for problem solving in relation to globalization, environment and society, risks and conflicts, and urbanization and demographic change. The examples stem from interviews conducted with more than fifty geographers for the new AAG book, *Practicing Geography: Careers for Enhancing Society and the Environment*. Among the issues discussed will be how geographers through their professional work act as conduits translating geographic research into business, public policy, advocacy, and consultancy contexts. Our paper addresses broader debates in the discipline as to the value of geography as a professional field and what reforms may be necessary to improve its positioning within the academy and society. There has been rapid growth in career opportunities and need for geographic expertise across the public and private sectors, from small business in local communities to international companies and nongovernmental organizations (NGOs). At the same time, some of these opportunities are in new areas of employment for geographers, and often employers are seeking new combinations of geographical and other skills. Improvements can be made in our undergraduate and graduate programs in the ways that educators inform and advise students about workforce trends and how to connect their skills and abilities to the needs of employers. There is a broad need for professional geographers to be able to perform general skills ranging from time management, writing and collaborating in team efforts to working effectively with computers and applying critical thinking skills for problem solving. With regard to geographic skills, many employers seek individuals who possess competency in field methods, have the ability to work across disciplinary boundaries, and can apply principles of spatial thinking and other forms of geographical analysis to support a variety of tasks and needs. Although many of these general and geographical skills are included in typical geography curricula, it would seem that there is substantial potential for developing methods for cross-training students through greater use of pedagogies such as problem-based learning, inquiry, and service learning, as well as providing more students with opportunities to apply their abilities in professional settings through internships. Improvements can also be made at the doctoral level, where often the hidden assumption is that all or most students are moving toward academic careers. Although the Ph.D. remains an apprenticeship in research, it has also become a qualification for a wide range of challenging careers and executive positions.



## Detection of Urban Heat Island Using Student Observations and My World GIS

*Kevin Czajkowski (University of Toledo), Mikell-Lynne Hedley (University of Toledo), Todd Ensign (NASA IV&V Facility)*

Students have been taking surface temperature measurements through the SATELLITES Program during intensive field campaigns in 2006 through 2011. An Earth Exploration Toolbox lesson (<http://serc.carleton.edu/eet/>) was developed to assist students in analyzing the urban heat island effect utilizing data from the GLOBE Surface Temperature field campaigns within the My World GIS. The SATELLITES Program was established in 1999 at the University of Toledo to engage students in 'real science' and introduce Earth System Science and geospatial technologies into the K-12 environment. The SATELLITES Program has held trainings in association with the AmericaView Remote Sensing Consortium. The GLOBE database contains thousands of surface temperature observations per field campaign from around the world. My World GIS was designed by the Geode Initiative at Northwestern University. Teachers have found it easier to learn than other GIS software. My World GIS comes preloaded with many data sets including demographic information, digital elevation models, and aerial photographs to name a few. The lesson shows students how to download data from the GLOBE website and import the data into My World GIS. Due to the schools that are currently involved with the GLOBE Surface Temperature field campaign, the lesson works best in Midwestern United States or Estonia and Poland due to the number observations in those areas. Students then use the threshold function to find large cities in a region. The students separate the data by rural and urban schools using a buffer around the cities. Other complicating factors that students can check are the cover type, cloud cover, time of day the observation was taken, day of year, etc. The lesson was field tested in Ohio with eleven teachers.

## C08.11-08 - Innovative Learning - New & Traditional Media

*Chair: Daniela Schmeinck, Joop van der Schee*

### Chances and Risks of Turning Teenage Students into Researchers

*Lars Keller (Universität Innsbruck), Anna Oberrauch (Institut für Geographie)*

Teaching geography - i.e. 'the world as it is' - has become mission impossible due to the complex and ever increasing effects of global change. Yet, encouraging students to get the picture of concepts of global importance, like the ideas of sustainability or quality of life (QOL), and strengthening their geographic competences is an important contribution to help them understand what they perceive as 'the world' around them. The innovative research project 'LQ4U - Teenagers from Northern and Southern Tyrol develop visions on sustainable QOL' (financed by Provincia Autonoma di Bolzano Alto Adige 2011-2013) takes this challenge as a chance. In what is called a 'community of learners', students of a commercial college in Vipiteno (Italy) and a high school in Stams (Austria) work together with scientists of the University of Innsbruck over a period of two school years. Before the actual start of the project, an interactive online Learning Management System was established, serving different purposes to students, teachers and scientists. As the main means of communication it helps to bridge the geographical distance between the two schools, stores materials and results, offers links to relevant sources on and outside the platform, creates Wikis, integrates other online software etc. In LQ4U the students are encouraged to develop their own personal research questions, generate hypotheses, plan and execute interventions, evaluate results, and interpret and discuss their findings. This innovative learning strategy should enable the young people to reflect on what they find important for their own (quality of) life. They realize how important it is to think through complex ideas and processes thoroughly and as unbiased as possible. As there is a very close link between the theories of QOL and sustainability, they should begin to understand the need of synthetic thinking and looking at things from different perspectives (e.g. ecology, society, economy). Following the ideas of moderate constructivism, the teenagers turn into scientists, and discover their very own visions for the future. Apart from generating geographical knowledge on QOL and sustainability on the students' side, the university researchers of LQ4U focus on didactical questions facing the chances and risks of innovation in learning and the use of new media: How can they really raise motivation in the classroom? Which role do the new media play for innovative learning? Might these innovative learning strategies ask too much of students who have been socialized by rather instructivist teaching methods? Can school surroundings provide fertile ground for innovative learning? Mission not yet completed.

### Understanding the Changing Planet: Online spatial tools tell powerful stories

*Anita Palmer (GISetc), Roger Palmer (GISetc)*

As the world is firmly into the second decade of the twenty-first century, education is grappling with the most effective ways to integrate twenty-first century technologies into the classroom. This is especially noticeable in primary and secondary grades. This paper addresses the use of cloud-based online map tools to augment, and in some cases replace, the use of traditional atlases to teach geographic concepts to secondary students. It examines a United States National Research Council effort to use these geospatial tools to engage the community to address pressing world issues as reported in the NRC report entitled Understanding the Changing Planet. This paper explores student responses to the use of cloud-based geospatial tools as well as the Understanding the Changing Planet web portal and ways in which these instruments might make a difference. A basic review of current research of this topic is examined.

### Investigating cognitive aspects in digital maps - using VGI to create a child suitable map

*Philippe Rieffel (ILS Dortmund)*

Today's technical development allows us to find detailed digital map coverage for almost every place in the world through the internet. While those maps (mostly) offer an acceptable level of detail, their design is addressing adults, regarding levels of complexity and symbology. Since the quality and coverage of available free geodata has drastically improved lately, mainly driven by the OpenStreetMap project, this data is used to create similar digital map coverage, but with design patterns, that match children's perception and understanding of space and their surroundings. The work at hand consists of two main parts, an investigation on the spatial perception of children and a practical implementation which reflects these findings. For the investigation on how children perceive their environment, an empirical study has been conducted amongst school children aged 8-12 years. Based on theories of spatial understanding and mental development of children, as described by Piaget, Liben and Downs and Stückerath, the questionnaire aims at getting information about the children's ability to understand a set of different maps. Furthermore it aimed at analyzing the children's understanding of symbols, shapes and colors which are by now widely used amongst maps. This survey has been conducted in Brazil so far and is right now taking place amongst German pupils. Conducting this survey amongst different cultures allows taking cultural differences into account when creating the final map. Another aspect which can very well be handled with a digital map is the aspect of scale. When children advance in their development, the scale on which they interact with their surrounding changes, from neighborhood over urban quarter to city, country and finally the world. This development can be accompanied with a digital map, because it is dynamic in scale and level of detail. The findings from the theoretical work and the survey will be used to create a rendering style sheet to render raster maps from the freely available OpenStreetMap data. This data

and the rendering software 'mapnik', hosted on a dedicated machine will then allow the creation of a worldwide coverage of a digital map, specially designed to cater children's perception. The development of map literacy and spatial understanding of children would greatly benefit from such a digital map. It could be used in education as well as within recreational activities like geocaching or while traveling. Since the project is not finished by now, this is a work in progress report

### GIS Awareness and Perception among Geography Teachers in Malaysia

*Vasugiammai Muniandy (Universiti Sains Malaysia), Habibah Lateh*

Technology utilization in educational purposes in schools is rapidly increasing. Geographical Information System (GIS), as an advanced technology too has been implemented across curriculum in school subjects in various art of the world. Even GIS is not included in Malaysian school syllabus, the awareness of GIS is there among the geography teachers. GIS integration in university syllabus has seeded early knowledge among these teachers. Thus, this study investigates GIS awareness and perception among geography teachers in Malaysia. The objective of this study is to determine the level of GIS awareness among the geography teachers in Malaysia. On the other hand this study also investigates the perception among the geography teachers in Malaysia towards GIS integration in schools, especially in teaching geography. Two stage stratified sampling method was used in this survey. Five hundred and ninety five geography teachers responded to this questionnaire. Questions regarding GIS awareness and GIS perception were self-developed and undergone internal consistency reliability analysis before being used in this study. Binary questions and a four-point scale items were used to determine the level of GIS awareness among geography teachers and a five-point scale items were used in determining GIS perception among teachers. The results revealed more than 50% of the teachers have heard about GIS, even only 30% have used GIS before. However, the awareness doesn't vary much between states and gender variables. Moreover, the GIS perception among these teachers were considered high and significantly contribute a bright chance of future GIS integration in teaching and learning process of geography in Malaysian schools. Keyword: Geographical Information System (GIS), awareness, perception, geography syllabus

## C08.11-09 - Preconceptions in Geography and Geography Education

*Chair: Fernando Alexandre, Sibylle Reinfried*

### Connecting argument analysis with conceptual change in a geoscience topic

*Dirk Felzmann (University Hannover)*

When students construct their conceptions in social interaction, arguments are verbally formulated on conceptual grounds. Being interested in the way alternative conceptions are constructed, the question arises whether there are typical argument structures. To analyse the conceptions and their development in social interaction, a qualitative research study was designed with 14-year-old students from Northern Germany focusing on the topic "glaciers and ice age". Seven teaching experiments, with three students each, were conducted to document students' conceptions. During the teaching experiments, the students were asked to describe their conceptions in group discussions. Students' conceptions about different aspects of the topic were identified by qualitative content analysis (Mayring 2008). Arguments were structured according to Toulmin's Schema (Toulmin 1958): A warrant serves as bridge between the claim (= the alternative conception) and at least one datum. Because warrants often remain unnamed, they had to be reconstructed by interpretation. The following types of arguments were found in particular: - The used datum is correct but the explicit or implicit warrant is problematic. The principle that functions as the warrant is not wrong but misjudged in respect of the limits of its validity or of the relevant dimensions. So, the students may think that the used principle is "always" - rather than "often"- valid in a specific way or the principle refers to other dimensions than the relevant ones: e.g. datum: "a glacier consists of ice", warrant: "ice can extend over big distances", claim: "glacier movement results from extending of ice". - Another type of argument, supporting the emergence of alternative conceptions, are false conclusions drawn by connecting at least two correct data, that correlate more or less with each other, in a causal way. For example: Datum # 1: "Northern Germany is flat, Middle Germany is mountainous." Datum # 2: "Northern Germany was covered by glaciers, Middle Germany was not covered by glaciers". - Within geological-historical discussions, the students often refer to valid present-day principles and transfer them into the past. So, they argue in an uniformitarian way (Frodeman 1995), when they analogize the situation during ice age with the situation during winter: "Plants outlived ice age as seeds", "birds migrated to the south". In summary, an in-depth analysis of the content and the structure of arguments in light of alternative conceptions can help to identify possible starting points for supporting conceptual change in the relevant subject area.

### Down to Earth – Meteorite Impacts on Earth. Risk Assessment and Education.

*Martin Müller (Accenture)*

Meteorite impacts have been an ongoing phenomenon throughout Earth's history and are a fascinating topic in science education. Not only in the past but also today asteroids and comets pose a high risk for our planet. This presentation is concerned with following aspects of the topic: the geographical assessment of the impact hazard, students' concepts about meteorite impacts and the educational implications of the subject. The central aim is to show a way for the educational implementation of the topic in Geography. Geography covers both natural sciences (physical geography) and social sciences (human geography). When trying to integrate meteorite impacts into the Geography, there are multiple points of contact to human geography (e.g. consequences of an impact on rural and urban areas, consequences on infrastructure and social systems on national and international level, consequences on current global economic structures, etc.). Moreover there are tight connections to physical geography as well (e.g. geographical distribution of craters on the Earth's surface, new methods to discover previously unknown craters, consequences of an impact on hydrosphere and biosphere (including mass extinctions), comparison of the impact hazard with the current global change issues). Numerous feature films and TV shows on the impact hazard have been published in recent years and have increased public awareness. However, the content often falls short of being scientifically correct and wrong concepts about impact processes and the threat level are generated. However, many institutions and expert teams define education and public outreach as their core task. USGS, ESA, NASA and the IAA have been the key driving force behind most of activities - spanning from contacts to political stakeholders over NEO search missions to threat mitigation. Thus the geographic community should work on an approach by addressing the topic in public education. There scientific and educational requirements can be taken into consideration. A sample of secondary education curricula in Germany was analysed and the impact topic is already reflected in German curricula. Meteorite impacts are part of the Geography curriculum. Following these findings the interests and concepts of students were studied. Key results show that there is high interest in the subject. Students gather their knowledge both from school lessons and TV documentaries/cinema movies. Students' concepts highly depend on age and gender; most often non-scientific interpretations of impact statistics and size relations are prevalent. The data from questionnaires clearly shows a lack of awareness of the geological timescale ('deep time'). In summary, both the willingness for taking action on public education and the demand for a high-quality educational approach are present today. A concrete way from the impact threat to educational action could be established in Geography.

### The geography that WE want to teach! The views of English trainee teachers

*Emma Morley (University of Winchester)*

Geography is a statutory subject in English primary schools and forms part of the current National Curriculum (DfEE, 1999) however the content of this curriculum is currently being reviewed. The Geographical Association amongst others have contributed to the consultation process regarding what the new primary geography curriculum might look like. Amid this background this paper summarises the initial findings from research conducted with one cohort of English undergraduate primary teacher trainees on point of entry to their course. The research builds on previous work by Martin (2005) who proposes a new way of conceptualising primary geography termed 'ethnogeography'. Trainees from two H.E institutions were asked about any hobbies or interests that they held and that they considered to be related to geography. Further questions were then asked about why trainees considered these hobbies and interests relevant to geography. Finally students were asked in more detail about what they thought should be included in the new English Primary Curriculum for Geography. The findings suggest that trainees perceived that they had a range of geographical related interests and hobbies that are relevant to geography and their future role as teachers of primary geography. Links are made to the work of Lambert and Morgan (2010) who describe teachers as 'curriculum-makers.' Analysis of students' responses with regard to what the content of geography curriculum should be identified five clear subject areas: environmental and futures work; fieldwork; map reading; knowledge of places and learning about current and relevant global events.

### I liked it. I love it. Effects of positive school experience with geography on positive affect

*Lorena Rocca (University of Padua), Angelica Moè (University of Padua), Giovanni Donadelli (University of Padua)*

Positive affect plays a crucial role in teaching, learning and in creating motivational settings. Teachers share big responsibilities as main 'promoter' of their discipline for their students; therefore, what a teacher does, always marks the idea of its discipline in his/her students imaginary. This imaginary is confirmed by those who associate their emotions on a subject to the memories of the teachers who had taught it (Rocca, 2007). Recent research have shown that teachers experiencing positive affect are perceived more enthusiastic in teaching and consequently favor positive affect in students (Frenzel et al, 2009). The following paper aims at investigating which causes can favor positive affect in geography teachers. Four factors were taken into consideration as potential inputs for positive affect: beliefs toward the subject, its usefulness, satisfaction in studying and strategies used to teach. Method 60 pre-service teachers (mean age 22.58, SD = 4.46, 2 men) coming from all around the Veneto region (north-east Italy), were asked to fill in a

booklet of questionnaires as a part of geography course requirements. The questionnaire was organized in 5 different sections: Geography beliefs: 17 items each describing a belief about importance, interest and every impression the teachers got from their personal experience at school with the topic. Geography usefulness: 17 items assessed to what geography was considered useful for. Satisfaction from studying: the SWLS (Satisfaction with Life Scale) were adapted, in order to assess satisfaction from studying. Emotions: from a list of 17 negative and 13 positive emotions, participants were asked to rate the frequency they experienced each one a) during studying and b) during studying geography. Strategies: 25 strategies to teach geography was presented, and the respondents were asked to clarify their respective use. Results To start with, the ratings given to each of the 13 positive emotions experienced during studying were summed up in order to obtain a 'positive emotions' factor. Afterwards they was correlated with: a) Each of the geography beliefs, geography usefulness, and strategy-use scores. b) The satisfaction-with-life score obtained by summing up the five scores provided for each item. Results evidenced significant correlations just with the following beliefs: pleasant, interesting (I have a beautiful recall of the subject), boring (negatively), a subject I know well, a subject I would like to teach and a source of pleasant memories. Ultimately, a series of regression analysis showed the positive relationship between I have a positive recall of geography and I would like to teach geography. Discussion Positive emotions about geography are related to positive experience with the subject and favor the willingness to teach it.

## C08.11-10 - Spatial Thinking I

*Chair: Sarah W. Bednarz, Detlef Kanwischer*

### **The effects of Google Earth based lessons on spatial thinking skills of Singapore secondary school students**

*Xiang Xi (Nanyang University)*

Spatial thinking is a new frontier in geography education in Singapore. Considering the encouragement of ICT use from Ministry of Education and availability of Google Earth in Singaporean secondary schools, a pilot study was conducted to investigate effectiveness if any of using Google Earth on developing one spatial thinking skill emphasized in the geography syllabus, analyzing spatial and temporal changes in environments. This study adopted a quasi-experimental design and selected two classes from a neighborhood school through purposive sampling. Both classes learnt the topic of coast during 8 sessions of 60 minutes. Students in the experimental group used a predesigned Google Earth learning package in the computer lab, while the control group received exposition in the traditional classroom. Results showed that students using Google Earth in learning performed better in the post-test than that who received exposition, although no significant difference between groups was documented. Supplementary data collect indicated that the positive effect of Google Earth on development of the targeting spatial skill could be attributed to its multiple overviews of geographic features and clear "simulation" of geographic processes occurring at a time scale. Google Earth may be an effective tool to support acquisition of spatial skills in terms of its good visualization and interaction with geographic phenomena and environments. To validate the initial finding, more spatial skills will be intentionally taught and assessed in the discipline of geography in future studies.

### **Möglichkeitenräume. Eine empirisch-rekonstruktive Untersuchung zur Förderung des reflektierten Umgangs mit Raumkonstruktionen in der Sekundarstufe II**

*Romy Hofmann (FAU Erlangen-Nürnberg)*

In times of increased flows of - often media-based - information, 'truth' is constantly produced and reproduced. News target at our attention and try to persuade us of one opinion or the other. The emerging contingency in world views is decidedly spatial in its nature though. People routinely assign meaning to spaces they inhabit and talk about. As a consequence, one place can obtain diverse values. Geographic education should thus aim at developing skills on the part of students to cope with the variety of spatial constructions - they have to be critically challenged. It is not that students would not be aware of their constructed nature but because spaces are always selectively and subjectively perceived against the background of one's own knowledge and experience.

Keeping in mind the claim of 'deconstruction' it is essential first to delineate what 'critical questioning skills' include in order to reasonably embed them into teaching processes. This leads to the central research question which strategies prove to be feasible to develop students' skills of critical spatial reflection. My dissertation is to be understood as a strategy to teach spatial literacy. Students should develop a more analytical habitus of looking at spatial constructions in their everyday lives. This is to be achieved by providing the students with a set of transdisciplinary tools - resorting to German and art didactics - which they can easily apply outside the classroom. My teaching unit is set up of 5 lessons thematically grouped around 'the city' and urban phenomena as well as current developments (gentrification, guerilla gardening, urban images, memorials). The second main featured aim is the 'constructive interference into systems' (Rhode-Jüchtern 1995: 124): The second part of the study comprises a two-days-workshop in collaboration with artists. In this mapping-process (Busse 2007) the students are animated to actively engage in the rupture of 'conventional' spatial structures. They will develop an alternative idea of its use(s) and constructively transform it. In group discussions, the students will finally recap their experiences. Departing from there, collective orientations and cognitive processes are reconstructed using documentary method (Bohnsack 2003). This last step allows for the testing of the projects' efficiency. First results will be presented. Literature: Bohnsack, R. (2003): Rekonstruktive Sozialforschung. Einführung in qualitative Methoden. Opladen. Busse, K. (2007): Vom Bild zum Ort: mapping lernen. Dortmund. Rhode-Jüchtern, T. (1995): Raum als Text. Wien.

### **Spatial thinking and GIS abilities – and exposure to geo-spatial technologies – of geography education students in South Africa: Extent, barriers and some solutions**

*Christo Van der Westhuizen (North-West University)*

Following the global trend, South Africa has embraced GIS within the Curriculum and Assessment Policy Statement (CAPS document) outpacing South African educational GIS research, as desired by the e-learning whitepaper. In 2006 the South-African Department of Education introduced GIS as a compulsory part of the Geography curriculum for gr. 10-12 in the Further Education and Training (FET). Scheepers (2006) states that the level of GIS awareness is not yet very high in South Africa. Although many tertiary institutions and private vendors promote GIS through GIS-awareness initiatives, it is also apparent that GIS has diffused slowly through the South Africa education system since its introduction into the Geography curriculum in 2006. At present many higher institutions are offering GIS courses outside education faculties. Higher educational institutions like universities should play a more prominent role in training current and aspirant educators pedagogically and to use didactical methods that meet the needs of pupils to properly prepare them to become more GIS competent rather than just imparting knowledge. In practice though, teachers may often recoil from textbook GIS, because they are left to their own methods and resources to assemble and develop

materials for integration with the existing curriculum. Teachers may also lack information communication knowledge, time to study software or time to explore an appropriate teaching learning approach. Additionally, insignificant GIS teaching-learning time within the CAPS, as well as the absence of a GIS practical on computers during grade 12 exams, because of the digital divide in SA, does not promote GIS teaching as a high priority. Although the digital divide within SA presents major barriers with regards to educational developments, it can also be viewed as an opportunity for academia to meet these challenges. This presentation will firstly focus on the spatial thinking and spatial abilities in general, as well as the GIS abilities of the Geography BEd teacher students at a South African university. It will report on the exposure and knowledge the geography teacher students have had at their secondary schools regarding Geo-spatial technologies. Furthermore, it will attempt to reveal the students' level of spatial thinking skills and GIS abilities before (pre-test) and after (post-test) a six weeks practical course in GIS. Secondly, this paper will briefly report on the main GIS educational barriers experienced in schools of the FET band, and test the viability of a USB friendly GIS-application in a learner centred environment.

### **Promoting and assessing student's critical spatial thinking skills for significant learning in Education for Sustainable Development through geospatial technologies**

*Vania Carlos (University of Aveiro), Norberto Santos (University of Coimbra)*

Education for Sustainable Development (ESD) uses a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills (Hopkins & McKeown, 2001), since the use of systemic, critical and creative thinking and reflection, in both local and global contexts, are prerequisites for action for Sustainable Development (SD) (Unece, 2009). Recognizing that all human action has a spatial footprint and the spatial dimension of social interaction, spatial thinking also plays an essential role in ESD (Goodchild & Janelle, 2010). Specifically, geospatial technologies can engage in inquiry for society, in society, and about society, promoting spatial thinking (Bednarz, 2004). This ongoing study follows an action-research methodology, in 2 student classes, whose transdisciplinary strategies to promote ESD, under the theme of 'Sustainable Informed Lifestyles', are supported by geospatial technologies and conceived during a teacher training course. It aims to identify and measure student's critical spatial thinking skills and processes and to answer the following research questions: How to promote and assess Critical Spatial Thinking, on the scope for ESD? Does the use of geospatial technologies promote the development and assessment of Critical Spatial Thinking? Based on a taxonomy of spatial thinking developed by Jo and Bednarz (2009) and combined with Ennis' Critical Thinking Taxonomy (1985) and Fink's Significant Learning Taxonomy (Fink, 2003), the teaching and learning strategies and assessment tools developed are presented. We believe, from student's learning outcomes presented, that this study can reveal shifts on student's lifestyle conceptions. It's also discussed the contribution of this

study as motivational for others, on the scope for ESD. References Bednarz, S. W. (2004). Geographic information systems: A tool to support geography and environmental education? *GeoJournal*, 60(2), 191-199. Ennis, R. H. (1985). A Logical Basis for Measuring Critical Thinking Skills. *Educational Leadership*, 43(2), 44-48. Fink, L. D. (2003). Creating significant learning experiences: An integrated approach to designing college courses: Jossey-Bass Inc Pub. Goodchild, M. F., & Janelle, D. G. (2010). Toward critical spatial thinking in the social sciences and humanities. *GeoJournal*, 75(1), 3-13. Hopkins, C., & McKeown, R. (2001). Education for Sustainable Development: past experience., present action and future prospects. *Educational Philosophy and Theory*, 33(2), 231-244. Jo, I., & Bednarz, S. W. (2009). Evaluating geography textbook questions from a spatial perspective: Using concepts of space, tools of representation, and cognitive processes to evaluate spatiality. *Journal of Geography*, 108(1), 4-13. Unece. (2009). Learning from Each-Other: the UNECE Strategy for Education for Sustainable Development.



## C08.11-11 - Spatial Thinking II

*Chair: Gabi Obermaier, John Lidstone*

### Reason and Representation – The Difficulties of Avoiding Maps without Meaning

*Anke Uhlenwinkel (University of Potsdam)*

Spatial thinking can mean a number of different things to different disciplines. For cognitive scientists it is often equivalent to solving geometrical problems. In a GIS context it is frequently seen as something like map reading skills where students are expected to detect limitations in spatial representations and inconsistencies in their usage. For a geographer this last perspective has to be widened so that spatial thinking includes the understanding and critical application of geographical concepts (place, space, scale, diversity, interaction, change, perception and representation). Therefore in this context spatial thinking becomes synonymous to thinking geographically in the sense that students are expected to apply geographical concepts to develop a better understanding of the world in which they are living. In Europe you find a broader discussion of geographical concepts as a basis for teaching geography in Britain and in France. While in Britain the discussion focusses on defining the concepts and trying to ground them theoretically, the French discussion is centred round the production of croquis, a kind of map that does not attempt to show facts or data but a geographical explanation of phenomena. Croquis are never finite, but always in the making or stories-so-far. Some of the most popular French cartographers of croquis advice their readers to draw them in pencil to make this quality clear. Croquis are therefore not necessarily GIS-based; but they can be. To draw a croquis you need some knowledge of how to use croquis-specific tools of representation, but more important is the understanding of geographical concepts and their application in geographical reasoning. Only with their help students will be able to structure problems, find answers and express solutions to these problems in the form of a croquis. In the French education much space is devoted to introducing the students to the form of representation, but rather little consideration is put to the question of how the students can elaborate the subject content of a croquis. French studies show that the restructuring of the geography curriculum with the aim of promoting conceptual thinking has not yielded the envisaged results, although French geography textbooks make ample use of croquis. According to the researchers one of the main problems is that teachers did not develop a deep enough understanding of geographical concepts and their representation in the form of croquis. Successfully training teachers' ability to use these concepts is therefore vital to the introduction of conceptual thinking into the classroom. The presentation will explore the challenges and opportunities of teaching geographical thinking and reasoning using examples from German teacher students, who have been asked to create croquis from a set of given

data. Ways to promote a better geographical understanding will be discussed drawing on the British discussion of geographical concepts.

### Children's independent mobility in the urban public space: the case of Riga, Latvia

*Girts Burgmanis (University of Latvia)*

Children after invention of a new paradigm of childhood in late 1990s in social sciences are considered as social actors capable to construct their own lifeworlds within various environments. The valuable interaction with the world beyond home occurs through independent and autonomous mobility which nowadays is endangered by manifestations of late modernity, based on increased use of the car in the everyday transport of children and parents enforced concerns on child's safety. Most of the previous studies reflecting the experiences of younger children from cities of Western Europe and North America emphasize direct correlation between gender and age and level of independent mobility. There is also evidence that unlike to younger children for whom independent mobility enhance locomotor capability and promote development of spatial cognition the autonomy of movement for teenagers allows to improve social skills, construct identities and acquire spatial knowledge of particular environment. However, despite the wide set of studies on independent mobility the experiences of older children are still studied superficially and experiences of teenagers from post-socialist cities are lost at all. In this paper children's, aged 12 to 17 years, independent mobility in Riga, Latvia urban environment is explored considering the trips to school, friends and leisure activities. The study focuses on two issues. First, it reveals which background variables affect children's level of independent mobility. Second, it elicits the effects of independent mobility on children's lives. In this paper the emphasis is on the use of quantitative data to explain children's independent mobility and freedom within urban spatial domain. The data were derived by a questionnaire survey from children aged 12 to 17 in eight both Latvian and Russian speaking randomly sampled urban schools in Riga. The findings of this study reveal that age and distance from home to activity site are crucial factors which constrain independent mobility and autonomy of children. Increase of independent mobility level promotes opportunities for children to improve social skills through sharing way from school to home or inverse with friends and acquire more detailed spatial knowledge of urban environment.

### Children's Misconceptions of the Relief with the Use of Maps

*Aikaterini Klonari (University of Aegean), Ekaterini Apostolopoulou (University of Aegean)*

Understanding the relief with the use of maps is a key concept in geographic education in primary school. Children's map reading abilities are interrelated with spatial perception and the study of misconceptions remains an important feature in learning with maps. In



this paper we present 11-year-old pupils' misconceptions of the natural relief in map tasks from a representative sample of the Greek school population. One out of three pupils identify as steep coasts on maps capes and as steep slopes mountain peaks or mountains. North coasts are also characterized as steep, while south coasts as gentle. There is an indication that the length of the coastline determines steepness of slope, associating long coastlines with steep coasts and short coastlines with gentle coasts. According to the results the influence of everyday experience with natural landscape is positive. Pupils from rural areas more frequently identify gentle and steep slopes on maps in comparison with city pupils. However locality does not affect morphological features identification from maps of the region of residence. 3D maps enhance relief understanding as three times more pupils avoid misconceptions over 2D maps. It is concluded that 3D maps should be incorporated in geographic education and curricula should include local geography.

### **Building a Spatial Literacy Program in Teacher Education**

*Diana Sinton (University of Redlands), Kristin Alvarez (University of Redlands)*

The growing interest in spatial learning has inspired educators globally to design new curricular opportunities. Though there is little in these efforts that is consistent and common, each unique endeavor provides more information about how the varieties and formats of content work with different audiences and within mixed higher educational contexts. This establishes a wide agenda for research from many perspectives, including teaching, learning, technology support, and the design of professional development. For a range of higher educational settings, we will first provide a simple framework for differentiating among learning environments, audiences, goals, and spatial learning outcomes. In the School of Education at the University of Redlands (California, USA), we launched a Graduate Certificate in Spatial Literacy for Educators two years ago. This program is also part of a Masters degree in Spatial Literacy Curriculum and Instruction. We use a definition of spatial literacy as the confident and competent use of maps, mapping, and spatial perspectives to address and understand ideas, situations, and challenges in society, our everyday lives, and the world around us. Our program is designed to model the spatial and geographic "advantage" for creative and critical thinking in general, and to support the development of spatially-informed teacher leaders who will be in a position to guide others. In this paper we will share our ideas on how foundations of spatial thinking can best be established among a group of teachers who are wholly new to these ideas. We will also discuss how spatially-informed curricula can be built and supported across a range of school subjects, and our initial explorations into multi-modal assessment.

## C08.11-12 - Standards, Concepts and Experience 1

*Chair: Joseph Stoltman, Armin Rempfler*

### Setting an Education Research Agenda in the Geographical Sciences

*Sarah W. Bednarz (Texas University), Susan Heffron (Association of American Geographers), Niem Huynh (Association of American Geographers)*

The National Geographic Society in association with the National Council for Geographic Education, the Association of American Geographers, and the American Geographical Society is engaged in a community-wide effort to produce a road map to guide planning, implementation, and scale-up efforts to improve geographical sciences education over the next decade. This road map, targeting policy makers, stakeholders, funding agencies, educators, and researchers, is being developed by expert committees in three areas: assessment; professional development and instructional materials; and educational research. The context for the project, funded by the US National Science Foundation, is the emergence of the modern geographical sciences and the growing national need for a spatially and geographically literate population. The challenges to large-scale improvement of spatial and geographical literacy are numerous and include: 1) the discipline of geography is not well-understood in the US and certainly not defined as a science; 2) school geography is largely taught by social studies teachers ill-prepared to teach the subject; 3) topics in science such as environmental systems, in which spatial and geographic understanding and reasoning are required, are underrepresented in the curriculum and also taught by poorly prepared teachers with little instructional support; and 4) the traditional discipline-based organization of the curriculum discourages integrative curricular development and instruction across the social sciences, science, and technology. The road map reports will address these and other challenges while identifying gaps in the existing knowledge base. The Geographical Sciences Education Research Committee is focusing on two important questions: What areas of research will be most useful for large scale efforts to improve education in the geographical sciences? What strategies and methodologies can relevant research communities develop and adopt to maximize the cumulative impact of research in geographical sciences education? The product of the Committee is a consensus report outlining a theoretical framework, with recommendations of research priorities. The report will enable scholars to select, develop, and implement research programs, whether individually or collaboratively, which contribute to the knowledge about student learning and teaching in the geographical sciences. This session describes the overall Road Map project and the report, framework, and recommendations of the Geographical Sciences Education Research Committee specifically. Contributions from and implications for the international geography education community are highlighted.

### Standards for secondary education in geography – An investigation about teachers' knowledge and attitude

*Sascha Haffer (University Giessen), Sandra Hof (University of Hamburg), Johann-Bernhard Haversath*

The development and implementation of the educational standards (not only in Germany) has been one of the most important developments in middle school education during the recent years. In Germany, the first version of the standards was published in 2006 by the German Association for Geography. After this, several steps were required for its implementation: curricula and exam questions needed to be adapted to the standards. Furthermore, the standards needed to be included in teacher trainings and teachers' professional development. The aim of this investigative study was to get to know to which extent the educational standards in geography were known and accepted from the teachers. The research questions were: What is the awareness level of the educational standards in geography? Does a relationship between the length of in-service and the knowledge and the attitudes to the educational standards exist? Is there a difference in knowledge and attitude of teachers who studied geography and those who did not. The study was conducted with 112 middle school teachers whose average age was 42.98 years (SD=11.23). Teachers were collected from different parts all over Germany. We collected data with a questionnaire that consisted of seven scales: awareness level, knowledge of standards, attitude towards standards, implementation of standards, effects, large-scale changes and modification. The awareness level and the knowledge of standards were measured with a 'correct' or 'not correct' item, all other scales by five-point rating scales (1 'absolutely true', 2 'rather true', 3 'partly true', 4 'somewhat true', 5 'absolutely not true'). All scales of the newly developed instrument showed a sufficient internal consistency (Cronbach's  $\alpha$  - ranges from .67-.89). The results show that 41% of the teachers know the standards but a mere 23% of them use the standards for planning and conducting geography lessons. Considering the knowledge about standards, the results show a mean of 6,3 scores (max. 10 scores). Taking a look at the length of in-service, ANOVA shows no significant difference between teachers who have started recently and those who are longer in duty. Taking a look at the difference between teachers who studied geography as school subject and those who did not (nevertheless they teach the subject). There is no significant difference between the attitude of teachers (t-test, n.s.), but there is a difference between knowledge (study geography: 6,7; no study geography: 5,6; max. 10 scores,  $p < 0,05^*$ ). Generally, it can be asserted that concerning the standards in geography, there is a need to extend the knowledge and the awareness level. For promotion, several recent projects were started. One example can be presented at IGC conference.

### Geographic skills in Czech schools: teachers' opinions and a real state

*Miroslav Marada (University Prague), Dana Reznicek (Charles of Prague), Martin Hanus (University Prague)*

The contribution presents a survey, which identifies ideas and opinions of primary, secondary schools and university teachers about the required performance of students in geography education. We monitored requirements on geography students at the end of the 5th and the 9th class of Czechia's elementary school (=end of primary and lower secondary stage) and at the 4th class of upper secondary schools (graduation year of school-leaving exam - 'maturita'). Survey's respondents commented on the proposal of geographic skills standard, which structure reflects an objective process of cognition (from 'Asking geographic questions' over 'Find out, acquire and process information from various secondary sources including maps' to 'Present the results by oral and written way in conjunction with maps and graphics'). The importance of individual items was assessed using a standard four-rate scale ('definitely' yes to 'definitely' no) so respondents were pushed to decide upon one pole. We assumed that responses of four professional teacher groups mentioned are influenced by factors that have different weights by groups. In particular, these could be their education, teaching experience, personal attributes as well as social representation of geography, i.e. the opinion of his mission in general education. The survey was realized on spring 2011. We obtained 541 responses in total; near one half was from upper secondary teachers. This is near 13 % of teachers addressed. We wanted to verify (a) whether there is significant variability in the measured opinions within professional groups and between them and (b) which items (skills) are acceptable for most respondent, and which not. Results of this evaluation, mainly with help of statistical methods (ANOVA, cluster analysis), were used to design tests for monitoring of real state of acquired geographical skills by Czech students. Some interesting results of these tests are presented in the contribution which is framed by general information about undergoing reform of Czechia's educational (school) system. This contribution was prepared thanks to the research project Pupils' skills in biology, geography and chemistry: research into planned, realized and achieved curriculum in implementation phase of curricular reform, No. P407/10/0514, Grant Agency of the Czech Republic. Authors are much obliged for kind support. Key words: geographic skills, questionnaire survey, primary, secondary and university teachers, Czechia

### Teacher training in geography in Germany – (Mis)match between acquired and required competencies

*Sandra Hof (University of Hamburg), Stefan Hennemann (University Giessen)*

As a consequence of the mediocre performance in international student assessments such as TIMSS or PISA, teacher training is increasingly becoming a subject of debate in Germany. In the course of several reforms, including the introduction of national and

federal training standards, the question has arisen of how high-quality teacher training at universities and in the teacher training colleges should be structured. However, there is no general consensus concerning the required competences due to a lack of concise empirical evidence, leaving an informational gap regarding the curricular contents and the required competencies on the job. As opposed to most other countries, the German system consists of two consecutive phases. This two-stage education offers unique possibilities to assess the acquired competences, and a detailed evaluation can deliver comprehensive information for curriculum adjustment when contrasted with the competences required in the work of teachers in schools. Our objectives are to dissect and investigate the appropriateness of teacher education for the job demands in secondary schools and produce empirical evidence on the state of teacher education in German geography. The main research questions are: What geographical knowledge/pedagogical content knowledge is required in the perception of in-service teachers? What geographical knowledge/pedagogical content knowledge was taught in the two phases of teacher training? Is geographical knowledge/pedagogical content knowledge over-taught or under-taught considering current job demands? We draw on an empirical study that was conducted in summer 2011 in Germany, which covered 179 randomly recruited teachers in the state of Hesse. The main survey instrument consisted of a fully standardized questionnaire that contained more than 70 competency items, separated into geographical knowledge and pedagogical knowledge. The respondents were asked to assess their level of expertise acquired in either of the two stages of their university education on a five-point likert scale. Additionally, all competencies were assessed on a five-point likert scale with respect to current needs in school teaching. The results suggest a considerable mismatch between acquired and required competences. While the first stage of university teacher education mainly provides theoretical knowledge that can hardly be used directly in school classes, it lacks the introduction of sound pedagogical skills that are needed for transferring knowledge to the students in schools. This lack of pedagogical skills cannot be compensated for by the subsequent second stage of practical training, leaving a gap in the highly relevant ability to learn how to teach complex content. Results will be presented at the IGC conference and discussed with respect to potential consequences for the teacher education in general.

## C08.11-13 - Standards, Concepts and Experience 2

*Chair: Joseph Stoltman, Armin Rempfler*

### **Bottom up – guaranteed success or problematic mission? The implementation of National Standards for school geography in a federal republic on the example of Germany**

*Ingrid Hemmer (Universität Eichstätt-Ingolstadt), Norma Kreuzberger (Gymnasium Lohmar)*

The National Standards for school Geography in Germany for the graduation at medium level (learners aged 16) were published in 2006. A year later 14 examples of tasks presenting possibilities of teaching according to the National Standards followed. At the same time the National Standards for School Geography were translated into English, however without the examples of tasks. The National Standards were not enacted top-down by the government, but developed by a group of experts consisting of Geography educators representing higher education, school Geography teachers, and geographers of the German Association of Geography. The Standards considered among others the International Charter on Geographical Education. This paper deals with the structure of the National Standards (contribution to education, fields of competences, standards, and examples of tasks). The acceptance of and resistance to their implementation as well as ways of implementation in the federal educational system of Germany are being illustrated drawing upon examples. The problems of the bottom-up-strategy and its success will become apparent. The benefit for the teacher-training and school teaching are being discussed. Ann.: At the conference in Cologne 2012 the English version of the National Standards for school Geography in Germany, including the examples of tasks, will be available as printed version. Each attendant of the meeting will receive a copy.

### **Geographical Education under the Regime of Standardization**

*Mirka Dickel (Universität Jena)*

This lecture aims at a fundamental critique on National Standards as guidelines for geographical education. Three key problems arise from contemporary changes in educational systems due to standardization: 1) The traditional and well-approved philosophical concept of "Bildung" and its basic and crucial meaning for mankind is buried in oblivion. 2) The very matters of "geography" - specific geographical contents and methods - are no longer of (major) importance, as the standards are generally framed, i.e. unspecific to the subject matter. 3) Lessons do no longer cater for personal experiences and pupil's individual development, but they do train for "competences", which focus qualifications and skills, and, thus, train for adjustment and confirmation. During the lecture the arguments supporting these statements are unfolded from an experienced-driven didactic approach that is embedded in scientific

positions that root in humanities especially in philosophical and culture-critical theories. In the course of the argument the standard-based implementations and operations within the educational systems are revealed as strategies promoting social, economic and political structures coined by neoliberalism and neo-gouvernance. In this respect the means of standardization are part of a general social transformation that can be described according to Deleuze and Foucault as the fundamental turn from a society that wields power by disciplin to a socialisation that is driven by control. Therefore, current school reforms thwart the meaning of education as a process within which the pupil comes to terms with himself. In order to get back hold on the crucial moment of individual learning we have to concentrate on the particular matters of our didactical business. This means to center geographical education on personal experiences and questions that emerge from the very individual headstrong affections and concerns. It is only in the face-off between the pupil and the very geographical subject matter that the idiosyncratic learning process spins off. This process can never be foreseen, nor guaranteed by the teacher, but the opportunities for learning can be kept fortunate. Learning can never be technologically planned in advance or standardized, we can only retrospectively know, whether learning has taken place.

### **National Content Standards in the United States: Origin, Impact, Revision**

*Joseph Stoltman (Western Michigan University), Susan Heffron (Association of American Geographers)*

The national content standards for geography in the United States were in response to changes in national educational policies in the early 1990s. After a lengthy development and public acceptance process, the content standards were published as Geography for Life (Geography Education Standards Project, 1994). The goal of the standards was to clearly articulate what students should know and be able to do at three specific grade benchmarks (grades 4, 8, and 12) within the school curriculum. This presentation reviews the standards process over the past two decades from three vantage points. First, the rationale behind the public educational policy changes is discussed. The policy leading to the standards development, the content and topic selections and significant influences on the content selection process will be discussed. Second, the impacts that the 1994 standards in geography have had on geography curriculum, educational materials development and assessment during the past two decades will be discussed as three elements. The initial element was the uptake of the national content standards as the curriculum components of the educational policies within the 50 states that are autonomous educational governing bodies. The second element was the effect of the national content standards on educational materials design and textbooks. The final element was the impact of the national content standards on assessment, and most specifically high stakes assessments by the states and to a lesser extent the National Assessment of Educational Progress (National Center for Education Statistics, 2011). Third, the refreshed edition of the National Content Standards in Geography for 2012 has

been completed and will be discussed. The lessons of nearly two decades of applications to teaching, learning, educational materials development, and assessment provided the basis for the 2nd edition. The major changes in access to reference materials such as the standards between the pre-digital networking work environment of 1994 and currently have resulted in a redesign to meet the demands of different groups of users. The standards in the 2nd edition are very similar in content, but are streamlined and enriched in their conceptual clarity and enhanced examples for applications to geography education. The expectation for greater accessibility by constituent groups of professionals who use the standards for content selection, teacher professional development, assessment, and educational policy implementation is an important projected outcome of Geography for Life over the next several decades. References Geography Education Standards Project. (1994). Geography for Life. Washington, DC: National Geographic Research and Exploration. National Center for Education Statistics. (2011). The Nation's Report Card: Geography 2010. Washington, DC: Institute of Education Sciences of the U.S. Department of Education.

### **The challenge of meeting the curriculum standards for environment and sustainability learning in school geography: A South African perspective**

*Di Wilmot (Rhodes University)*

Since the transition to democracy in 1994, the South African school curriculum has undergone significant changes and revisions. This has included the development and implementation of national standards to guide the selection of content and pedagogy in school geography. A key finding of curriculum reviews (Chisholm, 2000; South Africa, Department of Basic Education (DBE), 2010) and the Annual National Assessments (ANA) (DBE, 2011) is that the majority of South African children are not meeting the national curriculum standards. The National Curriculum Statement (NCS) (DoE, 2002) and its most recent Curriculum and Assessment Policy Statements (CAPS) (DBE, 2011), has a very strong environmental content focus at all levels and within all subjects especially geography. It requires teachers to integrate aspects of environment and sustainable development into almost all Subjects. Geography is seen as a key subject for this integration with more than 50% of the content focused on environment and sustainability learning. Teachers are seen as having a critical role to play in enabling and supporting the intended learning so that students' successfully meet the curriculum standards. This paper provides a commentary on how the national curriculum standards for environment and sustainability learning in secondary school geography (Year 8 to 12) guide the selection of content and pedagogical decisions (Rosenberg, 2011). Secondly, it discusses a strategy for strengthening teachers' knowledge (and pedagogical content knowledge) and professional practices associated with environment and sustainability aspects of the new CAPS curriculum. A conceptualisation and implementation of a model of professional development that enables teachers to re-orient and align their teaching and assessment practice to the curriculum standards is discussed. Thirdly, a national

initiative (Lotz-Sisitka, 2012) driven by the Environmental community working in collaboration with the Department of Environmental Affairs, non-governmental organisations and teacher education institutions is discussed. The development of a set of Open Learning Resource 'exemplars' that can be used flexibly in teacher education programmes nationally, is discussed. The paper reviews the first exemplar which has a focus on Earth System Sciences and Climate Change.

## C08.11-14 - State of the Art in Geography Education 1

*Chair: Alexandra Budke, Simon Catling*

### State of the Art in Geography Education in Portugal

*Felisbela Martins (University of Porto)*

At the turn of the 21st century, a Reorganisation of the National Curriculum for Basic Education in Portugal was operated, which was organised on the basis of general competences and identified, for each disciplinary area, specific competences and educational experiences with which students should be provided. For the Geography subject, care was taken to design new curriculum guidelines, such that they reflected the directives of the National Curriculum. They were primarily intended to ensure that, at the end of Basic Education, students had become geographically competent, that is, capable of thinking of space so as to be able to act in the environment around them. Thus, a National Geography Curriculum was designed from an integrated perspective, covering the 1st to 3rd cycles of basic education (6-15 years of age). 21 specific competences were defined for the 3rd cycle (12-15 years of age), where the subject is taught independently and not as part of the curricular area of Environment Studies (1st cycle) and the subject of History and Geography of Portugal (2nd cycle). These competences are divided into three domains - Location, Knowledge of Places and Regions, and Dynamics of Interrelations between Spaces. Learning experiences are put forward, to be developed over the course of the cycles, and geography teachers are responsible for organising the teaching-learning process, determining which is the most appropriate to their school and specific class. Students should be given the opportunity to take part in activities which encourage them to observe, record and process information, raise possibilities, formulate conclusions, present results, participate in fieldwork and teamwork. In the 3rd cycle, the subject is organised around an overarching theme 'Discovering Portugal, Europe and the World', aggregating six major topics: the Earth: Studies and Representations, the Natural Environment, Population and Settlement, Economic Activities, Development Contrasts, and Environment and Society. With the exception of the first topic, the others can be taught sequentially or in an integrated manner. At the level of Secondary Education (15-18 years of age), the Curriculum Review was suspended, and the Geography programmes were issued without significant changes in relation to previous guidelines. Over the last decade, however, a number of restraints have appeared, among which successive changes in government should be highlighted. However, the Ministry of Education established learning goals for all Basic Education subjects in the 2009/10 school year. 17 goals were set for the Geography subject, based on a set of epistemological and didactical references, linked to the nature of geographical knowledge and its transposition to the school setting. This paper intends to describe the evolution of Geography curricular development in Portugal.

### Changes and challenges for geography education – examples from Sweden

*Gabriel Bladh (Karlstad University)*

The aim of this paper is to present some perspectives on the situation of geography education in Sweden today. This will be done by presenting discussions brought up in relation to recent national curriculum changes in Geography, and by connecting those issues discussed with challenges identified from the perspective of the Swedish geography teacher education arena. Field research done in Swedish schools has shown that selective traditions of the subject dominate in Swedish school geography, especially in primary and secondary school. The debate initiated in the context of the development of a new national curriculum in geography in Sweden during 2010 illustrates the case well. A strong school subject discourse based on subject content where traditional regional geography still holds the key position is well established. On the other hand, the gaps between school geography vis-à-vis geographic perspectives treated in academic research as well as perspectives related to students' everyday contexts have increasingly expanded in a changing world. A weak national research tradition in geography education also complicates the picture. Examples from the implementation of a new syllabus in the geography teacher education at Karlstad University will be used in order to identify some challenges for geography education given by such gaps. Drawing on the time-space geography, developed by Torsten Hägerstrand and further developed by Pred and others, the need to bring forward a better understanding and application of perspectives on relational space in geography education, will be discussed through presenting some 'key-cases' used in the introductory course in geography. A material flow analysis, looking at the biography of a selected foodstuff, is presented and used to make relations between nature, society and space visible. In another case, space-time biographies in everyday landscapes are represented through a combination of time-geographical notation, photographs and diaries. Based on those examples, some themes for future research regarding geography education will be highlighted in the conclusion.

### What German Students Learn about Germany from Geography Textbooks

*Berta Hamann (Universität Würzburg), Dieter Böhn (Universität Würzburg)*

What German Students Learn about Germany from Geography Textbooks Geography instruction tasks include, inter alia, elucidating various regions of the world to students. An investigation of textbooks intended for use in academic high schools (Gymnasium) was performed to determine what German students learn about their own country. First the administrative conditions of the German school system are presented, because they clearly differ from those familiar in other countries. One such characteristic is the fact that each federal state and each type of secondary school has its own curriculum. Despite this, only a small number of publishing houses serve this market; as a consequence, identical content is conveyed in various federal states. The analysis considers the questions of what is conveyed, which geographic approach is accentuated in doing so, in which grade(s) is Germany covered? A further question considered is whether different

depictions still persist today in western and eastern Germany, more than 20 years after reunification. The geographical concepts analyzed can be summarized in simple terms: of the three methods that are in principle possible for depicting a specific space, only traditional encyclopedic description is hardly used at all; thematically-centered regional geography and a depiction based on systematic geography that presents regional examples dominate. A more traditional approach is taken for dealing with selected cities that are of particular importance for Germany as a whole. In five federal states, an element of regional geography is explicitly included'one's own federal state is covered in a separate chapter. In all textbooks, basic topographic knowledge is established with the aid of blank maps. Germany as a space is covered twice in all federal states'at the beginning of Secondary Level I (grade 5) from a primarily regional geography perspective and at the end of Secondary Level I (grade 10) or in Secondary Level II (grades 11 and 12) where it is dealt with by addressing questions pertaining to systematic geography. Here examples of spaces in Germany are used in the context of numerous topics that address spaces on other levels of scale ranging from European to global. Consequently the student realizes that structures and processes are not national in scope, but rather extend beyond national boundaries. Division of Germany into separate countries that continued until 1990 is still tangible to a certain degree in the examples of space that are selected today. Students in eastern Germany receive much more information about western Germany than students in western Germany receive on eastern Germany. In western German textbooks, very few spaces in eastern Germany are dealt with as topical examples. Keywords: Geography textbooks, Germany, West Germany vs. East Germany

### Geography for Younger Children: Some Future Directions

*Simon Catling (Oxford University)*

Geographical education is in a state of flux in England, as it is in Australia. In England geography has been a required subject in the National Curriculum since its inception in 1988. Currently it is in its third incarnation, but it is about to undergo further developments. The Geographical Association and others have put forward proposals as to how the fourth version of geography for younger children might look. Developments in geography education for younger pupils in Australia, where this is a new departure at a national level, bear some similarities to the curricula in England. This paper considers some of the implications for future practice in primary geography of these developments. It stresses the importance of children's own geographical experiences and of fieldwork in young children's geographical learning. It argues for a problem oriented and challenging approach to translating curriculum requirements into classroom practice, while noting the need for creative approaches to developing children's awareness and knowledge of the wider world. It identifies some of the initiatives and approaches which offer ways forward for primary teachers, while noting the need for further in-service teacher development to help achieve the best learning environments and opportunities for younger children.



## C08.11-15 - State of the Art in Geography Education 2

*Chair: Alexandra Budke, Simon Catling*

### Geography Teaching in Indian Schools: Geography Curriculum and Teacher's Knowledge

*Thiruvadanthai Geetha (Delhi University)*

The sustained positioning of geography in the school curriculum depends mainly on the issues of the scope of the subject, its relevant curriculum, the quality of teaching and the attitude of the public outside. The lack of trained graduate teachers has been the main difficulty in promoting the claim of geography as an important subject in the school curriculum. The policy decisions in terms of curriculum planning i.e. National Curriculum Framework-2005 and the recruitment policy of the government have put pressure on the already fragile status of geography in Indian schools. This study analysed the treatment of the subject and the policy decision to place the discipline in the hands of the non-geography (called social science) teachers. The geography curriculum under the banner of social science at the elementary level has not shifted its focus from the dry description of the geographical facts and a mass of unconnected details to be studied. This in turn has given the policy planners the legitimacy of recruiting teachers who need not be subject-specific experts. The study was conducted in 30 schools in Delhi with 60 social science teachers participating in it. A comprehensive questionnaire followed by unstructured interview was used. 80% of the teachers were trained in other subjects other than geography and found the content easy to 'understand' and 'teach' except physical geography concepts. Poor pedagogic knowledge and lack of specific training in their teacher-education programme perpetuated the problems associated with school geography teaching in India.

### Changes in the Geography curriculum and textbooks at the upper primary level in Mauritius: The post-2006 reform

*Boullé Pierre-André (Mauritius Institute of Education)*

Changes in the Geography curriculum and textbooks at the upper primary level in Mauritius: the post-2006 reform. This paper is based on the analysis of the changes and innovations we brought to the Mauritian geography curriculum in the context of the 2006-2010 reform. It will give background information on the 2006 National Curriculum Framework reform which was the first of its kind at primary level in Mauritius. The paper also examines how emerging themes such as sustainable development, natural hazards, changes in land use and new economic activities in Mauritius have been integrated in the upper primary textbooks we developed in 2009/2010. These are in line with national policies in the context of Mauritius aiming at becoming a sustainable and economically viable small island developing state. It finally reflects on the opportunities that the

designing of new textbooks has provided in integrating innovative pedagogical approaches and also on the constraints which were encountered to abide by the following prerequisites: prevent overloading of the curriculum while integrating new themes and issues; contextualise the curriculum; ensure that geography is 'an informing, enabling and stimulating subject and contributes to a lifelong enjoyment and understanding of the world' (ICGE. 1992) and be innovative and creative in responding to the needs and expectations of pupils.

### Undergraduate Geography Education in Canada: How engaged are our students?

*Erin Joakim (University of Waterloo)*

Over the past decade, there has been increased media coverage regarding declining student engagement along with high levels of entitlement in academic settings. These communications often assert that students expect high grades even with minimal work and that current generation(s) of students have higher levels of academic entitlement than previous cohorts. This study explores the concept of entitlement in relation to undergraduate geography education as well as the linkages between students' sense of entitlement and their approaches to learning. Through literature review and pilot testing, a questionnaire instrument was developed that measures four constructs: academic entitlement, deep learning, surface learning and strategic learning. Survey responses (n=583) were collected at a large public university in Canada, focusing on first and second year undergraduate geography students. This was followed by focus group discussions with students and faculty to explore the concept of entitlement and its intersections with learning styles. Responses suggest that students approach learning in mixed ways, and that approaches to learning intersect with students' sense of entitlement in complex ways. Overall, scores on the sense of entitlement scale were found to be moderate, challenging some of the assertions about today's students that have been made in the popular press. On the other hand, scores across all learning scales were balanced, suggesting a need for increased focus on deep learning strategies in university geography education. The results are then situated within the context of geography education in Canada as well as changing social and cultural norms, increased individualism, rapidly increasing technological advances, increased competition for scholarships, employment, and changing expectations regarding the role of post-secondary education.



### New government, new curriculum? Geography on the controversial Spanish curricular move (1990-2012)

*Miguel Pazos-Otón (Universidade de Santiago de Compostela), Ramón López Facal (Universidade de Santiago de Compostela), Valerià Paül (Universidade de Santiago de Compostela)*

In November 2011 elections, Spaniards gave a wide majority to the conservative People's Party (PP). Since 1990, when the General Organisation of the Education System Act was passed, the changes of ruling party in Spain (from the Spanish Socialist Workers' Party, PSOE, to the PP, in 1996, and from the PP to the PSOE, in 2004) have meant an in-depth debate over the curriculum, affecting all the subjects, thus including geography. These discussions have not always led towards a practical shift, but have shown differences in focuses, approaches and contents, and even dissimilar ways to understand pedagogy. Although still it is very soon to grasp the extent of the predictable curricular modification after the last elections, it makes sense to reflect on the previous disputes in order to note the most controversial issues. This analysis will try to highlight the different underlying understandings of geography and the changing meanings attributed to this discipline. The examination will be basically devoted to the secondary school (both compulsory -from 12 to 16 years- and non-compulsory -from 16 to 18 years- stages), where the discussion has been more intense. Disagreements have been partially focused on the tension between the curriculum decided by the Spanish government, on the one hand, and by some of the devolved governments (autonomous regions and nationalities, so-called in Spain "autonomous communities"), on the other. Geography has been particularly affected by this centre-periphery controversy, usually in a sort of conflict between nationalist visions installed in the central government and in autonomous governments such as those of Catalonia or the Basque Country. In this respect, the paper will consider in a second stage how two autonomous nationalities with their own language, Catalonia and Galicia, have adapted the general Spanish curriculum of geography. Legally, they both are supposed to have wider curricular possibilities than regions without their own language, but surprisingly one has been more controversial than the other in curricular terms. This differential behaviour will be scrutinised as well, focusing on geography matters.



# C08.13

## Geography of Governance

## C08.13-01 - Governance - key theoretical and methodological issues, main research directions 1

*Chair: Jan Bucek, Shannon O'Lear*

### Changing governance regimes for business partners in regional and local development: the past and future of chambers of commerce

*Robert Bennett (University of Cambridge)*

Public-private economic partnerships are now a widespread policy approach, but the private sector partners who are essential to the partnerships vary greatly in capacity to participate. Some are designed for a 'public purpose' to act as policy partners, but most are founded and maintained primarily for business purposes. This paper examines variations between countries in the capacity of one of the leading local-regional private sector partners used in most countries: chambers of commerce. Chambers have the advantage to government that they are democratically elected from the business community, have transparent governance that offers legitimacy, and are locally-rooted. They offer advantages over ad hoc and government-appointed bodies that often carry no weight with businesses allowing governments to draw on existing networks of traded and untraded dependencies between businesses, providing engagement and dissemination of information about policy needs at low cost, with no set-up costs, and are self-maintaining. However, local chambers of commerce vary between countries in partnering capacity chiefly as a result of the different regimes that govern them: private law and public law. The paper reviews the strengths and weaknesses of these two regimes, drawing on the presenter's recent book: 'Local business voice: The history of chambers of commerce in Britain, Ireland and Revolutionary America, 1760-2011', published by Oxford University Press 2011, 926 pp. Private law chambers such as those in Britain and the USA are often small, uneven in coverage, and depend for government attention on goodwill or the weight of publicity and campaigning. Their public law counterparts in France or Germany have larger size, more uniform coverage, and assured points of entry for business views with government. As partners, private chambers are thus less predictable as participants for government, but where they do participate they are closer to market needs and have a stronger scope to diffuse participation to the business community through networks and local clusters. Public chambers are better resourced and have privileged public status, but their ability to deliver effective involvement is limited because they depend more on the state to activate, may be ignored by their 'members', and may find it difficult to advocate 'difficult' policy solutions. Both systems have experienced substantial reforms since the 1990s to encourage improved effectiveness. For the future, increasing fiscal austerity is likely to lead governments to draw more heavily on chambers as partners, either to reduce public expenditure or to improve the depth of business involvement being sought. The paper will examine some of the challenges of achieving these goals.

### Is the treatment of risks different in the case of public and public-private transport projects? The case of high speed railway projects (TGV) in France

*Geneviève Zembri-Mary (Université de Cergy-Pontoise)*

Key words: risks, TGV, public projects, public-private projects. High speed railway lines have been planned, financed and built in France with two different types of multi levels partnerships: - public partnerships : Réseau ferré de France (RFF- which owns and develops the french railway network), the State and Region(s). - public-private partnerships (RFF-private companies) with a PPP contract or a concession contract. A PPP contract shares the financial risk between the public and the private partners. This type of contract has been criticized because of the cost which the public authority has to assume. In the case of a concession contract, a concessionary company can finance the building and operate a transport infrastructure by perceiving toll receipts from users. Transport projects can exceed certain cost limits and completion times and not always meet the initially determined objectives (like traffic forecasts, profitability forecasts). Risks, whether social or political (objection to the project from the public or local elected representatives), financial (additional costs), technical (such as a rockfall during the digging of a tunnel) or environmental (such as the effects on the ecosystem) are therefore particularly present in project decision-making processes, especially given that our society is largely concerned by uncertainty. This article examines the following research question : do each type of partnership (public or public-private) influence differently the treatment of risks and the respect of the objectives of the high speed railway projects in France ? The first part analyses different criteria (time, cost, traffic, profitability) to show if the projects have or not achieved their objectives among their are public or public-private. The second part analyses the decision making process of each project and the treatment of the social, political, financial, institutionnal risks by each partner and its impact on the cost, time, traffic, profitability of the projects. The decision making process can be the application of a procedure or an adaptation to a particular context. The third part proposes a critical analysis of the practices of the treatment of risks in the case of a public project and a private-public project. It proposes a diagnosis of the good practices and the differencies and similarities of practices of the two types of projects.

### Framework Governance: A Perspective of Political Steering in Geography

*Tobias Federwisch (iq consult)*

During the last decades, the nation state has been fundamentally changed. One of the particular characteristics of this change is the emergence of a neoliberal state system, which is often accompanied by a territorial reorganization of the nation state in favour of sub-national (regional, urban) levels. In this context new types of governance can also be observed. According to this, a successful steering of society does no longer depend on dominant government structures, but on a network-like cooperation of different elites. Social sciences benefit from the upturn of governance. In particular, the governance approach has contributed to deepen our understanding of that new type of political

steering. However, it is problematic that the governance approach is being assumed by other disciplines without closer examination. The cognitive possibilities and scientific results of such disciplines are therefore closely connected to the dominant viewpoint of the governance approach without sufficiently taking into account the research interests of the respective disciplines. The lecture deals with the integration of the governance approach into geography and points out the consequences of a blind assumption of terms and concepts. This includes a short introduction to the history of the governance approach, from which its dominant viewpoint can be deduced. Secondly, I will explain the central deficits of the governance approach, which have to be taken into account when integrating it into geography. To conclude, I will advertise a geographical perspective which is aware of those limitations and leaves 'space' for the specific interests of geography.

### **If all governance is territorial, is territorial governance anything more than just governance?**

*Dominic Stead (Delft University)*

Various publications and policy statements by international bodies such as the OECD and the Council of Europe have served to highlight the importance of place or territory in governance. These have undoubtedly contributed to greater attention to the notion of territorial governance in Europe, which can for example be found in 2009 Barca Report on Cohesion Policy reform -- it calls for a more 'place-based' approach to policy-making -- and current plans for European regional policy beyond 2014 -- it calls for greater sectoral and territorial integration of Cohesion Policy programming. Clearly the term territorial governance must imply something more than just governance alone if it is to make a meaningful contribution to policy or academic debates. So what exactly is the difference between governance and territorial governance? After all, governance is always concerned with a specific territory. This paper attempts to unravel the differences and implications. While a number of definitions of territorial governance can be identified, few of these help in clearly distinguishing between governance and territorial governance. The OECD for example defines territorial governance as 'the manner in which territories are administered and policies implemented, with particular reference to the distribution of roles and responsibilities among the different levels of government (supranational, national and sub-national) and the underlying processes of negotiation and consensus-building' (OECD, 2001a: p.142). Meanwhile, the Council of Europe define territorial governance in terms of 'the way in which the territories of a national state are administered and policies implemented, with particular reference to the distribution of roles and responsibilities among the different levels of government (supranational, national and sub-national) and the underlying processes of relationship, negotiation and consensus building' (CEMAT, 2006: p.7). With the possible exception that greater emphasis is given to the multi-level dimension, both of these definitions are not so dissimilar from general definitions of governance. This paper argues that territorial governance might be distinguished from

'plain' governance according to two key criteria: the prominence of place or territory in governance processes and the importance of sectoral integration. References CEMAT (2006). Resolution n°2 on Territorial governance: empowerment through enhanced coordination. 14 CEMAT (2006) 13 Final. Council of Europe, Strasbourg. OECD (2001). OECD Territorial Outlook. 2001 Edition. OECD, Paris.

## C08.13-02 - Governance - key theoretical and methodological issues, main research directions 2

*Chair: Jan Bucek, Shannon O'Lear*

### The Art of Mutual Adjustment and the Science of Critical Rationality: Theory for Reaching Decisions in Environmental Assessment

*Richard Hill (University of Cape Town)*

This paper presents a normative, methodological theory of the Environmental Assessment (EA) process that interlinks two primary concepts, namely, critical rationality and mutual adjustment. Originating from modernist planning theory, critical rationality is most pertinent to the assessment stage of EA in ascertaining the consequences of proposals, and later in providing justifications for decisions taken. Poststructural and postmodern critiques have disparaged rationality as an inappropriate approach to decision making. The paper argues that a reinvigorated, intersubjective, and critical approach to rationality is essential in EA. However a formalised process of mutual adjustment, sourced from theories of public sector decision making is most appropriate in the decision making (or decision shaping) that occurs in scoping and evaluation. In multi-actor decision making, participants adjust to each other's interests in agreeing on a course of action in a process that embodies social learning. Where mutual adjustment fails and consensual action is not possible, a decision must be taken and then imposed, subject to the conditions of critical rationality. This theory of the EA planning process is outlined for each of the stages of scoping, assessment, evaluation, and decision.

### Seeking Environmental Governability in Mexican Protected Areas: From top-down to participatory approaches

*Ludger Brenner (Universidad Autónoma Metropolitana)*

Seeking Environmental Governability in Mexican Protected Areas: from top-down to participatory approaches This paper adopts a political ecology approach to analyze the increasing social-economic complexity which has faced environmental governability as well as participative governance in Mexico during the last 40 years. Based on in-depth interviews conducted with key actors over a two-year period (2006-2007) in the well-known Sian Ka'an Biosphere Reserve (Yucatán Peninsular, Mexico), three periods of different governance regimes are identified. Then, governance-related challenges are presented in chronological order. Emphasis is placed on shifts in actor constellations, opposing interests and actions that still hamper the development of integral and participative governance. Moreover, means and tools that have recently been applied to establish more participative governance structures are described and critically evaluated. Study results show that both structures and mechanisms to conciliate conflicts among

conservation-centered actors and other stakeholders are still lacking. As a consequence, involved actors continue to pursue their individual interests beyond institutional frameworks. Therefore, there is still a need for conceptual and strategic advancement to foster the effective and socially-balanced management of Protected Areas. Given this complex situation, an explicitly actor-oriented environmental governance could be an appropriate way of mediating the conflicting interests among all actors involved. Keywords: Environmental governability & governance, Biosphere Reserves, Yucatán/Mexico

### Improvement of environmental quality governance in the Russian Federation based on the integration of European experience

*Viktor Plyusnin (RAS), Valery Kravchenko (RAS), Adrian Hoppenstedt (University Berlin), Wolfgang Wende (University Dresden), Anja May (University Dresden)*

The tools of environmental quality governance used in Europe and adapted to Russian conditions are considered. These tools are directed at improving the administrative, legal and economic mechanisms regulating the procedures of planning, coordination and implementation of planned activities. Such projects include: - Development of methodological framework for the assessment of environmental impact and performance of Environmental Approval of proposed activities; - Development of methodological framework for the regulation of intervention in the natural environment by means of a compensation mechanism of the disturbance, arising during the implementation of projected activity; - Provide the tools of landscape planning and the use of these tools as an information base for impact assessment and regulation of intervention. Russian-German Guidelines for environmental impact assessment and performance of Environmental Approval of planned activities are proposed as the first tool. The following things are described in this tutorial for the first time in Russian practice: - Scoping and screening techniques; - Current status of the environmental impact assessment, based on componentwise analysis in terms of its sensitivity and importance; - Methods of identification of influencing factors and prognosis of environment disturbance in the context of environmental condition. This tutorial introduces the preliminary assessment procedure, which allows optimizing the environmental projects monitoring and making this sufficient to guarantee the preservation of the environment. As the second tool methodical recommendations on the development of measures to prevent, reduce, compensations and replacement of damaged natural environment arising from the realization of the planned activity are proposed. These recommendations take into account the European experience and are adapted to the Russian practice Landscape planning as a tool of territorial planning and ecological zoning in Russia has no validity. There is not any law on obligatory implementation of landscape planning. However a number of laws in Russia (Land Code, Building Code, and the Law on Protected Territories) provide zoning of territories for various purposes. The main objectives of such zoning are: - zoning of territories for town-planning activity; - zoning of territories of

settlements; - zoning of separate territorial zones. Assessment of environmental condition, purposes of territory use and actions for achievement of these purposes in such documents are considered with different degree of detail depending on a document kind. As exemplified by zoning of a territory of especially protected areas the level of detail is the highest, at town-planning zoning ecological questions are considered superficially. The information contained in results of the listed kinds of zoning is not enough for the environmental impact assessment.

### Reservoirs of contradictions: Damming the Amazon

*Marcelo Salazar (Instituto Socioambiental), Mauricio Torres (University of Sao Paulo), Natalia Guerreiro (University of Sao Paulo), Juan Doblaz (Instituto Socioambiental)*

It is a very important task to question the consistency and the objectives intended with the recent ensemble of policies directed to the Brazilian portion of the Amazon and its populations. When one does so, it becomes suddenly clear the intern incoherence of these policies: speeches that proclaim the intrinsic value of socioenvironmental practices against predatory activities coexist with measures intended to appeal major economic interests. In the latest decades, we watched the creation of several conservation units and indigenous lands in Brazil. The Amazon map has been colored with mosaics of such genre of protected areas, proudly exhibited by the Brazilian government to the world. Frequently, these actions were adopted as a response to massacres and other conflict related events that occasionally made the global press. Nevertheless, beyond formalities and in the concrete field, we have reasons to believe these public policies are far behind the minimum required to face the problem, and the mosaics as well as sociobiodiversity corridors not always fulfill their intended objectives. In fact, the government seems to go in the opposite direction, by weakening the existing environmental legislation to make it easier for large projects to be installed in the Amazon. For Almeida & Marin, this movement could be called 'an agristrategy', consisting of a political and juridical construct aimed to remove formal and legal obstacles to capital's large ventures, as well as the insertion of additional extensions of land to the market. Focusing on the water business, the governmental plan for the decade predicts 66 large hydroelectric power plants and 177 small ones. Alongside of the dams, it is expected a massive investment in mining and other sorts of infrastructure, such as roads, ports and transmission lines. With all that, we must probably witness an enormous pressure over natural resources and traditional land rights and way of life of the residing population. This paper intends to explore the premises above throughout the analysis of two hydroelectric projects. Belo Monte, in the Xingu River, and the Tapajos river complex, both in the Brazilian state of Pará. Such examples shall allow us to describe and investigate the connivance, and therefore responsibility, of Brazilian government in reported cases of disrespect to the regional sociobiodiversity. Through a dialectic prism, we understand that capitals territorialisation embeds contradictions, and we aim to demonstrate that these projects

implementation, without modifications, shall aggravate land conflicts and facilitate predatory activities, such as illegal logging, land logging, deforestation, and violation to traditional populations rights.

## C08.13-03 - Governance - key theoretical and methodological issues, main research directions 3

*Chair: Jan Bucek, Shannon O'Leary*

### 'Best mayors', 'best governments' or 'best cities'? Methods for assessing the quality of local governments in major Polish cities.

*Lukasz Mikula (Adam Mickiewicz University)*

Effective and responsive local authorities and well-functioning public institutions are important elements of the urban competitiveness. The quality of political leadership, managerial abilities of senior officials, the organization and work standards of administrative staff have influence on the daily life of residents, the city's attractiveness to investors and the capacity to obtain external funding for urban development. The high value assigned to the public management is clearly visible in many urban rankings in Poland, which are usually prepared by scientific institutions, leading socio-economic magazines, consulting firms and national associations of local governments. Some of these rankings are even directly called 'Mayors ranking' or 'Local governments ranking'. However, there are many methodological problems in objective assessing the quality of urban governance. The main difficulty is to extract the elements related to the public governance from the characteristics relating to the city as a whole. Impact of the local public administration at the various spheres of city's life is usually very diverse. In some areas it may be of fundamental nature (shaping the structure of budgetary expenditures, raising funds from the EU to the local public investment), in others - a more limited. In the empirical part of the study, it was decided to use for the analysis such indicators and figures that can be unambiguously interpreted as relevant to the issue of local management and are possible to be objectively measured (by the Central Statistical Office). These have been divided into 4 groups: 1) the political circumstances, 2) the dynamics of local tax base, 3) efficiency in obtaining funds from the European Union, 4) the spatial policy. The 10 largest Polish cities have been taken into account. The results have been confronted with some of the most popular urban rankings in Poland, pointing out to key methodological problems. Appreciating the wide scope of information gathered in many published rankings, it must be underlined that there are some dangers associated with the use of some of the popular indicators as the base for pointing out 'better' and 'worse' mayors or governments. Key concerns being elaborated in the paper are related to the assessment of the local expenditures and cities' debts. The even more difficult problems arise when data for Polish cities are compared with urban centres of similar size within neighbouring EU countries (Germany, Czech Republic, Slovakia, Lithuania). Because of the institutional (constitutional, political, financial and planning systems) differences, making the international comparisons of local governments' 'quality', using the same methodology for each country, seems hardly possible.

### Environmental Governance Rescaling

*Juan Cervantes (Universität Weimar)*

The impulse that the Sustainable Development has gained among the actual speech involves many paradoxes, it has assumed the importance in the moment when the global power centers declared the shortcoming of the State as promoter of development and proposed the market as its replacement, while declaring also flaws within governmental planning. All of these factors denote a deep restructuration on the modes of governance, caused in turn by an evolution and succession of intertwined social, economical and political processes. Anyway, it could be considered that they all had a common root on the contemporary processes of globalization and the economic changes it has unleashed.

Sustainable development isn't just about ecological and environmental issues, in order to instaurate a successful environmental policy, the concept must consider and include political, economical and social processes, which are intertwined with socio-spatial notions of dynamic restructuration of the modes of governance and regulation, and that in turn, involve changes in the 'state – society – market cycle' as a permanent process of selection and institutionalization.

In the understanding of the concept of rescaling as defined by Gualini (2006): '...as part of a restructuration of the modes of governance and regulation involving changes in the state-society relation and its influence on spatial relationships'. It could be considered that deepening in studies of the environmental politics and governance between developed countries; examining the political and economical national contexts as well as the creation of Sustainable Development Strategies and analyzing the fulfillment of their objectives, is a decisive step in order to evaluate how the overarching infrastructure context of each country can represent a decisive pressure that can alter the objectives of the National Sustainable Development Strategy and how this in turn may influence the environmental governance at a regional scale on very specific regions within each country.

### Spatial Governance between Stability and Change - Case of the Metropolitan Region Hamburg

*Sabine von Löwis (Centre Marc Bloch)*

The paper addresses a case study of a finished PhD work analysing how and why interregional and cross border city regional governance structures change over time. It introduces a model to characterizing and analysing dynamics in spatial governance by using the criteria 1) goals and norms, 2) actors /actor constellations, 3) mechanisms and forms of coordination, 4) multilevel governance and 5) the relevance of resources and power. The paper discusses and reflects on changes in metropolitan governance in the city region Hamburg over a time span of 20 years with special focus on the methods and

model applied tracking and understanding reform and transformation of governance. The paper focuses on the importance of different levels of governance from local conditions to the relevance and influence of national and subnational governance levels in a multilevel context. Concerning the character of dynamics a change between stable situations of governance (e.g. small process adaptations) can be separated from dynamic situations in which strong changes happen (e.g. extension of the territory, fundamental new strategic orientation). The stable governance situations seem to be followed by dynamic situations in the way to stabilise the before developed new forms, goals, mechanisms of coordination, etc. Dynamics evolve through actors, new ideas, certain processes of interaction and coordination, a context which supports changes. All together leading to a certain outcome of a new governance structure - gained for or not. Context, actors and certain actor constellations have been shown very influential on changes in the metropolitan governance of the metropolitan region Hamburg. Within the case study of the metropolitan region Hamburg the above mentioned criteria of governance have been analysed over a time span from 1989 to 2009. The study shows that individuals have changed but the institutions they represent have been almost the same within the governance structure. Important have been the constellations of actors which lead to windows of opportunities to allow reforms. Similar to the same institutions involved, mechanisms and forms of coordination have not changed essentially. It even can be said, that a number of mechanisms persist while new ones develop over time in parallel to 'old' ones. Radical but in a rather subtle way norms and goals of governance changed. Globalisation and internationalisation as strong and dominant issue emerged while cohesion issues and sustainable development lost importance, but are still in place. The paper discusses the analysis of governance change, characterises governance transformation and through this comes to conclusions and recommendations about metropolitan dynamics illustrated by the case of the development of the spatial governance system of the metropolitan region Hamburg.

### Urban project spaces in French river cities: Which governance?

*Nicolas Raimbault (Université Paris Est), Jean Debrie (Université Paris)*

Urban development projects involve some complex relationships between institutional public agents, who govern local territories, and economic agents, who make urban economies. These relationships between economic agents and urban agents are embodied in exact projects which are set in urban spaces. Thus, they result in geographical governance based on arbitration about available land uses between these agents, in a context of reduction of available land resources. The study of several urban projects in river cities is a fertile fieldwork to analyze this governance. In these cities, there are lots of exchanges between the agents of the field of the river (port authorities, inland waterway managers, transport and logistics firms) and the agents of the field of the urban government and development (the different local and national governments, developer firms and urban development public corporations). These exchanges, set up to run river

and port projects, are concerned with large area spaces in the heart of urban agglomerations. The land values of these areas are often much higher than the traditional industrial uses that are theirs. Thus, in river cities, the urban development stakes are characterized by tensions between urban renewal of river port wastelands and industrial and productive activities maintaining. Land negotiations are the driving forces behind governances between agents and spaces of different status. Several French cases studies will enable us to analyze this governance, i.e. these relationships between economic agents and urban agents. Both the participation of a port authority in an urban development project on port spaces and the contribution of a municipality in a port development project will be studied. On the contrary, the case of oppositions or indifferences between port authority and municipality on specific places will be also analyzed. These examples enable us to approach the different dimensions of these exchanges. French cases studies are stimulating from the perspective of a geographical approach of governance field because river and port spaces are most of all state property in France. These lands, often located in the heart of urban agglomerations, are not historically part of the field of local public policies. Thus, the negotiations between land uses in towns (residential versus production) are deployed on different property lands (urban property lands versus state property lands). By this way, they are displaying the general complexity of the compromises which have to be found in urban spaces where land resources are limited. It shows which kinds of governance are developing around specific projects and spaces.



## C08.13-04 - Governing development in regions, cities and rural communities 1

*Chair: Jan Bucek, Andrew Ryder, Pushkar K. Pradhan*

### Coltan from Central Africa, international trade and implications for any certification

*Monika Dittrich, Raimund Bleischwitz (Transatlantic Academy, Wuppertal Institute)*

The exploitation of coltan in Central Africa can be considered a case of conflict minerals due to its nature. Many international organizations and bodies, national governments and private sector organizations seek to address this conflict, in particular via transparency, certification and accountability along the material supply chain. This paper analyses the international trade dimension of coltan and gives evidence on the dimension of illicit trade of coltan. The authors start from the hypothesis that illicit trade of coltan sooner or later will enter the market and will be reflected in the statistics. The paper is structured in the following manner: first, a short section gives a profile of coltan production and markets; second, an overview of the mining situation in the Democratic Republic of Congo (DRC) and related actors. The third section addresses mechanisms, actors and measurement issues involved in the international trade of coltan. The final part draws lessons for certification and conflict analysis and offers some guidance for future research. The paper identifies two main possible gateways to trace illegal trade in coltan: the neighboring countries, especially Rwanda, and the importing countries for downstream production, in particular China. Our estimation is that the value of such illicit trade comes close to \$ 27 million annually (2009), roughly one fifth of the world market volume for tantalum production. With regard to any certification the paper concludes that this will become challenging for business and policy: (a) Central Africa currently is the largest supplier of coltan on the world market, many actors profit from the current situation and possess abilities to hide responsibility; (b) China will need to accept more responsibility, a first step would be the acceptance of the OECD guidelines on due diligence; (c) better regional governance in Central Africa comprises of resource taxation, a resource fund and fiscal coordination. An international task force may provide more robust data, however more research will also be needed.

### A Study of Geographic Divisions of Islamic Lands

*Abbas Ahmadi (ZISTA Co)*

In the Name of God Abstract: Land division is one of the administrative-political methods, made to facilitate the provision of security, improvement of social circumstances and public welfare of society. This issue is based on different and distinct methods among

different nations and tribes. In Islam, land divisions of the early Islamic centuries considerably differ from those in the contemporary period. Studies reveal that divisions of Islamic lands were originally derived from the methods of forefathers, but in the next centuries, especially in the 3rd & 4th centuries of Hijra or, in other words, in the golden period of geography, geographic Islamic criteria as well as religious criteria constituted the base for division of Islamic land. Finally, in contemporary period, domestic divisions of countries and Islamic nations are based on socio-political criteria and observations. Thus, it can be concluded that the attitude toward geographic divisions of Islamic lands, both domestic and foreign, have been complying time conditions during history. Key Terms: Country Divisions, Islamic Land, Country Divisions, Arabia, Iran, Afghanistan, North Africa

### In Unit with EU Real Conditions of Entry to Economic and Monetary Union in Peripheries of the European Union after Financial Crisis

*Balázs György Forman (University of Budapest)*

In unit with EU Real Conditions of Entry to Economic and Monetary Union in peripheries of the European Union after Financial Crisis Keywords: EURO, Optimum Currency Area, Convergence, Public Administration, Financial Crisis In A Theory of Optimum Currency Areas can know the area of economic and monetary union to adapt to asymmetric economic crises can be by budgetary transfers and or research and development in each countries and regions. In the optimum currency area, the foreign trade are between in legal to each other independent corporations between the member states. The theory did not calculate with a multinational companies and consequences and effects of its operate. The theory assumed indirectly the all member states of optimum currency were able to adapt by R+D and investments of itself own corporations. Can true conditions in peripheral countries, or can not? Attention of decision makers avoid to fact that the medium level territorial public administration and local governments are not able to its work. The causes are differentiated: - Fragmentation of local governments - Demography: permanently declining population. - Spatial: increasing spatial differences among settlements. - Technology: in case of some task of local governments changed the technology (environmental management). - Finance: deciding question how can finance the local governments that will not raise spatial differences. - How can we interpret the concept of subsidiarity?

### Branding regions

*Ida Grundel (Karlstad University)*

The purpose of this presentation is to discuss how different kinds of representations of regions form a part of the institutionalization and creation of new and older regions of today. As a result of the discourses of new regionalism, we see ongoing processes where culture and identity are seen as important parts to create strong and competitive regions, which have become more and more important for peripheral and weaker regions around

Europe. Regional culture and identities are seen as part of different soft factors that are seen as strengthening the regional level and in that way contribute to the attractiveness and competitiveness of the region. It is also believed that different soft factors will strengthen the inner unity in the region and thereby lead to further development. Culture and identity have to a greater extent than before been given an economic value. By enhancing the distinctive attributes and features of a region such as culture, it is said to be more competitive in an international and national context. Different representations of the regions are used to create an image of the regions. This connection between regions and regional features could be seen as a result of a political agenda where it is the uniqueness of the region that is enhanced to create an idea of the region as a base for identity construction. By creating this attractiveness within the regions in different contexts, it exist several different representations of the regions in the same time. This altogether creates the identity of the region. Earlier it was possible to say that the marketing of regions and places mainly aimed to attract visitors, but today it is rather about attracting visitors, business, investors, new inhabitants and in scarce regions even to keep the inhabitants. There is also an emphasis on cooperation across borders between regions in different border areas between the member states in the EU. But in the same time the regions are also seen as competitors both nationally and internationally. Different regional policy programs enhance the importance to create strong, attractive and competitive regions. But what does this actually mean? By studying different representations of two peripheral border regions in Europe, Värmland in Sweden, and Hedmark in Norway, the aim is to show different representations of how the discourse of new regionalism affects different regional policies in scarcer regions in Europe, mainly with focus on different ways of branding regions.

## C08.13-05 - Governing development in regions, cities and rural communities 2

*Chair: Jan Bucek, Andrew Ryder, Pushkar K. Pradhan*

### Participation and market-driven development

*Jan Dohnke (Universität Berlin)*

Based in the Ciudad Autonoma de Buenos Aires, the paper examines two processes that have a high local impact in the Argentine capital, the construction of high-rise housing in middle- and upper middle-class neighbourhoods and the renewal and gentrification of the historical inner city. Both processes affect different strata of the population in very distinctive ways but ultimately challenge their right to remain within their neighbourhoods under self-chosen conditions. In both cases, urban planning is guided by a laissez-faire attitude towards private investment and market-driven development, only partially framing or regulating it. As a consequence, options for participation are very limited, causing local inhabitants to organize, voice their claims and find other ways to challenge current urban development. The different strata of the population affected employ very different strategies, which are linked closely to their own resources and power relations both within their neighbourhoods as well as with political institutions. As local inhabitants try to achieve the same goal, to apply their 'right to the city' in order to achieve a more socially sustainable urban development for them, the paper shows that the on-going restructuring of the Argentine capital does not only have adverse effects but also triggers new modes of participation and resistance which might allow to counterbalance current forms of urban development.

### The News Modalities of Territorial Governance in the State of Sao Paulo, Brazil

*Elson Pires (Universidade Estadual Paulista), Lucas Fuini (Universidade Estadual Paulista), Rodrigo Mancini (Instituto Aequitas), Danilo Piccoli Neto (Universidade Estadual Paulista)*

In Brazil the experiences of territorial governance became more evident in the year of 1990 with the advancement of political and administrative decentralization initiatives, requiring the federation of municipalities and other regional and local stakeholders a more active role in the reorganization of intra national territory. During this period new initiatives will appear in the State of São Paulo from some sectors of economic activity, pointing to new modalities of territorial governance that already indicate overlapping scales and new forms of regulation diffused from the local and regional territories, such as: Clusters, Tourist Circuit, Watershed's Committees and Sectoral House of Representatives of the Agrobusiness. Governance is no longer just sectorial and becomes territorial when it

recognizes that the territory is the spatial area of power that allows the sector its industries, the State and civil society have relations in a collective way, publicly, expressing various forms of interest and cooperation, revealing conflict, but cooperation and promoting a change of the territorial development process seen as "from the bottom", meaning that the citizens participates in the decisions taken. To show this recent phenomenon in Brazil, the article is structured in three parts, further an introduction to the problems of the study. The first part is concerned with the origins of the term territorial governance in its practices and formulations, and its relationship to the development local and regional. The second part seeks to show the process of ongoing construction of some structures of territorial governance in the State of Sao Paulo, using the examples of the Clusters, Watershed's Committees and the Sectoral House of Representatives of the Agribusinesses, sources of enlightenment about how the structures of regulation and sharing of powers in the territories may interfere in the process of negotiating of the local e regional territorial development in the country, as well as in the mechanisms of generation and distribution of resources between sectors and territories. The third part concludes the analytical framework with a critical assessment of the new born territorial governance in Brazil, considering the different sectorial, spatial and political-institutional realities. Keywords: Clusters; Watershed's Committees; Sectoral House of Representatives; Governance; Territory.

### Peri-urban development in Yogyakarta – an introduction of challenges and solutions of autonomous districts in Indonesia

*Christine Knie (Universität zu Köln)*

Yogyakarta region, located in central Java, is one of the economic, educational and touristic hubs of Indonesia. Yogyakarta city, with half a million inhabitants, is the centre of greater Yogyakarta region. The entire region has three million inhabitants and is divided into Yogyakarta city itself and four districts. After 2000, when decentralisation was implemented in Indonesia, Yogyakarta City as well as the neighbouring districts became autonomous regions elaborating their own spatial development plans. The population figures of the peri urban districts Bantul and Sleman are increasing while the number of inhabitants of Yogyakarta city is shrinking. The peri-urban area is currently in a transition phase from a largely agricultural to urbanised service area with a high demand for new building areas in fertile traditional wet rice regions. The presentation will introduce the challenges of the current regional development and compare the administrative concepts of Bantul and Sleman with a special focus on land administration. Both local governments developed different strategies which are targeting the illegal land grabbing and at the same time supporting a modern economic development. The presentation will introduce the various actors, their conflicting interests and strategies and highlight the different methods of policy implementation. Finally it will be discussed how the different governance processes are integrated into a regional development concept.

## Inequitable Accessibility in Health Care Services: Service mechanism and Urban Poor of Delhi

*Pragya Tiwari gupta (International Institue of Health Management Research)*

Theme of the Paper- India has been witnessing fast urbanisation since last decade. The urban population of India which is approximately 285 million people is estimated to reach 534 million by 2026. Percentage decadal growth in urban areas was 31.2% while in rural areas it was only 17.9% between 1991-2001. Delhi has a distinct status if we look at the statistics available on the growth of the city. While Delhi did not even feature in the top 30 cities of the world in 1950, it is now the world's second largest. Between 2000 and 2005, Delhi leapfrogged over Mumbai to become India's largest urban agglomeration. Mumbai, which was the 17th largest city in 1950 will go from the world's 4th to 3rd largest, overtaking Sao Paulo, over the next five years. The case of Delhi becomes even more absorbing after finding that the share of urban poor (15.7%) is also very high and estimates of consumption and expenditure in 2004-05 has recorded that 2.30 million people live below poverty line in Delhi. The ever increasing number of populace has been taking serious toll over the infrastructure and deteriorating health condition in the city. Equity is the buzz word both in the health mission statement where Equity stands as an independent goal. This paper tries to find the demand side of the health service requirement vis a vis the availability of the health services in the area. After the collection of the information by means of secondary data and primary survey the information is the interpolated spatially and analysed. Objective of the paper- The case of poor urban residence of Delhi therefore has become central theme for policy makers. Primarily this paper aims to see the urbanisation pattern in Delhi, urban poor in the city and their accessibility (Demand Side) and the availability of existing health resources (supply side), assessment of the Gap in the health services by plotting the accessibility (using ARC-GIS) on the selected study area. Method and research area- The data source for the present paper has taken from the recent Census publication and Delhi state Health society and small survey in one of the old rehabilitated slum area of North East Delhi. ARC-GIS is the software used for the accessibility analysis where WHO recommended tool AccesMod is also used to find out the Geographical accessibility of types of health care under the Plan in one of the selected study district. Conclusion- There is huge supply gap assessing the existing health facilities. And what came out from the research that not only the distance but time also one of the major constraint in health seeking behaviour. The paper divulge some of the major policy reviews which may be considered while planning physical health facilities and understanding people's perspective too while evaluating accessibility as categorised by Penchansky and Thomas (1984).

## C08.13-06 - Governing development in regions, cities and rural communities 3

*Chair: Jan Bucek, Andrew Ryder, Pushkar K. Pradhan*

### **Southeast European World Heritage cities in post-socialism – an analysis of governance and heritage management in Gjirokaštër (Albania)**

*Matthias Bickert (Universität Bamberg)*

Since the beginning of the so called 'third wave' of transition (Huntington 1991) southeast Europe is undergoing a deep economic, political and social restructuring. The region is in a specific state of transition, where the absence of vital civil society and political culture are major constraints for a successful consolidation of democracy. Especially Albania's recent development shows a stress field of extremes. After the beginning of the transition in 1991, civil-war like conditions in 1996/97 caused a setback from the achieved developments. Today, the country seems to be on the fast-track of economic growth. Those transitional socio-economic 'disruptions', as described e.g. by Hartke and Nitz, can be observed best in cultural landscapes. These influences leave deep traces in the dynamic development of Albania's urban settlements. Post-socialist phenomena of transition, such as high rates of regional and international migration, informal building activities and a little assertive state have a fatal impact on historic town centres. On the one hand many heritage towns have to deal with vacant, destroyed or collapsed heritage buildings. On the other hand especially for peripheral, medium-sized towns such as Gjirokastra the UNESCO World Heritage status causes a disproportional growth of publicity and therefore implies great potential for development. Stakeholders on every level of cultural governance from international to local are playing their own roles in governing a post-socialist World Heritage city. Many projects of different scales were and are being processed in southeast Europe, but dysfunctional political structures weaken the potential of historic town centres. For example the knowledge about official conservation constitutions and a vital international networking is usually underdeveloped. Furthermore the communication not only between the policy institutions themselves but also between the citizens and the cultural governance is a missing link. Fragile democratic structures, high rates of corruption and a weak civil society, whose needs are not involved in political decisions, show a lack of internal cooperation. For this topic the city of Gjirokaštër is good example of a medium-sized World Heritage city, whose potential is highly endangered by those problems. The loss of its World Heritage status therefore is at hand. To gain empirical data from both stakeholders - cultural governance and population -, a mix of different methods of geographical research are the key for understanding and improving the development process of World Heritage cities in southeast Europe. Qualitative expert interviews on the government level combined with the results from a survey of the citizen side can demonstrate the big variety of internal issues. Keywords: cultural governance, Albania, South-East Europe, UNESCO World Heritage

### **Politics of the built environment transformation in a post-socialist city**

*Pavel Šuška (Slovak Academy of Sciences)*

Years after 1989, built environment is among the spheres of Central and Eastern European cities most significantly affected by post-socialist transitions. Although this might seem inevitable as the social settings producing urban forms changed dramatically, the political context of the urban built environment transformation provides an interesting area for geographical inquiry. The city of Bratislava, the capital of Slovakia, gives an example of how the 1989 agenda of democracy and participation have been just scarcely met in particular areas. This paper gives a relational analysis of urban governance, focusing particularly on informal groups and NGOs in Bratislava advocating the conservation agenda by promoting the symbolical value of place and opposing large-scale development initiatives. It explores how during the last two decades, these preservationists acted in and affected local political opportunity structure, and thus participated in governance shiftings.

### **Suburbanization during the period of systemic transformation – case study of Lublin**

*Mariola Ferenc (Polish Academy of Sciences)*

Changes taking place in Europe at the turn of XX and XXI century affect on number planes of reality at economic, social and political way. The processes of democratization and globalization have changed both external and internal conditions of development of countries of the former socialist bloc. Economic processes of investment, employment, incomes are in the process of concentration, while the distribution of population and private construction investments become a freezing or deconcentration process. Official statistics do not reveal the size of migration in the suburban areas due to lack of required to register. The subject of study are transformations in the rural areas adjacent to Lublin after 1989. Author focus on multi-functionality and socio-economic opportunity in the countryside. The issues have been analyzed based on land use changes, statistics for the construction of houses and social statistics. The main reason to analyzing the space structure in the Lublin area is to determine the direction and pace of suburbanization in municipalities adjacent to Lublin, distinction factors and motives of population movements to the suburbs, complain rural-urban interaction and multifunctionality of land use. Suburbanization, that we can observe in the countryside has a huge impact on the quality of life. Housing development over the years was accompanied by confusion in planning documents and the law. Changes in regulations on land use in 1994 and 2003 in Poland additionally deepened the negative situation. Local authorities failed to control the spontaneous process of suburbanization, which adversely affected not only the spatial structure of municipalities, but also on local relationship, landscape and the former urban systems. The result are long-term problems associated with incompatibility rural areas to support a growing number of residents, such as failure of the social and technical infrastructure. Municipalities are trying to make their offer (lower property taxes, offer

home and garden, proximity to the city, but also to nature) favored the influx of investors because of the benefits that flow from this title to the budget. The conclusions reached contribute to the expansion of knowledge about the development of Lublin' suburban area will affect the planning decisions of local government units. There is no holistic concept of spatial development of municipalities located in the suburban area, the current activities are based mainly on local land use plans and studies of the determinants of the 90s. It is necessary to coordinate the plans of cities and municipalities comprising the suburban area.

### **A "new layer" consumer culture: A study on the "new class C" in the city of São Paulo.**

*Luiz Alberto Silva de Souza (Faculdade Paulista de Pesquisa e Ensino Superior)*

Researchers in the field of geomarketing and professionals linked to the consumer sector, has observed that entrepreneurs, manufacturers and the Government itself, are currently a policy of expansion of opportunities and possibility of buying seeking to attain all layers of consumers, through funding and tax incentives as the "IPI reduced" and increasingly interest rates low. We noted then that the consumer market in the city of São Paulo has obtained substantial growth compared to previous seasons. Even in times of crisis as the world currently lives, studies show that consumption continues to grow, especially in emerging metropolises like São Paulo, as well as in other Latin American cities and countries belonging to the BRIC 's. The high-growth sector in Brazil, has as its principal cause an increase in the purchasing power of individuals involved and to standardize the consumption trend, especially in the last decade, already in the era of globalisation. The good economic momentum observed in the Brazilian economy and the various trends of consumption of movable and immovable property, became part of the Brazilian consumer preference, what changed not only the consumption habits, as created new specialities for offering these products. According to the IBGE (Brazilian Institute of Geography and Estatíticc), Brazil has a portion of consumers denominated "new class C", and that already represented 52% of Brazilian population in 2010. This new consumer layer reached in recent 5 years an exponential growth that gave him prominence. Such growth took place mostly through trade expansion with the opening of new markets for Brazilian products, reducing unemployment and better job training conquered by democratic access to University, supported and funded by various government programs. The present study aims to demonstrate how emerges the so-called "new class C" and the urban spacialities configuration created by means of this consumers. The initial Hypothesis is that the emergence of this "new class C", which shows so demanding on time consuming as consumers greater purchasing power, is related to socio-governmental policies and associated with the advent of globalization, which produces new consumption habits especially in inhabitants of large cities as São Paulo. We will use as theoretical-methodological studies reference related to consumption, globalisation and

an in-depth survey on the implementation of government policies over the past 15 years, a period that coincides with the creation of the 'plano real'.

## C08.13-07 - Governing development in regions, cities and rural communities 4

*Chair: Jan Bucek, Andrew Ryder, Pushkar K. Pradhan*

### **Social order and economic upheaval in Indian rural community: Evidences from village festivals in Madurai District, Tamil Nadu, India**

*Keiko Sato (Kyoto University)*

### **Bioenergy for sustainable development in developing countries – A Jiangsu perspective**

*Kesheng Shu (University of Hamburg), Jürgen Scheffran (University of Hamburg), Uwe Schneider*

The use of biomass to produce bioenergy for a wide range of energy services and to produce biomaterials as substitutes for petro-chemical based goods is an integrating response to several global problems including climate change, fossil fuels shortage and so on. Out of this, bioenergy has gained a rapid growth in the past decades. However, more people start to concern about its negative impacts on the environment, land use, water resources and food security. In addition, the development path of bioenergy displays differently between developed countries and developing countries but the existed researches for developing countries are insufficient. In order to strengthen the benefits and reduce the risks of bioenergy in developing countries, this paper plans to design a tailored sustainable development approach of bioenergy for China. This paper points out that the construction of bioenergy industry is an effective and feasible method for the developing countries. After analyzes the particular characters of Jiangsu province, an eastern coastal province in China, we integrates the bioenergy life cycle into local situation and defines the two layers of stakeholders in the bioenergy industry. The basic layer of actors is central stakeholders including farmers or forest owners, haulers, and energy industry or plant operators. It is the supply chain of bioenergy, whose behavior determines the success or failure of the bioenergy industry. The upper layer of actors named peripheral stakeholders, involving governments, non-governmental organizations and research institutes, residents and local communities, energy end users and the general public, is the aggregation of actors who are impacted by bioenergy production but in turn also affect the supply chain, positively or negatively. Furthermore, this paper discusses the communication mechanism between these two groups. That is the challenges and benefits in social, economic and environment aspects induced by bioenergy projects execution. In other words, the benefits are the positive impacts of bioenergy project operations on periphery stakeholders. Through the benefit sharing mechanism and positive externality, central stakeholders can persuade the periphery ones to execute the projects together. Simultaneously, the challenges are the negative

impacts or externalities on periphery stakeholders or the problems proposed by them to which the central stakeholders have to face. These factors together compose the internal structure of bioenergy industry. As to the external structure of bioenergy industry, this paper draws a framework picture to demonstrate the bioenergy-centered industrial cluster. Through literature research from empirical aspect, we think three critical issues in the process of industrial cluster construction need to be further considered: the selection of feedstock, the innovation of supply chain infrastructure and the integration of energy market.

### **Intra- and Intercommunal disparities of communal infrastructure in rural Vietnam – A multilevel analysis based on the Vietnamese Housing and Living Standard Survey 2008**

*Antje Wegner (Karlsruhe Institute of Technology)*

Ensuring sustainable access to safe drinking water and waste water treatment for the population in developing countries is still a challenging task although in south-east Asia the majority of countries is on track to meet the Millennium Development Goals. For instance in sum 94% of the Vietnamese population had access to improved drinking water supply in 2008, but there are still large disparities between the quality of water supply in urban and rural areas, where centralized water supply is often lacking. Aggregated statistical data as published by the WHO Joint Monitoring Programme or in the Living Standard Survey of the Governmental Statistics Office of Vietnam is useful to get an overview and provides a rough quantification, but hardly reflects disparities on lower levels of spatial aggregation and fails to identify their potential causes. Based on household and communal data of the Vietnamese Housing and Living Standard Survey (VHLSS) 2008 the presentation examines how household and communal characteristics influence water supply and sanitation of households. Whereas on the household level sociodemographic and -economic characteristics of a household are considered, the communal level variables encompass factors like the participation in governmental programmes or projects initiated by non-governmental or supranational institutions, the geographical setting in terms of accessibility of the commune, the spatial distance to larger towns or the availability of communal infrastructure and public utilities. Since in Vietnam commune leading cadres have a strong impact on the development of rural areas the analysis additionally aims at revealing, how the quality of commune leading cadres (e.g. in terms of their educational and professional background or work experience) effects water supply and sanitation in the respective communes. The multilevel approach allows to separate the contribution of household and communal level effects to overall variance and to model interactions between both levels of analysis. Thus multilevel analysis proves to be a powerful tool to analyse the impact of programmes, policies or spatial effects. Finally the presentation discusses advantages and requirements of multilevel analysis based on the empirical findings from the VHLSS 2008.



## Aging in small paulista municipalities (< 10 000 inhabitants) means better quality of life? The role of local administrations – 1980 - 2010

*Odeibler Guidugli (University of São Paulo)*

Does the concentration of the elderly occur more often in big cities? Do the small towns signify good quality of living? Do the elderly who live in them have quality of living superior to the one of those who live in large cities? The data does not enable us to give positive answers to these questions. The term urban is widely used and have been focused on the metropolises and megalopolises, showing the insufficiency of studies and, in the marginalization of the small towns and of the tiny ones. However, they have demographic and spatial significance. How to plan the development, without considering them? The research tried to answer the questions mentioned for the small municipalities (< 10000 inhab.) of the State of S.Paulo, between 1980-2010. In 1980 there were 271 municipalities, 208 had been researched. The others, in 2010, had lost the demographic delimitation. In 1980, they represented 33% of the universe of the state and means only 3.6% of the population. In the census of 2010 the participation decreased to 2.6%. This data contrasted with the 54 522 km<sup>2</sup> of the area, or 22.0% of the total. Three integrated parts compose the study: first one, of theoretical/methodological nature evaluating the meaning of the geographic studies, focused on the small towns. Developed, dominantly, in national and international journals, the results have revealed a quantitative shortage and the non-importance of this category of towns and the marginalization of qualitative problems involving debates inside of the science, not only for the conceptualization of town, but in the characterization of the ones considered tiny ones. The second one focused on the historical and demographic dynamics of the past and of nowadays. Which processes led to their appearing and their remaining small, in the most developed state of the country? How to find out their future considering the process of globalization? Demographically relevant questions were observed: the comprehension of their reductions (negative growths), being that, of the total 32.2% registered absolute decrease; the role of the migratory processes and, the accentuated aging - the total population grew 18.5% while the elderly one - 60 years and over - 139%. In the end, the study focused the integrated evaluation of the municipalities from the critical use of different indexes and indicators: Municipal Human development Index; Paulista Index of Social Vulnerability and Futurity Index. The MHDl registered the decrease of 37 (17.8%) and only 15, classified at the high level. Finally it was verified the theoretical methodological insufficiency of the studies and the predominance of a quantitative profile. Demographically the challenge of aging in a society with demographic and economic decrease. Finally, the analysis of the data have made connections and disconnections come out composing a set of challenges in order to find out the necessary alternatives of development for these towns.



## C08.13-08 - Governing development in regions, cities and rural communities 5

*Chair: Jan Bucek, Andrew Ryder, Pushkar K. Pradhan*

### **Military territorial structures of Latvian borderland: Comparison past and contemporary situation**

*Janis Balodis (University of Latvia)*

This paper is written of new regional development policy which is related with military geographical aspects. Latvian Armed forces are dividend separately in all country. In literature is called military training areas. Soviet regime in the Baltic Sea and Riga bay coast area was 'closed zone'. This zone was 1,25 km wide and very strictly guarded. Other Latvian borderlands (inland) were more secure, and that's explenation why military structures were more developed in coast borderland. In contemporary situation of Latvian military teritorial structure is unregulated because terms and legislations of military regions of Latvia are weak legal entry. Military regions is fundamental research object of military geography. Latvian Ministry of Defence now create new administrative policy of military teritorial structure - military regions. There are three practical indispensibilities why this legislation is important. Significance is the obligation to the respect the distinction between military objectives and non military objects as well as between persons participating in the hostilities and members of the civilian population remains a fundemental principle of the international law in force. 1) It is important for local authorities whose made teritorial planning and development programmes for local community, who lives in potential military regions. 2) Environmental protection suggest that an integrated network of protected areas can made administrative borders of military regions. There has focused the Soviet state's military interests and civilian movement was restricted. Both this fact and the power of economic development model, which eliminated the collective farms, estates and developed centers, forced residents of the seaside villages to move to other areas of life. Now this is a inovation basement of regional development in coastal and inland borderlands. Polygon was used for practicing shooting from handguns, cannons and missile installations; battle simulations with tanks, helicopters and planes were also carried out. The existence of the polygon was top secret and to maintain ultimate secrecy, false name was used in legal documents. Latvian Ministry of Defence cooperation with Latvian Ministry of Regional development made new teritorial cohesion. It is a cross - border cooperation where border regions have been established with the aim to lower the state borders and to promote economic development in border areas. This presentation will structinize the current borderland economical development management. Key topics: borderlands, military geography, community management, territorial legislation, cohesion

### **Indigenous Migration and Development: Oaxaca and Chiapas in a Comparative Perspective.**

*Sascha Krannich (Princeton University)*

The two most Southern states of Mexico are relatively similar when it comes to economic and social underdevelopment of their communities, but they are fundamentally different in the migration patterns of their people in the US. Driven by poverty and human right violations, Oaxacan migration to the US became a mass phenomenon during the Bracero program in the early 1960s, whereas Chiapanecan migration to the US became a mass phenomenon just in the last 20 years. In this regard, Oaxacan migrants organize in higher numbers and for more years than Chiapanecan ones in the US. Thereby, indigenous people represent an important amount of migrants from both states. Most of them are Mixtecos and Zapotecos emigrated from Oaxaca, and Tzeltales and Tzotziles emigrated from Chiapas. While one can find well-established indigenous migrant organizations from Oaxaca in California, indigenous migrant organizations from Chiapas mushroom just recently all over the US. At this stage, after years of ignorance and distrust, the Oaxacan and Chiapanecan governments try to reach out to their indigenous diasporas in the US. In doing so, they have vital interests in collaborating with these migrant organizations to develop their underdeveloped indigenous municipalities. Some indigenous migrant organizations seem very excited to cooperate with their home state governments, whereas others react reluctant. Nevertheless, most migrant organizations, especially hometown organizations, have a deep interest in the development of their home states and home municipalities. This leads inevitably to the question, which role indigenous Oaxacan and Chiapanecan migrant organizations play in the development process of their home states? To answer that question, I will focus on indigenous migrant organizations with their transnational networks, forms of identity, specific relationships to their home governments, and their social and public development projects in selected indigenous communities in Oaxaca and Chiapas. At this comparison, fundamental differences between indigenous migrant organizations and their various development efforts in home regions become evident.

### **Dealing with the Requirement of Producing Exploitable Knowledge – Differences Between Social And Natural Sciences. Case Study in an Argentinean Peripheral Research Institute**

*Angelika Hubl (Universität Frankfurt)*

For some time past there is a global debate about today's mission of universities and research institutions as providers of education, research and knowledge transfer (third mission). Especially the future orientation of these institutions is hard debated. They have to justify themselves as providers of social benefits for society and economy. Due to globalization this debate was spread from Europe and the United States to emerging and developing countries in the global south. As one of Latin America's economically leading

countries Argentina as well takes place in the worldwide discussion. Argentina is a very centralistic state. Therefore the offer and reputation of universities and research institutions is very centralistic as well. That's why especially institutions in rural areas have to justify themselves exceedingly and have to struggle for reputation and funding. The case study will focus on a research institute and its close by university in the north-east of Argentina, which is a region of extremes and contrasts. Especially in population aspects it is one of the regions of Argentina with the highest social inequality and very diverse habitants like little farmers, indigenous people and marginalized people. Since this region is so peripheral, the research institutes' task to vindicate itself is very important. The goal of the case study is to examine how the knowledge transfer at the Argentinean research institute CONICET Tucumán works, how the institution and the researchers deal with the requirement of producing exploitable knowledge and what are thereby the differences between social and natural sciences. The field studies will be carried out between February 2012 and April 2012 at CONICET Tucumán. As method semi-structured interviews with the management of the CONICET Tucumán, the heads of the various research groups, and particularly with selected scientists of innovative research areas in the sense of knowledge transfer will be conducted. The interviews will be evaluated interpretative-reductively. The hypothesis that there are significant differences between social and natural sciences in dealing with the requirement of producing exploitable knowledge will be examined during the field study and will be extended with new insights about the role of research areas for knowledge transfer and adaption in this institute and in general. Therefore it will be an important Latin American case study as an example for dealing with the requirement of producing exploitable knowledge in peripheral regions. Results will be available in June and will be ready to be presented in my master's thesis and at ICG in August 2012.

### **Regional policy and regional disparities – Institutionalisation of spatial development in Serbia with focus on the Autonomous Province of Vojvodina**

*Andreas Winkler (University of Bamberg), Zoltan Takac (Scientific Association for Hungarology Research Subotica)*

Serbia's delayed transition into a market economy and Serbia's institutional transition into a highly centralized state intensified old and created new regional disparities. Spatial inequality - in a socio-economic sense - has to be seen as a permanent development problem of the Republic of Serbia. At the same time, the Serbian government and state bureaucracy is also showing inequality and asymmetry in regional governance and within their spatial development policies. The traditional polarisation picture of socio-economic differences between north and south, urban and rural as well as central and peripheral areas is still accurate. But - according to this study - the distribution of the spatial disparities is getting more and more unclear and fragmented. In other words, whole regions can't be regarded as favoured or undeveloped areas anymore. Within the newly defined statistical NUTS regions in Serbia, spatial differences are huge and are showing

strong dynamics. Simultaneously, after years of neglect of the regional level, a new institutionalisation of the regional policy has been implemented by the Serbian state; mainly forced by European integration ambitions. Since 2007 new organisations, institutions and agencies for regional development have been obliged to carry out tasks of former central state bodies. But this new approach to underdeveloped areas is still bearing elements of neglect of the regional level and system inefficiency of former times. Operations are still centralised and highly politicised, which is evident in the example of the Vojvodina region. The complex regional institutions of the Autonomous Province of Vojvodina can be regarded as a model for a future regionalisation of the whole state. Moreover, the province remained a whole, unified NUTS 2 region, when the regulations on NUTS were finally put in a legal framework in 2010. To put it in a nutshell, this paper summarizes the new Serbian regional policy with a focus on the Province of Vojvodina. It depicts the new institutions and shows with a quantitative approach of spatial analysis, the socio-economic differentiation within the newly installed NUTS regions in Serbia. The paper closes with the identified institutional problems and some institutional requirements of planning within the inhomogeneous statistical units.

## C08.13-09 - Innovations in public sector - public administration reforms, public sector reorganizations, local finance and progress in planning

*Chair: Eran Razin, Xiaohong Zhang*

### Fiscal Strategies of Russian Regions and Municipalities

*Vladimir Klimanov (Institute for Public Finance Reform), Anna Mikhaylova (Institute for Public Finance Reform)*

The paper is devoted to analysis of first experience of introducing long-term fiscal planning on sub-national level in Russia. Theoretically, development of any public strategies, at both federal and local levels, should be closely linked to the expansion of budget planning. But in practice, there is lack of experience of introduction of any fiscal strategy in Russian regions and municipalities. Besides, during last years, the reform of intergovernmental fiscal relations in Russia has solved some problems. For example, it has led to specification and expansion of responsibilities of regional and municipal authorities of the subjects of the Russian Federation and municipal formations. On the one hand, federal and regional finance authorities were offered a complex reform program for the budget system in the 2000s. Measures for reforming public finance at the regional and municipal levels were implemented on a systemic basis. Successful implementation of the first steps predetermined need to strengthen the results achieved and identified new priorities for further reform efforts. On the other hand, more than 60 subjects of the Russian Federation (among 83 ones) and several dozens of cities adopted and approved their own long-term strategies for economic development during the 2000s, in the pre-crisis years. Further steps to improve the management of regional and municipal finances will largely relate to readiness for adaptation of the budgetary innovations offered at the federal level. Thus, the most important financial innovation in Russia in the near future will be the formation of so-called program budget implementation and expansion of program-oriented principle of organization of public administration. In addition, in the presence of debt and budget deficits in the region or city debt management strategy as an integral part of the budget strategy should create conditions to ensure that minimize the cost of borrowed funds. The implementation of the budget strategy will involve increasing need for justification of strategic decisions and effective use of budget resources and the need to consider long-term budget constraints require the formation of reasonable and realistic programs to address the priorities of the territory. In general, while improving coordination of strategic and long-term fiscal planning budget policies at regional or local level, should be focused on the strategic objectives of the economic and social development of the territory.

### The role of central state in regional self-government building in post-socialist conditions: The case of Slovakia

*Jan Bucek (Comenius University)*

Among various changes that introduced many post-socialist countries, we can find those concerning regional government. Its introduction as new level government, or as adaptation of older regional institutional environment to new purposes, it has been strongly influenced by central state. This paper focuses on central state - regional self-government relations in Slovakia, within East Central European context. It has been introduced after decade of attempts in 2002. We discuss procedures and processes of its development in relation to central state approaches. Regional self-governments established their institutions, and had been adapted to execution of decentralised powers. Later it obtained more fiscal autonomy within the processes of fiscal decentralisation. Focusing in details predominantly on powers and finances of the regional self government, we document their weaker position. This process has been negatively influenced by the consequences of economic and public debt crisis. Until now, regional self-government has been less successful in rapid and full scale strengthening of its position with Slovak system of government. Despite relative successes, it is still less powerful level of the government. It can be perceived more as developing central state based project and not as sufficiently autonomous level of government. It is still lacking extensive own initiative and stronger position in intergovernmental relations. Besides relatively weaker position towards central state, it is also less well established partner to other societal actors, as well as to citizens. Part of the problem caused political and technocratic delineation of its borders by central state and missing regional identity in respect to such territorial units. It has limited and decelerated bottom up processes and stronger identification with new regions.

### The regional adoption of the European Growth Plan for coming out of the crisis: The challenging translation of the Europe 2020 Strategy to the regional scale

*Rubén Camilo Lois-González (Universidade de Santiago de Compostela), Carlos Macía (Universidade de Santiago de Compostela), Alejandra Feal Pérez (Universidade de Santiago de Compostela), Valerià Paül (Universidade de Santiago de Compostela)*

Since the outbreak of the global economic and financial crisis, European Union (EU) institutions have responded to the new, and mostly unexpected, critical situation on a broader scale. In particular, the European Commission launched the 'Europe 2020 Strategy' (EU2020S) that was finally adopted in June 2010. The EU2020S fundamentally constitutes a growth plan for the decade 2010-2020 that aims for EU recovery from the current ongoing crisis. Structurally, the EU2020S consists of three mutually reinforcing priorities: smart growth, sustainable growth and inclusive growth. Derived from these

three pillars for growth, seven particular flagship initiatives are proposed, each one including specific actions. In addition, the EU2020S contains a list of numerical goals (so-called headline targets) that set specific figures for measuring its purposes. The EU2020S is the common framework that each one of the member states of the EU is committed to adapt to the respective national situations by means of the Annual Growth Survey. In this document each member state establishes its own national targets developing the EU headline targets contained in the EU2020S. Beyond this national adoption, the EU2020S loses spatial scope. Indeed this is the point of departure of this paper: how the EU2020S can be understood at the regional scale. In other words, while the growth scheme for the European and the national levels is clear, it is not obvious how this plan can work in regions. In order to provide answers to this problem, two approaches are considered in the paper. First of all, the headline targets and other numerical goals contained in the flagship initiatives are mapped for all the EU regions. This provides a picture on the uneven geographies of the EU2020S implementation, including a specific consideration of the "problematic" types of regions (outermost, rural, border regions, etc.) as defined by the EU. Secondly, some strategic reflections on the possible ways to implement the EU2020S at the regional scale are raised. These strategies are basically devoted to those regions empowered in political terms (federal states or regions with devolved governments). To sum up, although apparently economic growth and development strategies seem to be only in hands of the EU and member state governments, this paper reflects on these issues at the regional scale. This is consistent with the EU2020S itself, which claims that "It is essential that the benefits of economic growth spread to all parts of the Union, including its outermost regions, thus strengthening territorial cohesion". This paper is prepared as part of the research project entitled "Spatial Indicators for a 'Europe 2020' Territorial Analysis" (SIESTA), funded by the ESPON 2013 (Applied Research 2013/1/18) and partly financed by the European Regional Development Fund.

### **Inter-local fiscal transfer and tourism management in Bali: How cultural thickness triggers regional collaborative governance**

*Luh K. Katherina (Institut Teknologi Bandung/ Akatiga), Delik Hudalah (University of Groningen)*

Intercity networking is increasingly suggested as an alternative form of regional governance in the face of globalizing world and declining influence of the nation state. However, inter-local governmental networking is rarely practiced in Indonesia, partly due to uncontrolled presence of local egoism and the structural constraints of decentralization policies. This paper explores the rare success story of intercity networking in Bali, which has been consistently practiced since 1972. The networking is manifested in inter-local fiscal transfer as means of sustaining the island's cultural tourism industry. With the facilitation of the province, the municipalities and districts receiving high revenues from the tourism industry have long agreed to transfer parts of their revenues to their

neighbors experiencing fiscal deficit from tourism. The objective of this paper is to identify the process, the challenges, and the factors influencing the success of this intercity networking. Our investigation revealed that the success of the inter-city networking in Bali is influenced by the geographical proximity among the municipalities and districts as compared to other regions in Indonesia. The proximity has increased dependency among the regions because while tourist attractions spread across the island, the hotel, restaurants and other facilities are concentrated only in designated areas. This economic dependency is reinforced by the pervasive role of Balinese culture; the culture that belongs not to particular municipalities but to the whole Island community. The local leaders had long perceived that the benefits gained from the existence of this culture should be enjoyed by all people of Bali. This cultural thickness has been responsible for the building of trust between local governments in Bali. In such a cultural-based society, cooperation is not necessarily based on sound legal basis but the mutual agreement among the leaders.



C08.14

# Geography of the Global Information Society

## C08.14-01 - Global Information Society: Mobility, Society and Network Connectivity 1

*Chair: Mark Wilson, Maria Paradiso*

### Daily spatial mobilities: Nature, features and dimensions

*Aharon Kellerman (University of Haifa)*

This presentation intends to introduce the new book entitled *Daily Spatial Mobilities: Corporeal and Virtual* (Ashgate 2012) by its author. Daily spatial mobilities are typified by several aspects: they are two-way mobilities; frequently performed; constituting a major element of our daily routine lives; and they are inclusive of both corporeal and/or virtual mobilities. Major daily movements include commuting, shopping, social ties, information, banking, news, studies, business meetings, etc. The roots for daily spatial mobilities and their nature are varied, and the needs and triggers for their performance include psychological, geographical and political perspectives. Of special interest in this regard are the social roots and norms for personal mobility and for personal autonomy as expressed in daily spatial mobilities. The exploration of the various roots for daily spatial mobilities permits to further examine potential mobilities as a mental and preparatory phase for eventual practiced ones. An additional element of the nature of daily spatial mobilities is the functional nature of these mobilities, which is highlighted through a discussion of the question whether terrestrial, virtual and aerial mobilities constitute a joint mobility category or whether they are rather three distinct ones. Another dimension of daily spatial mobilities relates to the modes of daily spatial mobilities, highlighting separately the nature and dimensions of terrestrial, virtual and aerial daily mobilities. The understanding of daily spatial mobilities requires not only to explore their very identity and nature, but also to discuss their spatial implications, notably three major ones: urban spatial reorganization in the information age; mobility terminals, namely central railway and bus stations, as well as airport terminals, notably international ones; and, finally, global locational opportunities for individuals potentially becoming possible by daily virtual mobilities through the Internet, mainly for online shopping, e-learning, home-based business/work, and social networking.

### Development of the network-type career education program using ICT: A case of Housuu-juku in Saga, Japan

*Kenji Hashimoto (Waseda University)*

It is one of the important roles expected from ICTs to offer a both directions type educational program between remote places. Housuu-juku is one of the NPOs which perform career education in Saga Prefecture in Kyushu, and it has furthered development of the network type educational program using ICTs, such as a system which distributes a lecture from the Tokyo metropolitan area, and a system by which a participant performs

exchange of opinions on on-line. Now, in Japan, same NPOs come to be established all over the country, and Housuu-juku is regarded as those innovators. This report would like to explain the educational program which Housuu-juku developed from the viewpoint of advanced use of ICTs, and analyze about the influence which these programs had on the area or regional economies.

### Social relations, the internet and decisions to move among urban young adults in Sweden

*Bertil Vilhelmson (University of Gothenburg), Eva Thulin (University of Gothenburg)*

The Internet and social media encourage distant personal contact and social interaction. Social networks also offer important support when life decisions are made, for example whether to move elsewhere or to stay. Also, social factors (related to family and friends) are important motives for migration and choice of destination. Drawing on these premises, this paper examines to what extent the Internet is perceived to influence the migration decision process. It is based on data from a 2009 survey of 750 young adults in Sweden and twenty four in-depth interviews. Results show that the Internet supports individuals' plans to move as well as to stay. This split is further analyzed when several factors are taken into account: Internet-based social contact intensity, recent migration experiences, future migration plans and certain demographic, socio-economic and geographical factors. Key words Internet, social contact, interregional migration, migration plans, migration experience, survey, interviews, young adults, Sweden

### Global Urban Analysis: Exploring the link between demographics, economics, and network connectivity among the leading world cities

*Douglas Sathler (UFVJM), Gilvan Guedes (Vale do Rio Doce University)*

Globalization has deeply transformed the way people, and as a consequence, urban areas connect with each other. The advance in information and communication technology, including social media, mobile gadgets, and faster and cheaper ways of transport has redefined the way individuals interact. Although urban centralities are still characterized by the stock of material power, financial and informational flows reshaped the time-space dimension of urban centralities, allowing their citizens to establish space-free and real-time interactions with other citizens worldwide. As a consequence, the Global Urban Network has been more integrated and experienced a recent proliferation of centralities able to mediate the various types of material and immaterial flows in both developed and developing countries. Despite the long theoretical tradition on the relevance of information in explaining the ranking of leading cities, was not until recent that empirical support started to emerge. Using data on GDP, population size and network connectivity indicators applied to the latent class model, this study aims to contribute to the literature on global urban analysis by bringing empirical evidence on the



heterogeneity among the leading world cities. The model identified six types of urban areas with markedly different characteristics: Marginal Connectivity Centers, Integrated Centers, Emerging Centers, Large Emerging Centers, Consolidated Centers and Large Consolidated Centers. The spatial distribution of these classes assumes a defined spatial pattern around the globe, suggesting that although GDP is still relevant in explaining urban ranking, the role of immaterial flows, such as the network connectivity indicators used, is key to better qualify how different same-size, equally rich cities are in a reshaped, and increasingly immaterial world.

## C08.14-02 - Global Information Society: ICT, Knowledge & Media 2

*Chair: Mark Wilson, Maria Paradiso*

### Knowledge city and digital development. The case of Montpellier, France.

*Henry Bakis (University Montpellier), Alexandre Schon (University Montpellier)*

Montpellier Metropolitan Area, located in County Languedoc-Roussillon, is in a context of high demographical growth. In the mid 60s, the town's selection as the County's Capital city determined the implantation of numerous public research centers in the Health and the Agronomy sectors in particular. At the same time, the implantation of an IBM factory, and the settlement of many IBM subcontractors added a specialization in the field of electronics, data processing and communication. Nowadays, Montpellier has a high Scientific and intellectual potential. The Region Languedoc-Roussillon comes second after ile-de-France (Paris county) in the number of innovative company's settling yearly. Some innovative companies are driven in their creation by Business Incubators under a Public supervision. The height French city in terms of population size, Montpellier is number four (after Paris, Grenoble, and Toulouse) in terms of strategic employment concentration (within the high tertiary sector) which guarantees good conditions for the implantation of innovative companies (highly qualified workforce is available). This communication will introduce the main specialties of the Montpellier Metropolitan Area (medicine, agronomy, communication), and highlight the recent development of numerical infrastructures (Pegase and L3LR. mainly) within the Agglomeration in relation with places of services activities and innovatives parks. Key Words - Numerical infrastructures. Internet. Pegase. Num'hérault. L3LR. Opérateurs. Haut débit. Montpellier. Region Languedoc-Roussillon. Département de l'Hérault. Innovative companies. Technoparc.

### Innovation and technology strategies, growth and regionality in Finland. Reflecting on period 2011–2015.

*Tommi Inkinen (University of Helsinki)*

This paper examines theories and practices of innovation and technology policy in Finland. A starting point may be detected to the classical agglomeration theory from where I proceed towards the analysis of innovation creation and economic development traceable back to the ideas of Schumpeter and evolutionary economics. I will consider elements of networking, dispersed production models and location in their relation to innovation policy in Finland. I will discuss the empirical case of the current (latest) Finnish innovation and technology policy documentation. The paper provides a critical view on how regional development and spatial clustering of economic activity are integrated and visible, or non visible, in the policy documentations. The technological development (e.g. cloud services) of the production of immaterial services (and goods) on the internet are

considered. The transferability of and accessibility to information is considerably easier and faster than before the time of the information networks. The strategy guidance of Finnish innovation policy provides an up-to-date view to policymakers' appreciations and beliefs concerning the near future (till 2015) and the role of innovation in economic development. Key words: regional economy, economic geography, innovation, technological development, clusters

### A consideration on the changes of telemedicine users' behaviours by operating the telemedicine system

*Sookyung Park (Sangmyung University), Yuki Hanashima*

Telemedicine may take specialized care to medical care centres in the distance places and restructure the time-space configuration of medical care opportunities. Despite of the rise of the attention toward it, the reconsideration of telemedicine users' behaviours by operating the telemedicine system has been never studied by geographers. In this sense, the purpose of this research is to take a closer look at the question as to how telemedicine influences on the behaviours and trajectories of telemedicine users empirically within the framework of time geography suggested by Hägerstrand. The time-space path, devised by Hägerstrand, shows the movement of an individual in the spatial-temporal environment with the constraints placed on the individual. With this context, by exploring time and space changes in medical care related to telemedicine, we consider not only where an opportunity for medical care is located, but also when it is available more effectively. Under the notion of Hägerstrand, in-depth and open-ended interviews of physicians and patients in Togane general hospital (Japan) were conducted from February and June in 2011 and looked into the comparison of telemedicine users' behaviours between before and after diagnosing via the telemedicine system. And 'Extended Time-Geographic Framework Tools Extension for ArcGIS 9.3', which generates space-time paths from appropriate input data sets and facilitates interactive visualization of space-time paths in a space-time GIS environment, was used. From a perspective of patients' behaviours, telemedicine contributes to the fact that patients can avoid the costs and dangers of transporting patients to external medical institutions. Especially, the changes of waiting times for diagnosis, transportation fee, and transportation methods are outstanding. Considering that most of the patients are chronically ill and elder patients, the telemedicine system is helpful. Besides, there are no considerable changes in time for diagnosis and medical expenses. In addition, physicians as the other telemedicine user could provide core medical treatments to patients with ease and made a profit without any movement. But they have the burden to attend a regular meeting provided by Togane general hospital and spend considerable time. Even though they take the trouble, the participation of the regular meeting is regarded as one of the important activities among them in order to avoid a misdiagnosis and share their opinions or specialized knowledge. Telemedicine can overcome the 'tyranny of distance'; therefore, it improves the unequal geographic distribution of health care resources and



ameliorates inadequate access to health care. According to the results of this research, the range of practical use is limited because telemedicine is regarded as an ancillary method of health care delivery.

### **Technology as a factor of the States' power: the example of the Lybian war**

*Olivier Lefebvre (Consultant)*

Technology as a factor of States' power: the example of the Lybian war. The Lybian war was an example of efficiency of military technology, which was at disposal on the NATO side (the coalition gathered USA, Great Britain and France, mainly). It is not always the case. What are the specific conditions of this war? What are the lessons brought by this war, concerning the military technology as a factor of the States' power? Gadaffi committed three errors, political, diplomatic and strategic. It explains he was won by a coalition made up of three allies: Lybian insurgents, NATO and the United Nations. The political error concerned his own political regime, which was undermined by the revolt of a majority in the population (in particular the Army chose rebellion). The diplomatic error was the international isolation of the Gadaffi's regime, which allowed the United Nations to authorize NATO to support insurgents, because Gadaffi himself announced he will not respect the Human Rights. The strategic error was to neglect the efficiency of military technology used by NATO. Air Power allowed blocking the Lybian troops where they were, destroying their mobility, so the insurgents on the ground were able to win them one after the other. The tactical support by the aircraft of NATO helped them, also. These specific conditions explain the efficiency of military technology (remote sensing satellites, Unmanned Aerial Vehicles, cruise missiles, accurate bombings ...) during this war. Obviously, it is not the same in all the cases (since counter insurgency failed in Irak and Afghanistan). Probably the most powerful countries (USA, European Union, Russia, China) will continue acquiring sophisticated weapons. even, the interest of the Mahanian ideas on Sea Power (and ideas on Air Power) is re-launched. But we have to recall the limits of the efficiency of military technology: - it is very costly, and we are in times of reduction of budgetary expenses - some conditions are required for the military technology to be efficient. The Lybian war allows for a reflection on this topic. In particular, counter insurgency cannot succeed thanks to military technology, only. Also, this technology is easy to use in coastal regions, and is more difficult to use in the heart of continents.

## C08.14-03 - Global Information Society: Urban and Regional Development 3

*Chair: Mark Wilson, Maria Paradiso*

### The transformation towards an information society and its relevance to urban management

*Joana Kowalewski*

The transformation to an information society is reflected in various socially relevant areas. Though there is still no common definition on the knowledge concept, which underlies the information society, trends can be noted that shape this transformation process: technization of different areas of life, growing importance of creative industries, or more generally the knowledge economy and a modified approach to knowledge and its generation (KUEBLER 2004, 2009). A penetration of all social systems is currently visible in broad terms. But for the foreseeable future the different areas (economy, politics, science, education, family, etc.) are not yet fully penetrated. Prerequisite for this would be free access and usage of information and knowledge. A common and accepted "open-source idea" and the repeal of personal or institutional barriers to the use of digital media (Digital Divide) are associated with it (FORSTLEITNER / PAWEL 2007). Under the assumption that there is a penetration of society in this sense, the paper shows the relevance of this transformation to urban planning and management. Initially, the change in the dimensions of economy, society and space are described and in accordance with the basic assumptions their future development is demonstrated. Based on these hypotheses the paper highlights what kinds of questions can arise for urban planning and what solutions seem viable. Already today new approaches following an "open-source logic", which is more open-ended and flexible (e.g. in the field of participation or the use of urban brownfield sites and vacant properties), can be seen. "Open Source" means here not only free access to information and knowledge, but also the involvement and mobilization of knowledge of all relevant groups confronted with the planning process (STOLLORZ 2011; WILLINGER 2011). The paper shows examples of appropriation of spaces, which are novel in the usage and utilization of knowledge and identifies new partnerships between private and public actors.

### Can oases appear in medical desert via information network? The spatiality of health care changing in Japan

*Tsutomu Nakamura (University of Tokyo)*

This presentation examines the ways in which information and communication technology (ICT) is used with a view to improving medical desert for some cases concerning regional medical information networks in the disaster areas, Japan. Geographical research has

estimated the role of information systems as a means of providing public services. As such services involve public funding; accessibility as well as cost-efficient use should be taken into account in their provision. In Japan, each prefecture implements its own regional health care program for the appropriate allocation of medical resources. However, regional disparities in such allocation have not yet been resolved. The Japanese government considers that the function of each medical institution should be defined, medical networks suitable for each type of disease should be constructed to make good use of human resources such as medical professionals and medical equipment, and that medical services should be decided according to the health condition of patients. For this purpose, the development of ICT as an information infrastructure is a matter of great urgency. The existing ICT are developed to process information effectively. However, the role of ICT as an information infrastructure has been spotlighted after the Great East Japan Earthquake. Before the earthquake, the information infrastructure had been built in itself. The earthquake brings about changes in people's awareness that the real world should be restructured via the infrastructure. Because there are many examples that the paper-based health or medication records were washed away by the tsunami, effectiveness of cloud-based electronic health record is attracting attention. The reasons electronic health record have failed to become widespread are (1) high operational costs; (2) a lack of compatibility with other systems; (3) and a lack of doctors' appreciation of cost effectiveness. The presentation illustrates the current conditions and challenges of the development of medical information network in Japan. The survey items are as follows. Why have medical information not been made electronically available via cloud-computing up to now? Why does former paper-based medical information become increasingly digitized recently? How cloud-based electronic health records are being utilized to help the solution for medial desert?

### Regional revitalization by using virtual contents: A case study of Nipponbashi electric shopping street, Osaka

*Takashi Wada (Tokuyama University)*

Recently, many local municipalities and economic organizations make positive efforts to support contents industry and to revitalize local economies by using virtual contents made either by themselves or by content creative companies in Japan. For example, cartoon or animation museums have been built at many cities and many tourists visit them. And many enthusiastic fans of specific works visit the places drawn in the works. This phenomenon is called 'Seichi-Junrei (pilgrimage to holly sites)'. More, the shopping areas, such as Akihabara (Tokyo) and Nipponbashi (Osaka), have developed from electronics quarters to agglomerations of shops dealing with subculture products and services. Nipponbashi electric shopping street once flourished as the 2nd biggest electric shopping district in Japan. But the number of the electronics stores has declined since 1990s because of the bubble recession and advance of major electronics stores around Nipponbashi. As a result, the number of the shops dealing with game software, CDs,

DVDs, books, instruments and hobbies has increased instead of that of electronics stores. For this situation, 19 owners of retail stores established a new company 'Nipponbashi Machizukuri Shinko Co.' to revitalize Nipponbashi electric shopping street in 2004. The company has carried out some unique projects. Those are the event to promote both electronics stores and subculture shops, creation of town map to introduce subculture shops, management of incubation facilities for CG animation authors, support for robot-related industries. And the company created a virtual idol 'Neon and Hikari' to promote Nipponbashi shopping street as a subculture holly site mainly for young people. With the change of stores configuration, Nipponbashi has become a hobby town. The enthusiasts of each hobby (content) usually enjoy their own hobby (content) at home and communicate one another on the Internet (cyberspace), and they visit the shops (real space) dealing with the products they love on holidays. They buy the products at the shops and enjoy communication with salespersons with knowledge of the products. The events held by each shop and the company are great opportunities for the enthusiasts of each hobby (content) to communicate with one another in face to face. Then, they write a diary about their visit to Nipponbashi on the weblog or the twitter they manage, and another enthusiasts make comments on the diary. But the enthusiasts who love different hobbies (contents) rarely communicate with one another. The virtual idol 'Neon and Hikari' and the event 'Nipponbashi street festival' held by the company have become the symbols of Nipponbashi electric shopping street. But they are nothing but symbols. Each enthusiast only enjoys his or her own hobbies (contents) both in real space and cyberspace.

### E-capital in Helsinki Metropolitan Area

*Maria Merisalo (University of Helsinki)*

This paper applies and redefines the concept of electronic capital (e-capital). It refers to individual willingness, capability and possibility to use ICT, social media and electronic services. Here, e-capital relates to theories of human capital, or educational talent, and of social capital or individuals' capability to create social networks. The study examines the level of e-capital and explores its socio-economic and -spatial dimensions across the Helsinki Metropolitan Area (HMA). The data were gathered with a stratified postal survey (n=971) conducted in the HMA in 2010. Cross-tabs, chi-square -tests, and logistic regression analyses were used to examine the data. The results show that education is related to e-capital: higher educated and knowledge intensive workers have higher e-capital. The level of e-capital is statistically connected to income level and occupational position. Additionally, teleworking relates to the use of ICT and social media. The use of social media for networking purposes, i.e. formation of social capital via social media, relates to socio-economic position within the respondents. Thus, the study argues that a high 'level' of e-capital can be considered as an asset compared to nonusers. Previous studies have shown that networking and creating and maintaining of social relations have an impact on individual well-being. Furthermore, both human and social capital are

already recognised as the driving forces behind economic development. Thus, the relation between e-capital, human capital and social capital indicates that the high level of e-capital within a region has a connection to economic development, regional knowledge intensiveness and well-being. Keywords: social media, electronic services, information and communication technology, social capital, human capital, Helsinki Metropolitan Area.

## C08.14-04 - Information and communication technologies for development and human well-being 1

*Chair: Mark Wilson, Dorothea Kleine*

### Mobile Communication and the Transformation of Social Structures in Dhaka, Bangladesh

*Harald Sterly (University of Cologne)*

Mobile Communication and the Transformation of Social Structures in Dhaka, Bangladesh The past decade has witnessed a tremendous growth in the number of mobile phone users especially in developing countries - in Bangladesh their share has risen from 0,2% to 46% during the time from 2000 to 2010. Through device sharing and access to call centers the share of actual mobile phone users among the two lowest-income quintiles in Bangladesh was estimated as high as 96% in 2009. Substantial research has been carried out on the social implications of ICT and mobile communication in high-income countries, whereas in developing countries the research focus has largely been on economic benefits of mobile communication based on access to information. The presentation will discuss the transformation of communication practices and social structures among low-income rural-urban migrants in Dhaka, induced through the practices of mobile phone use. A special focus lies on the dynamics of long-distance family relations and shifts in gender as well as power relations. The study uses a theoretical framework based on structure-agency theories as well as aspects of the capabilities' approach by Amartya Sen.

### ICTs for Education and Development in Rural Vietnam

*Minh Nguyen (VNU University of Science)*

Information and communication technologies (ICTs) are great human inventions. They bring many social and economic benefits and dramatically change our daily life in all six continents. Vietnam is a SE Asian country with a large population living in rural areas. It is in the process of urbanization and is striving to basically become an industrialized nation by 2020 through efficient development of natural and human resources. To this end, ICTs play a very important role in creating good opportunities for education at all levels and development across the country. This paper attempts to answer the questions related to the country's experiences in implementing ICT programs and projects that lead to better rural connectivity for education and development in Vietnam based on literature review, site visits, and interviews with ICT managers, educators, researchers, and students. It is believed that an insight into these issues will serve as a sound basis for further national and international, public and private cooperation activities to maintain and upgrade ICT infrastructure, services and capacity building to prepare a qualified workforce capable of

conducting successful socio-economic and environmental applications of ICTs for sustainable development in the country in the years to come.

### Web maps for visually impaired: Strengthening eInclusion & eAccessibility

*Sabine Hennig (OeAW GIScience)*

Advance of information and communication technologies (ICT) changed the way we communicate, exchange information, and catch up on contents. Virtual globes, web mapping services, GPS, and many other geographical digital tools are intimately linked to computer-based communication processes. With the rise of Web 2.0 dynamic web maps (providing interactions and multimedia integration) became more and more popular while using digital devices such as PCs, tablet PCs, and smartphones. Given current demand this opens up new opportunities for e-inclusion: On the one hand, society is asked to create an environment in which all people have equal, easy and dignified access to all kinds of infrastructure. On the other hand ICT applications can support disabled people in living more independently and self-determined (e.g. more, improved mobility). Thus, for instance provision of ICT tools suitable for visually impaired gains in importance as number of people with age-related visual impairment is increasing, due to demographic change, i.e. rapid aging of population,. While a number of guidelines and standards is available on providing partially sighted or blind people with (digital) non-spatial information (e.g. inclusive Design, WCAG, ISO 28803, ISO/ TR 22411), less material exists when it comes to publish spatial information digitally for visually impaired. Current applications make use of web maps for visually impaired difficult or even impossible. Hence, several open questions exist on appropriate design of web maps centering visual impaired: What should user interfaces (graphical, speech etc.) and interactivities look like? Which map content is asked for by this target group? Which cartographic design parameters are most useful to enhance accessibility? How can the map content be described textually (semantic spatial description)? The AccessibleMap project, funded by the Austrian Federal Ministry of Transport, Innovation & Technology (Benefit program) addresses the above questions. While creating a web map application the project targets at methods to make web maps on urban space more easily accessible for visually impaired (test area: a district of Vienna). AccessibleMap centers on graphical design and functionalities suitable for people with low vision and color vision deficiencies, and on providing semantic spatial descriptions on the map content (automatically generated from vector data) to meet blind users' needs. User requirements which are grouped under different categories of target user groups, i.e. people with low vision, color blind, and blind people, are specified based on literature review, online user survey, and close cooperation with experts and persons concerned. Engaging experts and users in the ongoing software development process (participatory design) ensures the usability of this application being platform-independent, executable on PC, tablet PC, and smartphone.

### Leveraging buying power for development – Exploring “ethical” state e-procurement

*Dorothea Kleine (University of London), Maria Das Graças Brightwell (University of London)*

Individual ethical consumption choices are one way in which people with sufficient resources can express their views on what kind of economy they support and what kind of society they want to live in. In the terms of Amartya Sen's version of the capabilities approach, they can be part of the freedom people have to live the life they have reason to value, which in turn is key to development and human wellbeing (Sen 1999). Such individual choices stand in contrast to state procurement, where representatives of the state make decisions on behalf of the collective of citizens. ICTs are increasingly affecting both processes: the ability of individuals to make informed consumption choices and the move to more transparent state e-procurement. The paper will present selected findings from two projects: the EPSRC Fair Tracing Project (2006-2009) which used smartphone technology to give consumers independent product information at point of sale, and the recently launched ESRC-DFID Choices Project (2011-2013) on ethical consumption and ethical procurement in Brazil and Chile. In this project, a partnership between universities from three countries, we are exploring through participatory processes what Chilean and Brazilian citizens themselves define as “ethical” consumption. As policy makers in the two countries seek to steer their public procurement markets, together worth 63 billion USD, towards more ecological sustainability, the project asks what criteria citizens themselves would like to see applied. Drawing inspiration from Brazilian experiences in participatory budgeting, and the potential of ICTs for public discourse and collective decision-making, the projects seeks to explore ways in which public e-procurement can be aligned with citizens' individual and collective choices.

### The feasibility of the animation industry in local regions: A case study of working conditions at an animation studio in Okinawa

*Kenta Yamamoto (Kyushu University)*

The animation industry is agglomerated in the Tokyo, Seoul, and Shanghai regions in East Asia. But, in recent years, some Japanese studios have established subsidiaries in local regions of Japan. This presentation examines the feasibility of developing the animation industry in local regions by showing the working conditions at a studio in Okinawa. In this process, we compare conditions with those of a studio in Tokyo. The studio in Okinawa was established with 26 employees in 2009 as the subsidiary of a Tokyo studio. Okinawa implemented a new industry policy whose aim was to generate employment from 2009 to 2010, and the studio in Okinawa was established to receive support from that policy. So half of the estimated 35 million yen they received through the policy as their budget for the project was used to hire jobless people living in the region. And the studio was obligated to produce and broadcast an animation program by March 2011 as part of

their fulfillment of the policy. When the studio was established, there were few local workers with experience in the animation industry in Okinawa. Workers at the Okinawa studio come into work at around 11 and leave work at around 20. These are healthy working hours in Japan. Creators belonging to the Okinawa studio work in the daytime because their working hours are strictly controlled due to the policy. On the other hand, at the Tokyo studio, workers often stay past midnight and rest in the morning. It is necessary for the Okinawa studio to cooperate with the Tokyo studio when they produce animation as they have no technological agglomeration. There is a small but critical time gap between them. As a result, the animators at the Tokyo studio produce the animation instead of the animators at the Okinawa studio. In this case study, we can find the following lesson. It is important for the studio to receive financial support from the Okinawan prefectural government so as to avoid investment risks when establishing new studios. However, the support from the prefecture also imposes restrictions on the studio, especially regarding the working conditions and the time allotted for technical training. Workers with talents and skills are essential for this kind of creative industry; however, such talented people cannot be trained and prepared in a short space of time. It is quite difficult to create quality products after only a couple years of training. The Okinawa studio achieved a certain result by providing jobs to the region. On the other hand, it is hard to say whether the studio can continually produce content. This case study implies that long term and continuous support, such as stepwise capital support, which also includes the measure to enforce the independence of the studio, is important in developing creative industries in the region.

## C08.14-05 - Information and communication technologies for development and human well-being 2

*Chair: Mark Wilson, Dorothea Kleine*

### The Gender Digital Divide in Rural Pakistan: How Wide is it and How to Bridge it?

*Karin Astrid Siegmann (University Rotterdam)*

While Pakistan's National Information Technology (IT) Policy aims at harnessing the potential of information and communication technologies (ICTs) for development, especially in the underserved rural areas, it ignores the role of existing gender inequalities on the possible benefits of ICTs. We have investigated aspects of the 'gender digital divide' in rural areas of Pakistan in order to enable an evidence-based gender-sensitive revision of the policy as well as ICT-related interventions from which both females and males gain. The study took place in four of the most marginalized rural districts of the country where this divide is likely to be most pronounced. We found mobile phones to be the ICT that is most commonly available in rural Pakistan. Radios and TV sets are the second most widespread technologies in marginalised rural areas. However, mobile sets at hand are largely owned by women's husbands, fathers and brothers, whose permission to make calls is required by a large share of all female respondents. I, therefore, argue that availability and gendered use of ICTs are two different things altogether. Social norms related to women and girls' access to education as well as regulating their mobility prevent them from using ICTs. These norms have to be taken into account in policies and interventions to ensure women and girls' access to and beneficial use of ICTs.

### The Use of Communication Tools for Child-rearing Information among Mothers Living in Central Tokyo

*Mikoto Kukimoto Fujita (Tokyo University)*

This study clarifies the use of communication tools among working mothers to build mothering community in central Tokyo, an area lacking in childcare services and parental support. Recently, the problem of 'isolated mothers' has been gaining more media and public attention in Japan. The decrease in the number of children because of the lower fertility rate has created difficulties for mothers in exchanging child-rearing information and supporting each other. At the same time, centripetal population movements in the Tokyo metropolitan area and changes in the construction of condominiums since the latter half of the 1990s have been reported. In these areas, more families with small children have moved in, which are now facing a lack of childcare support, child-rearing community, and childcare facilities for the mothers who need to work outside home. Especially, in

redeveloped area in Tokyo, there are large number of new families with small children who has no child-rearing information or support resources in community. This situation increases the importance of communication tools including mailing list with mobile phone, blog and SNS in bringing mothers together. In this study, a questionnaire survey and interviews to working mothers with small children were conducted, in order to explore how the mothers with small children in central Tokyo acquire and exchange child-rearing information. The research area is "Toyosu" in Koto ward, the place in which the population has increased rapidly in the 2000s because of the growing number of super high-rise condominiums. According to the questionnaire survey, more than 90% of mothers don't have daily parental support because of long distance from their parents. They use telephone or email to acquire emotional support from their parents. Also, in an acute situation, such as mothers' or children's sick or business journey, their mothers(grand mothers of children) come to help beyond geographical distances. They are facing severe competition to use limited childcare facilities such as daycare nursery or medical support because of explosion of childcare needs in local level. Therefore, acquiring information about availability of childcare facilities as soon as possible is important for working mothers to balance work with family life. According interviews to working mothers, mailing list, blog and SNS play an important role for mothers to acquire information. First, mailing list is a significant tool to acquire new information about childcare facilities or pediatric service in Toyosu area. Most of mothers use mailing list on the mobile phone, which tell them new information wherever they are. Second, blog and SNS are places they not only acquire information but also exchange information or word-of-mouth about available childcare support. Some SNS communities are password-protected, which is more useful to the mothers who value their privacy.

### Internet Accessibility and Related Issues in a Developing Country : A Case Study of Guwahati City, Assam, India

*Rupali Bhuyan (Cotton College), Ruksana Sultana (Cotton College)*

In the recent years, the development of technology has changed the world rapidly. One such technology is the internet, which is a part of telecommunications. The internet has enabled and accelerated the creation of new forms of human interactions through instant messaging, internet forums and social networking sites. Information is probably the biggest advantage internet has to offer. But the benefit of this digital revolution could not reach every nook and corner of the world. There is a huge digital divide among the rich and the poor. In the case of developed, developing countries, it can be seen that almost all the developed countries have more than 50 per cent internet users but developing countries only have about 15 per cent of it. This is because, with the exception of affluent and high middle class, a large chunk of people in less developed and developing countries do not have the infrastructure (computer, mobile or internet) to use the internet regularly. In India, where internet was first introduced in 1995 by VSNL, the growth of internet has been phenomenal. However, India still has only 6.9 per cent internet users

(81,000,000 out of a total population of 1,173,108,018 according to Internet Usage Statistics and Telecommunication Market Report, 2010). In Guwahati, internet was first introduced in 1999. Guwahati is the premier city and the most important cultural, commercial and industrial centre of North Eastern India. It is a home to a variety of people from different socio- cultural and economic backgrounds belonging to different age groups, and hence their needs and priorities regarding the use of internet are also not similar. Many internet cafes in every part of the city have sprung up to cater to people with weak economic background who do not have the infrastructure at home. Moreover, students residing in hostels without internet connection frequent these cafes. It is the young generation, especially the teenagers who are more interested in using the internet. Besides being a source of entertainment and social networking, internet has become an indispensable part of the education system. But though innovations in internet services were done with the best of intentions, many people nowadays misuse it, causing harm to the social atmosphere. Fraud advertisements, online robbery and use of pornographic sites are some of the problems the city is facing in the recent times. The study is primarily based on field survey. 100 samples of people from different age groups using internet facility have been collected from offices, institutions, homes and cyber cafes. A well-designed questionnaire covering all the aspects of internet accessibility and related issues has been used. This type of study has not been done in the study area so far. It is, therefore, expected that the proposed study will have immense academic significance and practical value.

### **Becoming Smart? On the Implementation of a Smart City Project Using Information and Communication Technologies in Germany**

*Lena Hatzelhoff (Bonn University)*

In 2007 the City of Friedrichshafen, located at Lake Constance in Southern Germany, was declared winner of the T-City contest initiated by Deutsche Telekom. The T-City project aims to increase quality of life and location by implementing innovative solutions based on information and communication technologies (ICT). Given its history of technological innovation, Friedrichshafen seems to be the ideal place to realize a smart city project. However, the progress of the project using ICT to build an example for raising quality of everyday life has encountered difficulties and the reception by the citizens did not meet private and public partners' expectations. Different project cultures and organizational structures of Deutsche Telekom and the City of Friedrichshafen pose a major obstacle for a successful realization. In addition, the lack of visibility of ICT solutions hinders the public perception of the project. In Friedrichshafen many citizens regard ICT as a possibility to simplify certain aspects of their everyday life, but so far only a few citizens benefit from the multitude of individual projects within T-City which are targeted at specific audiences. Users of the project's solutions judge the core idea of T-City noticeably more positive than non-users. The evaluation of the T-City project is taking place over a five-year period and combines quantitative analysis with interview-based

explorations in order to reveal the achievements and difficulties regarding the project's implementation as well as opportunities for Friedrichshafen's development on its way to become a smart city.

### **Remediating the Urban. Implications of Mobile Phone Use on Urban Practices**

*Carola Wagenseil (University of Erlangen-Nuremberg)*

How are mobile phone use and non-material dimensions of the urban connected? How does the usage of mobile phone as an integral device of every day life shape urban practices and urban lifestyle, and as a consequence urbanity? Located in the broader context of ICT and urban geography, the presentation will highlight these aspects with a focus on young adults living in Nuremberg, Germany. Research methods in the ongoing explorative study are narrative interviews and a GPS-based study of cell phone use in urban space. First results show that the selected age group is very heterogenous in using the mobile phone. This concerns both usage data like frequency and location of use and the mode of mobile phone use in a call situation. The same heterogeneity also applies for the perception and assessment of other people's mobile phone usage. The empirical findings furthermore suggest tendencies to a reorganisation of communication and coordination of individuals in the city as well as modifications in the individual's way dealing with privacy. Urban practices e.g. exploring the city in a very spontaneous way, lingering with friends in public space or presenting oneself in the public seem to be strengthened while other properties of a "classical urban" lifestyle e.g. being confronted with strangers seem to be weakened in a mobile phone society. Many aspects of the German discussion about urbanity are touched by these processes, for example anonymity, private vs. public sphere, city as place where strangers meet (e.g. Simmel) and others. Urban society in the age of mobile phone seems to be constituted by some new practices and rules, but these new developments don't contrast former ideas of urbanity, they rather modify and reshape them in different ways. So findings of the study don't affirm arguments that suggest a general shift in urban spheres and urban society. In the presentation I will discuss if these processes could rather be linked to the concept of 'remediation' (Bolter & Grusin 1999), a concept developed in media science and originally limited to a narrower media context.



C08.15

# Geography of Tourism, Leisure, and Global Change



## C08.15-01 - Global Change and Tourism: Socio-Cultural Issues

*Chair: Jarkko Saarinen, Alan Lew*

### The Place of the Luxury Hotels Metropolitan Context of Sao Paulo (Brazil) and Buenos Aires (Argentina)

*Carlos Henrique Costa da Silva (Universidade de São Carlos)*

This work does an analysis about the role of the big international hotel chains and the concentration process of the luxury hotels in determined parts of São Paulo and Buenos Aires metropolises, with the setting of new centrality areas, which came from new articulations between local and worldwide plans. At first, we highlight that the location of these hotels is linked to the places of larger concentrations of the most important commercial, services and company management sectors activities. These are the places where the global economy contemporary businesses are done. The discussion includes an analysis of the globalization process and how the big companies have articulated themselves to guarantee their profit, what, in our understanding, ends up producing the corporative and fragmented metropolis as presented by Santos (1994). For a better understanding of the hotel business dynamics in these two metropolises it's crucial to highlight the tourism sector and its direct relationship with the real state and financial sectors. Tourism and its businesses, or better, the businesses which have pushed the tourism development in the most important cities in the world, must be seen as an important factor for the raising and discussion of subjects which consider this socialspatial practice beyond leisure. Today tourism is no longer an activity subdued to others, for many times, it presents itself as one of the few ways to generate certain richness for some places.

### Tourism for Development? Local perspectives to tourism and its role in socio-cultural change in Northern Botswana

*Jarkko Saarinen (University of Oulu), Julius Athlopheng (University of Botswana)*

Tourism as a global scale and growing industry has great potential to provide benefits to its destination areas and communities. In southern Africa, including Botswana, tourism is seen as a good strategy for the development and economic diversification of the country. The current tourism related policies encourage increasing local participation in tourism development and there are also emphases on the need to create better awareness of tourism among the local people, in order to capitalise on the prospects of growing tourism. This paper overviews the basic nature of tourism in Botswana and the current policy context of tourism development in the country. Based on community interviews the paper aims to analyse the local perspectives to tourism and its socio-cultural impacts in

Northern Botswana. The results indicate that local people are relatively aware of the tourism industry and the nature of its' local operations and impacts but very few are actually involved with the industry or benefit directly from it. This raises questions related to the sustainability and practices of the industry and the implementation of the national tourism policies. Keywords: tourism development, benefits, awareness, impacts, communities, policies, Botswana.

### Writings as cultural symbol writing the places in China's tourism destinations

*Jie Zhang (Nanjing University)*

Calligraphic landscape was defined as a portion of geographical space with a specific visual characteristics and special sense of place resulting from the laying-out of assemblies of calligraphy as landscape elements. As Chinese calligraphy is a typical symbol of Chinese culture, calligraphic landscape was typical traditional Chinese culture landscape and an important part of cultural landscape of both urban and town. On the basis of different character of calligraphic landscape, this paper developed an index of calligraphic landscape to measure the Spatial differentiation of calligraphic landscape with respect to its scripts. Almost twenty surveys of calligraphic landscape were done to detect the spatial differentiation all over the cities and towns in China with different background of globalization and modernization. Survey areas included those areas well-affected by globalization, like Beijing, Sichuan, Jiangsu, Hong Kong and relatively less-affected by globalization like Anhui Province and those vernacular townships. The statistical results of calligraphic landscape showed obvious spatial differentiation phenomenon. Spatial differentiation not only existed among the cities and towns with different cultural attributes and functional attributes, and also existed between the peripheral zone and the core zone within the same cultural or business block. The important factor forcing this Spatial differentiation of calligraphic landscape was subconscious cognitive and cultural identity to calligraphy of shopkeepers. The spatial agglomeration of different shops which forced by the pursuit of the agglomeration benefits was another important factor. Considering calligraphy as symbol of landscape and culture in subconscious of Chinese people made calligraphic landscape having functions of space delineation and definition and may contribute to the formation of cultural symbolic space of cities and towns. Research of calligraphic landscape has practical meanings to the protection of traditional Chinese cultural landscape under the process of globalization and urbanization. It is supposed to be a kind of national identity in globalization era. So Chinese writings of calligraphy as symbols in landscape writes the different places in tourist destinations.

### **Spatio-Temporal Development of Tourism in Tamil Nadu State of India: Socio-economic Assessment**

*Gambhir Singh Chauhan (University Madhya Pradesh)*

Tourism is a major engine of economic growth and harnessing. In the changing globalized economy of 21st Century, there is a great pressure on modern living and life style and as a result, large number of people is trying to get away from stress and strain of modern urban life and relax in a healthy and peaceful atmosphere. Tourism has emerged as the most significant industry in India. In case of India, particularly in Tamil Nadu state, travel and tourism business is growing at very fast speed during the last 10 years. India is one of the major destinations of the foreign Tourists particularly the state of Tamil Nadu which has a rich cultural heritage among the Indian states. The statistical figures reveal that major lion share of total tourist's arrivals both foreign and domestic are coming to Tamil Nadu. The results of temporal analysis of both domestic tourists inflow reveal that in 1993 only 14.21 million (1,42,11,900) domestic visited which further touched the highest 39.21 million tourists (3,92,14,721) in 2006. Where as in case of foreign tourists inflow the total number visited in 1993 were 0.43 million (4,35,473) which has further witnessed the remarkable increase i.e. 1.33 million (13,35,661) in 2006 in Tamil Nadu state. Tourism has direct and indirect multiple impacts on various anthropogenic activities of the human society. It makes an important contribution to socio-economic growth, employments and foreign exchange earnings. It has immense potentiality in order to generate substantial income and employment opportunities and ultimately strengthen the national as well as local economy. Tourism is a unique and dynamic tool which has substantial potential to change the socio-economic conditions of major line shares population of specific region. Key words: Lion share, anthropogenic activities, immense potentiality.

## C08.15-02 - Sustainable Tourism 1

*Chair: Jie Zhang, Carolin Funck*

### Tourism observatory and indicators: Challenge in the sustainable tourism Agenda in Mexico

*Oscar Frausto (Universidad de Quintana Roo)*

Tourism Observatory and indicators: challenge in the sustainability tourism Agenda in Mexico The monitoring and controlling of indicators of the Tourism Agenda, across the local tourism observatories, is of recent creation in Mexico. The observatories are local organizations that link the governmental sector and the civil society with the expert researchers as for local, human development and sustainable of the destinations. The present work has systematized finally the experiences of the Program Habitat in the item of the creation and state that there guard the local tourism observatories of Mexico and the results of the monitoring of the indicators for the period 2000 - 2005. The design and development of general indicator systems for diverse regions and areas has been difficult and had discouraging results, especially in the field of tourism. The result of the experimental programme on sustainable indicators and observatories for Mexico illustrates this trend. In the present contribution, 44 experiences of sustainability tourism indicator development for a specific regional context are presented. The examples from Mexican destinations underline the necessity to develop indicator concepts based on the specific problems and goals for the region without neglecting the global principles of sustainability and tourism. Furthermore, the description of both case studies (methodology of selection, indicators and its application) illustrates the problems and challenges of indicator concepts for a specific region. Finally, the authors give some recommendations for the development of a Tourism Agenda for a specific regional context in Mexico.

### Mallorca and sustainable tourism – synonym or oxymoron(?), and the challenges ahead

*Angela Hof (Universität Bochum), Macià Blázquez-Salom (Earth Science Department), Thomas Schmitt (Geography Department, Chair Landscape Ecology/Biogeography)*

Starting from a review of tourism development and the relevance sustainability has gained in the last fifty years of tourism in Mallorca, Balearic Islands (Spain), the paper discusses future pathways, options, and challenges in the face of climate change and the limits of growth on the island. As one of the major Mediterranean tourist resorts with an internationally acclaimed Local Agenda 21 and sustainable development as its overarching policy objective, the municipality of Calvià is a paradigmatic example to unfold this critical discussion. Passed in 1999 and coined as a sustainable strategy for a

tourism destination, the innovative Local Agenda 21 formulates the limitation of urban growth and a reduction of water consumption as main development objectives. The Agenda 21 came alongside a strategy of more diversified tourism development and tourist specialization. Already in 1990, the municipality started to retrofit its mass tourist success model by so-called 'quality tourism' and 'tourist excellence'. Specialization in conjunction with the development of the real estate market, international capital flows, economics, institutions and policies has produced another tourist boom. As a result, 12% of the yacht berths and 25% of Mallorca's golf courses are concentrated in the municipality which has a proportion of more than 60% second homes and is characterised by an urbanised coastline with residential resorts and villas around mass tourist centres. Notwithstanding, limitations to urban growth have been abandoned as a political mainstream goal, as far as new conservative governments have implemented the neoliberal agenda to Mallorca's regional planning. The paper presents results from interdisciplinary research over the last two decades: spatially explicit landscape analysis and environmental indicators document habitat loss, accelerated water consumption, energy demand and waste generation, and cast a critical light on sustainability in the long run. Water management in particular is a key challenge for the economic and ecological sustainability of tourism. With its significant vulnerabilities to climate change and an already critical water demand-supply ratio, Mallorca is beginning to experience the challenges that many resorts will probably have to face in the near future. The paper sums these findings and new questions up by discussing whether the concept of ecosystem services may be a new opportunity to steer future development into a direction which attaches values to nonmarket commodities and recognizes the important role natural areas, landscape heterogeneity and sustainable water management play in promoting the tourist product in the long-term. The revision of the sustainability key indicators for Calvià, taken as a paradigmatic tourism destination, can help to reconsider tourism sustainability in the context of glocal change and capitalism's crisis.

### Whale watching as sustainable tourism development strategy in El Vizcaíno Biosphere Reserve, Mexico

*Marius Mayer (Universität Würzburg), Bernadette Schauss (Universität München)*

Whale watching tourism (WWT) shows increasing importance in world tourism. The economic effects of WWT constitute an important argument for protecting whales and continuing the banning of whaling. As a sustainable tourism activity WWT reconciles the strict protection of the marine mammals with the economic interests of local people. One of the best WWT spots in the northern hemisphere is the biosphere reserve El Vizcaíno (BREV), Baja California Sur, Mexico. At the destination level the demand- as well as the supply-side are analysed in order to deal with the following research questions: - How high is the regional economic impact of WWT in BREV? - Can WWT serve as a sustainable regional development strategy for the peripheral area of Central Baja California? The BREV is located in the north of the state of Baja California Sur on the

Mexican peninsula of Baja California. The tourist frequentation of the region goes hand in hand with the hibernation of thousands of Californian gray whales in two lagoons. Thus WWT is the principal type of tourism and dominates the structure of the local tourism industry due to an extreme seasonality with four months of high frequentation. During the WW season 2006/07 a sample of 382 WW tourists were asked for their trip motivation, expenditure patterns and sociodemographic characteristics. Parallel counting of WW tourists validated the official visitor numbers. Nearly all tourism enterprises (in total 40) were interviewed qualitatively in 2007. Thus we were able to estimate the economic impact of WWT from the demand as well as from the supply side, which enhances the reliability of the results. In a conservative demand-side estimate 13,000 WW tourists generated a gross turnover of USD 2.79 million in the WW season 2006/07. For more than 90% of the visitors the whales were the main reason to come to BREV. On average, an individual tourist spends USD 69.48 per day in BREV, thereof 35% on the WW tour, and stays on average 2.94 days in the destination. These results are supported by the supply side study which calculated a gross turnover of tourism in BREV summing up to USD 2.85 million. In total, WWT in BREV creates 334 seasonal and 180 year-round jobs. The importance of tourism for the local economy varies significantly between the small town Guerrero Negro (3.3% of the total workforce; the world's largest natural salt production plant is located there) and the village of San Ignacio (18.1% year-round, 45.8% seasonal). Furthermore, the supply-side study reveals a high outflow of tourism revenues of 75%, mainly for intermediate inputs. Thus, WWT in the BREV constitutes an important economic factor for the region, but its economic impact should not be overestimated because of limited visitor numbers, an extreme seasonality and a high leakage rate.

### Sequential characteristics of emotions during hiking experiences in nature-based tourist destination

*Koun Sugimoto (Tokyo University)*

Hiking is one of the most popular activities in nature-based tourist destinations. People enjoy walking on trails while seeing landscapes. Therefore, how to design trails has been an important topic for tourism planning in every nature park. The present study discusses the interaction between human activities and trail environment. The main purpose of this study is to clarify sequential characteristics of one-day hiking experiences in a national park. Our research was conducted in the Mt. Mitake-Hinodeyama walking trail in Chichibu-Tama-Kai National Park in Tokyo, Japan. This trail is the model courses introduced in a tourist brochure. The trail goes through forest environment and passes by Mitake Temple, some commercial facilities at the top of Mt. Mitake, scenic view points at the top of Mt. Hinode, and a hot spring facility at the end of the trail. A group of university students were asked to answer a questionnaire for describing their emotions and feelings at seven locations on the trail. Questions were constructed with 17 emotional factors related to their experiences: attracting, boring, challenging, crowded, depressing,

enjoyable, exciting, exhausting, frustrating, interesting, lonely, motivating, nervous, pleasing, promising, relaxing, surprising. Multivariate analysis was applied to those data sets. First, MDS method was used to visualize the similarities and dissimilarities among factors. We interpreted that Dimension-1 represented a positive-negative relation, while Dimension-2 corresponded to an intrinsic-extrinsic relation. Next, hierarchical clustering was applied in order to extract clusters of similar emotional factors. As a result, four clusters were identified. Cluster-1 (attracting, enjoyable, exciting, and pleasing) showed high values when the participants hiked Hinode Mountain and rested at the hot spring facility. Cluster-2 (challenging, interesting, motivating, promising, and surprising) was relatively high in the beginning, but the values tended to fall gradually as the participants went on. Cluster-3 (crowded and relaxing) fluctuated irregularly. This was probably because crowded and relaxing were strongly influenced by extrinsic factors such as the characteristic of locations. In the case of cluster-4 (boring, depressing, exhausting, frustrating, lonely, and nervous), the values of emotions except exhausting continued low, but the values increased during the descent from Hinode Mountain. The value of exhausting was higher than those of other emotional factors of cluster-4 at all survey locations, but interestingly, it showed a very similar fluctuation with the values of others. Thus, we concluded that tourists' emotions during a recreational activity were not stable, but unique sequence patterns were formed for each emotion type.

## C08.15-03 - Sustainable Tourism 2

*Chair: Jie Zhang, Carolin Funck*

### Indicators to assess the environmental and socio-economic impacts of tourism on protected areas of Mongolia

*Navchaa Tugjamba (University of Humanities), Erdenetuul Sereeter (University of Humanities)*

The Protected Area Network of Mongolia cover over 14.5 percent of the total country's territory and has become major destinations for rapidly growing tourism and recreational activities for its natural beauty, rare species of wildlife and historical and cultural heritage sites. According to the Millennium Development Goals, the Government of Mongolia made the legislative commitment to set aside 30% of its territory as protected areas by 2015. Over 80 percent of Mongolian protected areas are occupied by tourism and related activities which impose such adverse impacts as environmental pollution, land degradation, loss and damage of historic and cultural heritage sites. On the other hand, tourism is the main source for funding Protected Area administrations. Therefore, it is crucial to develop indicators to assess the environmental and socio-economical impacts of tourism on Protected Areas. Development of such indicators will enable the policy makers, project initiators and project beneficiaries to duly monitor, evaluate the project implementation in order to promote and sustain positive outcomes while preventing and minimizing adverse impacts. Our research team purposed to develop the assessment indicators of the environmental, socio-economical, management and infrastructural impacts of tourism on Protected Area. Field research study was conducted on "Orkhon Valley" National Park in order to verify the development and implementation plan of proposed methodologies and indicators. The main paper consists of four sections and "Introduction" part explores the understanding of Protected Areas, legal framework of tourism activities on Protected Areas (PA), in case of Mongolia and challenging issues of tourism development on PAs. The comparative studies on assessment indicators of tourism impacts to PAs made in case of international and national levels. Second section describes the "Indicators of environmental and socio-economical impacts of tourism on PAs". Moreover, this part explains the indicators' frame and limitations, application principles, estimating units and evaluation periods. Third section identifies the assessment methodologies of the indicators. Environmental, socio-cultural and economic indicators would be evaluated by -3 up +3 scores. -3 shows the lowest negative impact and +3 expresses the most positive impacts. 0 means no tourism impacts. Final section includes the legal frame of indicator application. And some recommendations and options to make change in legal documents and related regulations for the purpose of maximize positive impacts and minimize negative impacts of tourism on PAs were included.

### Sustainability and tourism transport: Regional impacts of ski-incoming tourism by plane to the Alps

*Tobias Behnen (Universität Göttingen)*

Due to the topography air transport in a high mountain region is subject to special ecological, social and economical but also technical circumstances. Therefore the impacts of actual growth processes in tourism for the airports and their surroundings often contradict the goals of sustainable development. Despite the volatility of the market during the last decades many airports in the Alps have had a significant increase of the passenger numbers. The incoming ski tourism is a main push factor. It is carried out with scheduled flights by full service carriers and low cost carriers but also with charter flights. The aim of this paper is to characterize and discuss the development and its sustainability referring to typical airports and to show which regions, institutions and persons profit from the process and which are affected adversely. Own quantitative and qualitative empirical research was conducted at Salzburg, Innsbruck, Klagenfurt (all Austria), Bolzano (Italy), Berne (Switzerland) and Ljubljana (Slovenia). Most of the ski-tourists which especially come from the British Isles, Scandinavia, the Netherlands, Germany and Russia arrive on Saturdays where some airports have to manage overloading at the airside and at the landside. It is another remarkable result that the flights for tourists do not only substitute other means of transport (car, bus, train) but induce entire new journeys to the Alps. The road towards more sustainability would include efforts and regulations concerning noise, land use, inter-modality and modal shift but most notably a better communication and participation of all stakeholders in ski tourism.

### Territorial dynamics in Brazilian Pantanal wetland: Impacts of the tourism and planning proposals

*Carla Moura de Paulo (USP)*

Pantanal wetland, study area of the present work, is in a good state of conservation and has a biodiversity strictly related to its local dynamic, especially due to the flood pulse. The natural attributes reveal a favorable scenario for the development of tourism activity, which has been growing since 90's. Though, this practice may represent a serious threat due to the changes in the natural environment and to the establishment of infrastructure in wild locations. In this way, this research has established an analysis of the territorial dynamics influenced by the tourism in four municipalities of Pantanal: Aquidauana, Corumbá, Poconé and Cáceres. The main characteristics of these municipalities were identified, also the urban and periurban areas of each municipality were studied and the uses of Pantanal by the tourism sector were identified. The main environmental impacts were analyzed, besides the planning instruments capable to diminish these impacts and the policies that are related to the theme. The study of the instruments and policies - analyzed in global, federal, state and municipality scales - has shown a strong necessity that this issue be addressed in regional scale. In the meaning of constrain the individual

actions of municipalities and, in the other hand, to strength the decisions that consider the whole Pantanal wetland and not only those that benefit the administrative boundaries without a natural logic. In case of consideration of these conditions, the tourism could be an allied for the Pantanal's conservation, as this activity depends on a good state of the natural environment to the attraction of tourists. Keywords: Pantanal, tourism, environmental planning, environmental impacts, public policies.

### Recreation development features in Russian protected areas

*Leonid Korytnyy (Russian Academy of Science), Natalia Luzhkova (Russian Academy of Science)*

In the Era of Climate Change and Human Impact, existence of protected nature areas is essential for the Biosphere sustainability. Strict reserves are the leading category in pristine wilderness conservation. In 2011 Russian Government passed the 'Strategy 2020' on the Federal Protected Nature Areas development, where they were proposed to put ecotourism into service to increase self-efficiency. To implement this first recreation project nine model territories were selected and granted funding. According to environmentalists, the selection was controversial because these 2011 - 2013 Federal Budget Allocations were provided to Strictly Protected Nature Reserves (or zapovedniks), the most nature protecting category in Russia and Worldwide. For decades Zapovedniks have been the most spread category of environment component protection with the mission to conserve unique and typical nature through complete human activity prohibition. With the first Barguzinsky Zapovednik establishment in 1916 their number has grown to 102, covering more than 2% of Russian territory and delivering unique philosophy of strict protection. Hypothetically, now all this vast land can be unveiled to the World society. As the decision on Zapovedniks has been made, a number of actions have to be taken to make upcoming changes both environmentally friendly and sustainable for the nature and people. Two (Baikalsky and Baikal-Lensky) of nine selected reserves are located in the Lake Baikal Natural Territory. The Federal Legislation and UNESCO Nature World Heritage Site Status protect Lake Baikal and its watershed from certain industrial developments. So the protected areas have to develop tourism and meet sustainability criteria at the same time. Our main research has been conducted in Baikalsky Biosphere Zapovednik established in 1969 in Southern Lake Baikal. Under its bylaws main factors of sustainable recreation development were identified for Baikalsky Reserve: 1. Environmental. Protection of all inhabitant components is primary, therefore only environmentally friendly types of tourism may be introduced. 2. Social. Collaboration with all stakeholders is important to gain positive attitude to the upcoming changes. However success depends on the partnership level between the Reserve staff and locals. Residents can prosper though providing services to reserve visitors. 3. Managerial. The zapovednik has to elaborate a gradual conception of recreation infrastructure development and discover effective management tools. 4. Economical. Each recreation activity has to be justified and calculated as well as the contribution and profit of

bordering establishments to provide full tour packages. Hiking tourism is foreseen as a sustainable type of tourism and our trail classification is been implemented as an effective management tool in Baikalsky Reserve. The gained experience can be further used in other Reserves and National Parks.

## C08.15-04 - Tourism Development and Management

*Chair: Jie Zhang*

### Institutional Initiatives on Tourism Policy and Creation of Sustainable Tourism Concept

*Anna Torres-Delgado (University of Barcelona), Francesc López-Palomeque (University of Barcelona)*

In the last two decades sustainability as a concept has strongly emerged in tourism sector, reorienting and enhancing public management of tourism and inducing the process of formalizing the sustainable tourism concept. In this context, numerous institutional initiatives have defined a framework for theoretical and applied development of sustainable tourism, which has allowed generalizing the sustainability paradigm in the new contemporary tourism. Gradually these initiatives have been outlining and determining the current conception of sustainable tourism; therefore a process of institutionalization of the concept has occurred. Policies and institutional initiatives have progressively evolved from a green sense, exclusively based on environmental conservation, to a more comprehensive meaning which considers the balance between society, environment and economy. In this evolutionary process sustainable tourism has been created as a concept in itself, acquiring meaning and value, until today when it has become a maxim in any desired tourism model. Based on this framework, this paper presents the results of an analysis and evaluation of several institutional initiatives on tourism policy at international, European and Spanish level. It provides knowledge about the process of creation and use of sustainable tourism concept, through studying initiatives that have been developed over the past 20 years. The systematic analysis of 55 institutional documents at international, European and Spanish level has pointed out the importance of these initiatives in introducing the principle of sustainability in the tourism sector and, moreover, their contribution in creating and promoting the sustainable tourism concept.

### Tourism in Croatia: Projects for a sustainable future

*Ornella Albolino (University of Naples)*

Tourism in Croatia: projects for a sustainable future Ornella Albolino The paper aims to consider the development and evolution of the tourist sector in Croatia and its economic and social impact. Croatia can be considered an interesting case study on the relationship between tourism and sustainable development. In particular a special attention to local specificities seems to be present in policy planning and project implementation. Even if seaside tourism is prevailing, initiatives towards sustainability are concentrated on environmental, rural and cultural tourism. Tourism development in Croatia has been a meaningful pattern since the 60s of the XX Century when some

infrastructure constructions, such as the Jadranska magistrala and the airports of Split, Pula and Zadar, reinforced the international profile of the touristic flux. After the dramatic events of 1991, there was an overall blockage of this development and even tourist attractions were often considered war targets. It's with the creation of the new independent state that tourism received a new spurt, being it considered as an integrated asset of the economic development of the Country. After the war, the first investments were devoted to re-establish the infrastructures: the reopening of Dubrovnik and Split Harbours were the first steps to relaunch the tourism industry even if the perception of Croatia as war zone damaged its international image. Since the beginning the investments have been made on multiple fronts: ' territorial marketing campaigns to reinforce the image of a safe land, ' an opening - even if cautious - to the international capital, Policies and projects are inspired to the conservation and the valorization of the cultural and environmental heritage and, even if the coastal areas were the most renewed international destinations, the government promoted meaningful initiatives in in-land and rural areas as well as in natural parks and protected zones. Among the most interesting actions it should be considered the COAST project (Conservation and Sustainable Use of Biodiversity in the Dalmatian Coast) sponsored by UNDP, targeted towards sustainable policies in order to integrate tourism, fishery and agriculture with a special attention to eco-tourism. However, there are also weaknesses: despite the various initiatives implemented at local level, a coordinated and integrated planning at national scale is absent. Nevertheless, different best practices makes Croatia an interesting example for the Mediterranean Region.

### The Development of Antarctic Tourism: Implications of Multilevel Spatial Management

*Andrii Fedchuk (National Antarctic Scientific Centre)*

Over the past two decades tourist activities have grown and diversified rapidly, and now tourism represents an increasingly important aspect of the Antarctic economy in terms of the number of participants and modes of transport. The absence of local authorities in the Antarctic region makes spatial management a useful strategic approach for regulating human activities, particularly tourism. Key elements for sustainable tourism development in Antarctica have been developed through joint efforts of governments, inter-governmental, and non-governmental bodies, as well as business initiatives. A multitude of good tourism management practices exists throughout Antarctic that should be evaluated for either expansion to new regions or modification for current tourist activity areas. The site-specific guidelines have already been created for most of these frequently visited sites, with the intention to provide a code of conduct and allow for a flexible approach to in situ visit management. Tourism development at these frequently visited sites is monitored to assess the effectiveness of these site-specific guidelines. This piece of research also describes how environmental and management changes affect the spatial extent and diversification of human activities in certain area in Antarctica. The



activities in the area of Ukrainian Vernadsky station (former British Faraday station) are shown as an example. Vernadsky station may be considered representative in touristic term because it has been regularly visited by seaborne tourists since 1968. The visitor sites in the station area became tourist destinations as a result of varied factors, including its natural and historic attractions as well as annual sea ice conditions with a tendency to improve accessibility of the station location due to regional climate warming. On the other hand, the increase in the number of visitors is also due to the fact that the station has changed its governance since 1996. As a result, in the period of 1995-2011 visits of both cruise ships and yachts have increased considerably. It is suggested to elaborate a broad-scale management system for the area which is under the influence of Vernadsky station.



## C08.15-05 - Sustainability Related with Second Homes

*Chair: Jie Zhang, Carolin Funck*

### Assessing Sustainable Development of Second Home Tourism and Same Day Visits in Northern Rural Areas of Tehran Metropolis

*Mohammad Reza Rezvani (University of Tehran), Saeed Reza Akbarian (University of Tehran)*

**Introduction:** There are many attractions and resources in rural areas to develop of tourism activities. These attractions in rural areas of around of metropolises have more importance due to special conditions of urban environments including mass market, environmental pollution, and need to leisure spaces. There is much tourism attractions in northern rural areas of Tehran metropolis and people of this city highly depended to these areas. The second home tourism and same day visits are two important pattern of tourism in these villages. In Shemiranat County as a metropolitan rural area, there are about 4705 second homes (%38.76 total house) according to field observations. The expansion of rural tourism in this area has had many effects and impacts on local people and villages in environmental, economic and social dimensions. The assessing tourism effects and sustainability of two patterns of second home tourism and same day visits are very important. **Methodology:** The current research is applied and its method is descriptive. The required data is gathered by questionnaire that made by researchers. Statistical populations are four groups including local managers, local residences, second homes tourists, and same day visitors. Sample sizes 17 villages and as well as 34 managers, 281 same day visitors, 164 second home tourists and 281 local residences. According to three sustainable development dimensions, 13 index and 87 indicators of economic, social and environmental is selected and is measured by Likert scale type of question from strongly disagree to strongly agree. The validation of indicators and index is assessed by Delphi method and a panel of 35 tourism researches and experts. Finally, the gathered data is processed and analyzed by SPSS. **Results:** The research results indicate that mean value for economic sustainability indicators is 2.99, social sustainability indicators 2.93, and for environmental sustainability indicators is 2.94. Also these values for second home tourism are 3.24, 3.23 and 3.17 and for same day visits are 2.74, 2.62 and 2.7 respectively. Furthermore, the mean value for all of indicators for second home tourism is 3.21 and for same day visits is 2.69. Therefore; sustainability of second home tourism is more than same day visits relatively. This increase is seen in all of sustainability dimensions. **Conclusion:** As the study showed, sustainability of tourism in study area is average, but there existed meaningful differences between the two patterns. Therefore the planning and management of tourism activities to increase of tourism sustainability is necessary through community participation. **Key words:** Second Home Tourism, Same Day Visits, Rural Tourism, Sustainable Tourism, Tehran Metropolitan Area

### Second Home Tourism as a Factor for Sustainable Development: Case Lake Engure Watershed, Latvia

*Maija Rozite (School of Business Administration Turība), Daina Vinklere (School of Business Administration Turība)*

The fishing in coastal municipalities is losing its significance and tourism is becoming one of the significant activities and it is important to promote tourism and recreation development while balancing the socio-economic interests of the local inhabitants and preservation of the natural environment. The paper analyses the impact of tourism not only on the nature reserve territory but also on a wider scale - the whole Engure's Lake drainage basin area. Researches on tourism impact until now have been usually focused on traditional tourists and same day visitors whereas second home tourists were never taken into account and their impact has not been evaluated. The aim of the research is to evaluate role and impact of second home tourism on sustainable regional development in the Latvian coastal region, a part of which is also the specially protected nature reserve territory. Owners of summer houses and recreationists were surveyed, their behaviour, the local services availed, the involvement of local municipality in the process and their future plans were studied to evaluate the possible impact of second house tourism. The research results show that so far tourism pressure in the whole Engures Lake drainage basin has been relatively low. Results of research validate that project area is not single tourism destination, but at least 3 tourism zones (2 well expressed zones and one zone with separate tourism clusters) with different tourism pressure on environment. As Engure Lake is not primary destination for tourists, main travel motivation is transit and short-term recreation. Therefore equal attention should be paid to recreation and tourism development and impacts. The most impact is forecasted from second home tourism. The coastal territory already has a lot of summer houses and a part of the previous living houses are used only during the summer season. With the improvement in the economic situation the project region coast could appeal to more affluent migrants who could due to the relative proximity of the capital city relocate to the attractive sea coast as a permanent place of residence commuting to their workplaces in the capital city. The main results gathered analysing field work and survey results indicates that this activity creates pressure and changes the environment and landscape, but it would still be less compared to the pressure created by commercial tourist accommodations. Holidaymakers contribute not only to the local economy but also are a lot more responsible towards the environment and try to preserve the value and uniqueness of the natural environment as they consider themselves belonging to the place. Therefore municipalities have to develop a special development policy not only for tourism but also for recreation. Simultaneously cooperation should be developed with second home owners, who reside here not only during the season but also very often during weekends all year long.

### Sustainability, urbanization and tourism: New challenges for second home tourism in a global crisis context in the interior of Catalonia (Spain)

*Alfonso Daniel Martínez Casal (Universitat de Barcelona)*

The process of generalization, democratization and expansion of tourism, which in recent decades, are knowing most of spaces and social groups, is leading to a process of turistification of the territories from the new dimensions and facilities of the spatial mobility and the hierarchisation of territorial functions (Vera et al, 1997). In this general context, the second homes have known strong expansion throughout the Mediterranean area. When there are doubts about the sustainability of this model of urbanization, from different administrative scales attempt to justify the need to reach the functional diversity of the territory and its economic development. Second home tourism is closely linked to the saturation of large cities and metropolitan and the need to scape of them on holidays and leisure (free) time. In addition, also is linked to economic development since the 1960s, an increase of employment benefits or changes in transport and communications network (reduction of working hours, increased purchasing power...) which have generated demand for the purchase of this type of second home over the past decades, although must take into account the current context of economic crisis that has slowed (but paralyzed) the second home development. For this reason, the formulation of initiatives and proposals to regulate the second home development in the current crisis economic requires to tend towards a sustainability model of territory. However, the lack of an integrated territorial planning reveals inconsistencies between the bet on the residentialism and the warnings about their social and economic impacts (Millán Escriche, 2005). The second home tourism can be understood as economic activity oriented urbanization, construction and sale of housing unrelated traditional hotel and touristic sector, whose users use them as accommodation to spend their usual periods of leisure and rest outside their places of residence and respond to new forms of mobility and living causing obvious territorial effect in the spaces where they settle (Mazón and Aledo, 2005). Under these premises, this paper will analyse the role of the second home in the process of urbanization of Catalonia and the complex relationships that presents residential tourism with traditional tourist activity in the interior of Catalonia giving raise to the residential specialization of many municipalities in interior, which has contributed, on the one hand, to revive the economy and set population of many interior spaces, and on the other hand, to generate significant territorial changes in pre-existing territorial structures. Territorial effects that have altered the spatial organization of these places, and which therefore need an adequate response from the public and private actors responsible for planning and land management to local and regional level in order to achieve a balanced and sustainable territorial development.

### Community involvement and the sustainability debate: A study of homestay operations in the Kumasi Metropolis

*Elizabeth Agyeiwaah (University of Cape Coast)*

Sustainable development has been replicated in tourism studies due to the enormous benefits it brings to stakeholders of tourism. More importantly, the dependence of most communities on tourism returns requires that the phenomenon is developed sustainably. The purpose of this study was to assess the sustainability of homestay operations in the Kumasi Metropolis. Specifically, the study explored the sustainability of homestay operations in the metropolis and the participation of locals in the homestay business, the preservation of the culture of the host families and enhancement of the experience of tourists. From a quantitative perspective, 151 international guests were sampled accidentally. While, 10 host families who have been in homestay operations for at least three years were selected purposively and interviewed using in-depth interview guide. The study revealed that socio-cultural, economic and educational motives propelled host families into homestay business. Homestay registration fees and service requirements were considered flexible by host families making it easier for them to get involved. The study further suggests that homestay business in the Kumasi Metropolis is sustainable with bright future prospects. Specifically, the management of homestay operations were done exclusively by host families and the hosts' culture was preserved through socio-cultural interactions with guests which made them stay for longer periods. More importantly, the availability of intermediaries such as NGOs and tour operators who supply host families with an all year round customer base makes the homestay business lucrative and sustainable. In addition to this, homestay operators charged cheaper rates per night (US\$9-15) compared to hotels (US\$60-137). There is also the existence of homestay regulations by the Ghana Tourism Authority to facilitate and sustain homestay operations in the metropolis. For guests (90.1%), the home setting provided the opportunity to learn new things which would not have been possible in hotels. However, delayed payment by some intermediaries is a challenge faced by homestay operators. It is recommended that intermediaries make timely payments for a successful homestay operation.

## C08.15-06 - Tourism sustainability with GIS and zoning systems

*Chair: Jie Zhang, Carolin Funck*

### A GIS based MADM model about tourist resort for post mining land use (Case study: Darreh-Zereshk)

*Nazila Najafi (Azad University), Ahmad Pourmoroufard (Azad University)*

In order to perform a sustainable mining activity, mining area should not be left useless and abandoned. One of the options for post-mining land use is reclamation and development of a tourist site. Darreh - Zereshk deposit alongside other deposits is planned to provide copper ore feed to Taft Copper Complex in Yazd province in Iran. Darreh-Zereshk deposit is situated underneath a village with the same name. In order to mining activities be commenced, the village should be dislocated and obviously, during mining activities all agricultural lands will be covered and concealed by mine stockpile. This study discusses about changing the above mentioned mine after abandonment to a tourist resort to provide sustainability in this area by studying the impacts of mining activities including social and environmental effects of mining, dislocation of an old farmer community and substitution with a new blood industrial community, created and lost jobs, financial and economic factors, quality of life index, infrastructures and post-mining land use. For obtaining the goals of this study and careful illustrating of existing variables in the subject, this study was performed by documentary, descriptive-analytical method and field studies. Also during this study GIS software was utilized to process and provide sufficient data for decision making by MADM (Multi Attribute Decision Making) method. And finally; financial studies has been performed to find out its viability, considering green accounting method. It should be mentioned that there is not any back ground of post mining use in Iran. That is why there were some considerable source limitations to be referred to. The results of these studies, revealed that despite all negative impacts of operating a mine in rural areas such as contaminated, unstable and dangerous mining constructions which make the area an unattractive place to live and since tourism is a common option for the sustainable regeneration of mined lands and communities and considering the infrastructures developed for mine such as private roads, power, water, communication facilities, plants, obtained incomes and community change and green areas and lakes has been created by mine reclamation can potentially improve this area to a higher level of living standards and also bring clean and safe employment to the area. With the help of all these infrastructures we can create accommodations, tourist recreational centers, lake and other facilities in the region and change it to a novel tourism opportunity.

### Sustainable Mountain Resort Development in Colorado: In Search of a 'Green' Resort Environment and Preserved Historic Landscapes

*Rudi Hartmann (University of Colorado Denver)*

In the last few years considerable efforts have been made by the resort industry and mountain communities in Colorado to develop and implement environmentally friendly policies as well as to preserve traditional landscapes which have been threatened by continued expansions of the resort environment. This paper examines the success of strategies and measures taken so far in ski resorts of the Colorado Rocky Mountains to promote a 'greener' environment. Nationwide, the "Sustainable Slopes Program" launched by the U.S. National Ski Areas Association in 2004 formed one of the voluntary initiatives to promote a higher environmental performance. The main part of the paper focuses on two case studies: (a) a review of Aspen Ski Company, a corporation operating four ski areas in or near Aspen, Colorado and their decision to include far-reaching environmental stewardship programs and (b) the preservation efforts of local and regional non-profit organizations in the Town of Steamboat Springs (nicknamed "Ski Town USA") in Routt County. Many structures from the traditional ranching economy have been saved and/or found new functions in the current resort economy. In the final part of the paper, the potential and limits of "getting green done" will be discussed.

### Registration and tourism assessment of Greek geosites using G.I.S. techniques

*Athanasios Skentos (University of Athens), Maria Triantaphyllou (University of Athens)*

The geotectonic and paleogeographic evolution of the Greek area during the Cenozoic era is marked by significant changes in the Greek landform. The characteristics of these changes, combined with more recent endogenous and external earth processes, are reflected today in specific geological places, known as geosites. The purpose of this paper is to highlight and promote geosites by recording and evaluating them as a tourism product of great importance for the Greek region. The methodology is based on the calibration of a series of criteria for each geological place that compose a geodatabase. Criteria cover the topics of geology, ecology, culture, tourism and aesthetics. Each criterion is evaluated on a scale ranging 1 (low significance) to 5 (high significance). The average number represents the total score of a geosite, which is responsible for the final calibration in the national list of geosites. The whole idea of the study is to transform qualitative data into quantitative geocoding data. In this way it becomes easy to manage and analyze information with statistical and geoprocessing tools. The final result of the assessment of the selected geosites is the designing of the geotouristic map of Greece that will reveal possible perspectives of the country for sustainable tourism in a local or regional level, including ecotourism and educational activities.

## Toward New Management Framework for the Place Impacted by Tourism Activities

*Takayuki Arima (Tokyo University)*

Tourism activities still cause negative impacts on many places. However many researches revealed the degrees of tourism negative impacts, their results are not much developed to apply to land management. This presentation proposes harmonious management framework with outcomes of on-site studies for the places impacted by tourism activities, particularly the natural area such as national parks. The frame mainly consists of geographical layer concepts using GIS. It is divided into analysis-face and apply-face with on-site surveys. In analysis-face, the on-site surveys have conducted in Fraser Island, Australia as a case study, which faces severe track degradation problems. The results yield three major points of understanding. First, the track-widening and track-deepening degradations were found to be unrelated each other. Second, the track-widening degradation was found to be dependent mainly on the activities of the historical timber logging industry on the island. Third, the track-deepening degradation was found to be related to certain aspects of tourism activities. These results also have been described some geographical characteristics. Although land zoning systems such as Recreational Opportunity Spectrum were useful methods for land management from tourism activities, practice of the management is rather complicated and involves several human concerns. In apply-face, demands of tourists and management authorities are reflected for new zoning system. The tourist demands are originated from their activities and accounted for the system. The demands of management authorities are also important and accounted. Finally, the zoning using AHP method is carried out by using several criteria. Although the results indicate that the vehicle tracks always require highly maintenances, natural conditions and tourism behaviours affect the classification of management importance. This new management framework can be modified for use with any region to maintain its lands and landscapes from tourism activities.

## C08.15-07 - Tourism and Global Environmental Change: Climate Change Issues

*Chair: Jarkko Saarinen, Colin Michael Hall*

### The impact of climate change on water demand and energy consumption in Austrian and Swiss ski areas

*Robert Steiger (Centre for Climate Change Adaptation Technologies), Bruno Abegg (HTW Chur)*

Climate change is a threat to the snow-dependent winter tourism industry. This important economic sector is confronted with decreasing snow trends and less frequent cold spells necessary for snow production. The ski area managers' faith in technology is likely to lead to further investments in snowmaking facilities in order to conserve the status quo. Such a development would cause considerable ecological impacts related to water demand and energy consumption. A recent study for Austria showed that a 2°C warming would require a doubling of current snow production in the average in order to reach desired ski season lengths. In this contribution, the ski season simulation model SkiSim 2.0 will be applied to four case studies in Switzerland (with current low level of snowmaking) and Austria (with already high level of snowmaking) to assess potential changes in water demand and energy consumption related to an increased use of snowmaking. In contrast to previous studies assuming a certain percentage of slopes being equipped with snowmaking without validation of the modelled produced snow volumes, our contribution uses real operational data on snowmaking (e.g. water & energy consumption) to validate model results. In order to consider different climatic conditions, ski areas from more humid and drier regions of both countries were chosen. Regional climate model data for the 21st century will be used as input for the assessment of future snow and snowmaking conditions. The resulting required increases in water demand and energy consumption will be put in relation to the number of residents and tourists and to other touristic infrastructure. Up to now we have validated the model at all four sites with real snowmaking data. In the upcoming months we will run the climate change scenarios and analyse potential impacts as described above.

### Changement climatique sur les côtes atlantiques. Quel développement touristique peut espérer une station balnéaire qui égare sa plage ? « Cas des littoraux ; Aquitaine et Sud marocain (Souss Massa Draa) »

*Soumia SABBA (Université Bordeaux), Laurent Couderchet (Université Michel de Montaigne)*

La France et le Maroc, à l'instar d'autres pays côtiers, figurent parmi les destinations touristiques privilégiées à travers le monde. Le tourisme occupe dans ces deux territoires

une place primordiale dans le développement socio-économique ; certes il est très diversifié mais très largement concentré dans les zones côtières, notamment sur la frange littorale, où il représente un caractère fortement saisonnier. A partir du moment où les réputations et les choix de destinations se fondent sur les images que le climat génère, le changement climatique annoncé pour les décennies à venir peut transformer la nature et la configuration du tourisme balnéaire avec l'élévation attendue du niveau de la mer et l'intensification de l'érosion des plages. Pour l'heure, la situation n'a pas de caractère dramatique, mais à plus long terme, les perspectives sont moins rassurantes ! Cet article tente un état des lieux des stations balnéaires pour les deux provinces atlantiques, l'aquitaine et le Souss Massa Draa, et une mise en évidence du degré de vulnérabilité de ces systèmes touristiques face au changement climatique. Il traduit l'importance d'envisager des stratégies d'adaptation pertinentes et d'action dans un contexte d'incertitude. Mots clés : changement climatique, tourisme balnéaire, littoral atlantique, incertitude, région Aquitaine (France), Souss Massa Drâa (Maroc), vulnérabilité et stratégies d'adaptation.

### Temperature and destination choice – a pan-European perspective

*Carl Marcussen (Centre for Regional and Tourism Research)*

This paper explores the relation between temperature and the propensity to spend nights in commercial accommodations. As far as leisure tourism is concerned, it is expected that there will be a strong tendency for the demand for bednights to be concentrated in the warmest months of year, with the exception of a few alpine and other dual season tourism destinations. Business and leisure tourism seasons are different, with business tourism only partly affected by temperature. Thus the meeting industry has a high season in September, when the holiday season is finished, but when the weather is still nice. As far as travel outside of Europe is concerned, destinations with relatively high temperatures seem to be preferred in the European winter months. It is the contention of this paper that temperature drives tourism both domestically and internationally. Domestically the demand for bednights is concentrated in the summer months. This, both has natural and institutional causes, namely temperature as a natural cause, and school summer holidays as an institutional cause. Temperature also drives tourism internationally, since in the summer holiday season, Europeans tend to prefer the warmer to the cooler destinations. Thus holiday-makers from northern Europe tend to travel south, to the higher temperatures and more sun safe destinations, for their summer holiday. The question is, though, to what extent are the choice of the warmer destinations driven by a desire for higher temperature or lower prices or other attributes of the destinations? Costs consist of transportation costs and costs at the destination (for accommodation and other things). If the travel is straight south, from northern Europe, this could indicate both a desire for higher temperatures, and a desire for low travel costs. If the destination has relatively low prices, this could indicate that also low prices play a role for destination choice. If the travel deviates from the straight south direction, this could indicate that

other things than the desire for higher temperatures play a role. In light of the increasing average temperatures, this paper will show, if the peak summer months of July and August has accounted for a declining percentage of all bednights in Europe over the last two decades, and if so, it will be discussed to what extent this is related to climate change or other factors. The main data set applied in this study is monthly bednight statistics for all European countries (4 segments: hotel/other, domestic/international) for the period 1990-2010. The research question of this paper is: What is the role of temperature in destination choice? And hereunder: To what extent is destination choice for holidays and leisure travel in general by the desire for (higher) temperature or (lower) prices? - Has climate change affected seasonality (and destination choice)?

### Management Strategy for Recreational Diving in Bleached and Damaged Coral Reefs

*Thamasak Yeemin (Ramkhamhaeng University), Makamas Sutthacheep (Ramkhamhaeng University), Sittiporn Pengsakun (Ramkhamhaeng University), Mathinee Yucharoen (Ramkhamhaeng University)*

The severe mass coral reef bleaching events have led to coral mortality in several diving sites of Thailand. The present study aims to assess ecological and socio-economic impacts of the coral bleaching events and to propose management strategy for sustainable diving tourism. The 1998 coral reef bleaching event severely affected coral reefs in the Gulf of Thailand. Some reefs showed a declining trend in live coral cover, but other sites exhibited slight increases of live coral cover. However the 2010 coral bleaching event caused coral degradation more severe and extensive in the Andaman Sea than in the Gulf of Thailand, with the inner Gulf of Thailand exhibiting the lowest bleaching impact. The questionnaire surveys, secondary data sources and interviews of key informants in several diving sites revealed that 52-91% of the tourists interviewed were aware of the 2010 coral reef bleaching event. About 27-50% of tourists in the samples was their first SCUBA diving/snorkeling at the diving sites. The tourists mentioned that the diving was not as good as they expected before coming to the diving sites. About 34% of tourists who have visited the diving sites before said that SCUBA diving/snorkeling was not as good as they expected because of coral bleaching and they were happy to pay the extra money 74 USD to see better coral reef condition. About 85-95% of tourists interviewed said that they would like to visit the diving sites again. A proposed management strategy for recreational diving sites in Thailand was provided. The main issues include; prevent coral damages from snorkeling in the shallow reefs, sediment load from coastal development, wastewater discharge from boats and land-based activities into coral reefs; temporary closure of diving sites; establish new diving sites; conduct research and monitoring program for coral conservation and restoration; inform people and tourists concerning status of coral bleaching; provide sufficient manpower and budget to relevant government agencies; establish effective networks of universities, government agencies, province offices, local administration offices, NGOs,

private companies, and conservation groups. Effective mechanisms for project implementation under Thailand's national coral reef management plan are also needed. A list of research topics towards adaptation to coral bleaching was provided by relevant experts and organizations. Development of young researchers and raising public awareness are urgently required for coral reef conservation in Thailand in the period of increasing human and climate change impacts.

## C08.15-08 - Tourism and Regional Development 1

*Chair: Dieter Müller, Dallen Timothy*

### Clusters without content? Investigating Icelandic regional tourism policy

*Edward Huijbens (Icelandic Tourism Research Centre)*

This paper explores the relationship between Icelandic regional policy and tourism development. It is inspired by the efforts of the Icelandic government to base tourism development strategies on their Vision 20/20 strategy for regional development, which in turn is premised on cluster thinking. With tourism gaining increasing recognition as a central pillar of the national economy and clustering being seen as central means to success, the paper proceeds with a critical evaluation of the cluster concept. The introduction of cluster thinking in Icelandic regional policy is illustrated through the tourism strategy 2011-2020 as approved by parliament and how it manifests in a regional context. A specific focus will be on North Iceland, where the cluster approach to general regional development and tourism has been used for the longest and gone through two successive stages. This case underpins the central argument of the paper that cluster thinking by the Icelandic government is merely being paid lip-service to, with no serious effort to work out the theory in practice. The paper argues that this stems from a lack of engagement with regional socio-spatial specificities. These specificities need to be recognised and worked with in order to establish the necessary foundations for any successful cluster initiative and ultimately regional tourism policy. Thus the paper concludes with questioning the efficiency of top-down governance approach in enhancing regional tourism development.

### Tourism Development in the Polish-Slovak Borderland

*Marek Wieckowski (IGiPZ PAN)*

The paper presents selected problems of development of tourism within the areas of the Carpathian Mts in Poland and Slovakia. The essential objective of this study has been to analyse the role and significance of tourism in the functioning of this borderland. Currently, economies are characterised by a shift in the functional development of regions towards the services sector, including also as regards opportunities related to tourist development. Within borderlands, tourism is considered the most important branch of the economy, and one that is often treated as the sole opportunity for development, at the same time becoming the primary domain of transboundary integration. It was important to make apparent the influence of a boundary on the development of tourism structure (tourist traffic and tourist infrastructure) within Polish-Slovak borderland. The Carpathian Mts., both in Poland and in Slovakia, constitute one of the most important tourist regions of the two countries. Over the decades the Polish and Slovak's parts were being developed separately, and separately touristically used. The geopolitical and socio-

economic changes in East-Central Europe that has been started at the beginning of the 1990s has brought about a radical change in the function of boundaries, the status of border zones and the character of cross-border relationships. The Polish-Slovak border after Poland's and Slovakia's accession to the European Union and to the Schengen Zone changes their status, and comes to existence as the full open border. The prospect of Poland joining the Schengen Agreement determines the potential spatial effects of the changes in the magnitude of movement on the border inside of the European Union. The main effects of these changes was the increase of the tourist flow and creation of a new tourist space especially close to the border. Resulting from the increase in the number of trips, new tourist developments, supported by accompanying services, come into being, or else existing ones are extended. Tourist space develops there, where the area is attractive for tourists (e.g. thanks to attractions being associated with the boundary, peripheral location, nature). In the paper the influence of the most important elements on tourist attractiveness of a mountainous borderland are presented. Tourism in the Polish-Slovak borderland is based upon an attractive nature (including in National Parks) and a cultural heritage. Additionally, regions and departments try to develop new ski-centers and new event tourism, both in national level and international (even transboundary). An analysis has been done of regional development due to tourism especially in the fields of: tourist function, tourist flow, spatial organization, functioning and creation of tourist attractions and products, both in national level in each country and in transboundary level.

### Custom and tourism in Wedr

*Anne-Marie d'Hauteserre (University of Waikato)*

This presentation will demonstrate that customary practices can be used to foster economic returns while minimising negative impacts. It will present a potential model for economic growth that is controlled from the grassroots. The usual discourse is that Indigenous custom is antithetical to any form of economic improvement, in particular because of communal and inalienable land property rights. The 'When age makes multilocal grand chef' of Wedr, a district in an outer island of New Caledonia, is busy proving the contrary as small entrepreneurs, residents in the area, progressively improve economic returns to the various tribes of his jurisdiction. He has used different forms of customary practices to obtain cooperation for development of activities and attractions as well as consensus for continued high maintenance of the main site used to welcome visitors. He is cooperatively and dynamically moulding the future of his residents, having taken up the challenge to move forward rather than lament losses. The roots of this development lie in the cooperative creation of a dance troop by members of his tribe twenty years ago that has successfully represented Kanak culture on the main island and across the world. Outmigration is a major problem for the outer islands of New Caledonia as it threatens cultural survival in an area that had suffered less than the rest of New Caledonia from the ravages of colonialism. It is also very difficult for the migrants to



recreate their culture on the main island as they have no land base there. Not all migrants find work either, especially young adults. The development occurring in Wedr, one of the three communes of the island of Lifou, is from the grassroots: decisions are taken by the local population who has fully committed to them before requests are made for subsidies to implement them. Plans have been valid enough that foreign investors are participating rather than demanding compliance to their wishes. It is a form of local economic development tailored to local conditions to ensure its durability.

### **Community-Based Tourism and Regional Development - the example of Wasini Island, Kenya**

*Hubert Job (University of Würzburg)*

Community-based tourism (CBT) is held as an important concept to reduce poverty and to develop rural areas of developing countries. It relies on the participation of the local people and takes into account the specific local situation with its endemic resources. This study analyses the potential of CBT to foster regional development in the area surrounding the peripheral Kenyan Marine National Park Kisite Mpunguti. For this purpose, a value-added-analysis of the area's intra- and extra-regional economic system was carried out in order to show the influence of the local participation in CBT on the economic effects of the National Park on the island of Wasini. Taking the examples of the two villages of the island and two enterprises with different local interrelations, the role of varying extents of participation in tourism is highlighted.

As for Wasini village the participation in CBT led to increased income, reduction of poverty and an improvement of the living standards. In the village a large part of the jobs depend directly or indirectly on tourism, along with the relatively high income per capita of the people. At Wasini village, tourism is not only of great economic importance, but has also made other subsistence livelihoods nearly redundant. The great attractions for tourism as an employment generator can be proven by both the growing number of population, and the disappearance of subsistence economy and ways of life. For instance, the population growth until 2008, which was high above the Kenyan average, was mainly due to rise of the economic migrants from the neighbouring coastal region and the Shimba Hills from the hinterland. In addition to this, tourism also prevented the exodus of young people, which is typical for many peripheral rural areas in Kenya.

The difference between the data for the two villages reflects the result of the participation of local people in CBT. All the positive effects of tourism observed in Wasini village are missing in the village of Mkwiro, where the inhabitants hardly participate in tourism ventures, but work either in agriculture or fishery sectors and in extreme cases, abandon their village.

The comparison of the two tourism enterprises shows that tourism does not necessarily contribute to poverty-reduction. Whereas the local business manager is personally interested in promoting regional products and distributing profits among the employees,

the international enterprise tends to reduce costs by bulk purchase in Mombasa and transferring profits abroad. Therefore extremely different leakage rates can be explained. Tourism is also sensitive to external shocks such as political conflicts. The study showed the weakening of the tourism system by the external influences such as the absence of the visitors after the post-electoral riots in Kenya 2007/08.

In summary, intensive local participation is a prerequisite for CBT which enables the people for, but does not assure poverty-reduction. Beside the strong local participation, it is important to note that the tourism based long term development depends upon a stable political and social framework.



## C08.15-09 - Tourism and Regional Development 2

*Chair: Dieter Müller, Dallen Timothy*

### **The Impact of World Heritage Tourism upon the Local Rural Area: The Case of Horse-Riding Tourism in the Villages around Lashihai Lake, Lijiang**

*Guoqing Du (Rikkyo University)*

Located in the Northwestern China, the Old Town of Lijiang in Yunnan Province became one of the most popular tourist destination since its registration of World Heritage in 1997. The visitors increased significantly and the development of tourism has created a great impact upon not only the Old Town itself but also the suburban villages and agricultural areas. Visiting of a big amount of tourists for horse-riding leisure changed the villages around Lashihai Lake, which is located about 10km from the Old Town of Lijiang, into one of the a-day-trip destinations. By this research, we try to investigate the development and collaboration management of horse-riding sites in each village, and clarify the impact of peasants' independent tourism management upon local society and world heritage tourism.

### **The shift from hotels and lodges to second home villages and mountain resort accommodation in Norway**

*Thor Flognfeldt (Lillehammer University College)*

The importance of private-owned second-home villages compared to the traditional accommodation industry has been little studied and is not well understood. A common belief amongst planners and decision-makers is that the hotels constitute the gravitational point of the ski resort. Yet both data and general observation suggest that this orthodoxy has ceased to reflect the changes that have occurred over last couple of decades. The reason this phenomenon has acquired little attention may be that the developers and the providers who have had a role in the chalet- or second-home development typically have been the landowners and local small-business owners. They have been less visible than the large tour operators and other accommodation providers. Another reason the second-home business and the dwellers have received little attention as part of the tourism industry may be that much of their activity traditionally has been attributed to other industrial categories like the building sector (contractors), janitorial and domestic services (e.g., snow removal), and commodity trades (e.g., for clothing and groceries). Consequently, neither trade journalists nor tourism organizations are yet fully aware of the changes in accommodation preferences that have taken place. Norway now has more than 430 000 registered second-home buildings. The actual number of second homes is higher, partly because several second-home units in an apartment building are registered (in public records) as a single second-home unit. This paper seeks to illuminate and discuss the market shift from 'accommodation markets' to 'second-home markets' and

its consequences. This can be understood by examining the history of the development of the second-home industry and the migration of visitors from the hotels to chalets and apartments. We are able to conclude that economically the second-home dwellings in rural areas have today become more important than the hotels. Thus, the second-home villages have become the new gravitational point of Norwegian winter tourism resorts, and the sector needs to act accordingly. The local communities have gradually come to realize the economic importance of second homes, but the general public and the decision-makers have not. The traditional accommodation providers, on the other hand, face increasing challenges, and may choose 1) to stay in their traditional markets and lower their prices, 2) to reduce the number of commercial beds and become active providers of food and beverages to the second-home dweller, or 3) to close down completely and to sell out to estate developers that will convert hotels or lodges into apartments for the second-home market. A continued focus on how to save the traditional accommodation industry that has lost its customers to the second-home market is misguided. Instead a push is needed to nurture and develop the opportunities created by the rapid development of the second-home villages.

### **Why always tourism? Questioning a default strategy in regional development**

*Holger Lehmeier (Universität Bamberg)*

There is hardly a development strategy for peripheral regions which does not include the tourism sector. Especially project-based, endogenous regional development initiatives rely heavily on the positive outcomes of tourism; it should stimulate the local economy and help to improve the regional image. Nevertheless, the actual economic impacts are often not directly examined and a great amount of ambiguity about them remains. Thus, regional decision-makers act in a field of uncertainty, which leads to an increased dependence on institutional factors. It is necessary to identify these hidden motives to understand the wide-spread choice of tourism-focused projects. The presented study examines two regional development programs in the German federal state of Bavaria which cover 84 local initiatives. A qualitative empirical approach involving interviews and textual analysis is applied. Additional quantitative data is used to strengthen the empirical evidence. The paper is based on the neo-institutionalist idea of institutional isomorphism (Meyer/Rowan 1977, Powell/Dimaggio 1983) and aims to discover structures that can lead to three distinct kinds of homogenization in terms of development strategies. Firstly, coercive effects can occur, when formal or informal rules lead to similar outcomes. Secondly, the wide-spread use of best-practices leads to mimetic effects, especially when the cause-consequence-relations are not known exactly. Thirdly, professionalization causes normative effects, when closely-linked actors share similar opinions about good or bad strategies. First results show that the conditions for several isomorphic effects exist. The key roles of local politicians can convert development initiatives into objects of regional politics, subjecting them to short- and medium-termed

interests. Projects promising quick success are preferred; concepts with uncertain outcomes or only long-term effects are less popular, leading to the choice of the (seemingly) easy field of tourism. The concept of normative isomorphism also contributes to the understanding of regional development strategies. All of the initiatives examined are, to some degree, dependant on professional regional planners with scientific backgrounds: The majority of the regional managers possess university education in a narrow range of subjects, most notably geography, economics and planning. Moreover, the documents defining the local development strategies are often written by professional consulting companies with similar scientific personnel. All in all, the study contributes to the understanding of decision-making in regional development initiatives. Therefore, it helps to identify and ultimately avoid ineffective use of public funds.

### **Whose winescape? A political ecology of wine tourism in Salta (Argentina)**

*Gerhard Rainer (Universität Innsbruck)*

The Calchaquí valleys in the province of Salta constitute one of the most important historical regions of Argentina. In addition, the favorable characteristics of soil and the arid climate have enabled the creation of the world's highest wine region. This combination of viticulture, Andean landscape and historical sites has contributed to the creation of a unique winescape. The growth of wine tourism all around the world has shown that the combination of wine and tourism represents opportunities for regional development in a globalized economy. Studies on wine tourism have frequently stressed these potentials. Nevertheless, issues of power relations in the development of wine tourism, distribution of environmental benefits and costs and social equity have mostly been untouched. Those issues are especially important in third world regions, where a main goal of sustainable regional development must be to overcome a long history of social polarization. The multi-scalar political ecology approach that focuses on the contrasting interests of actors and their capacities to take an active role in the negotiation processes within a politicized environment puts those issues at the core of research. In the case of the Calchaquí valleys the orientation towards global wine tourism markets started in the first decade of the 21 century. International investors began to buy vineyards and wine cellars from the regional elite, composed of big landowners holding important political offices, and initiated an orientation towards quality in wine production. This process was accompanied by the growing importance of wine cellar visitation and cellar door sales, the creation of a wine route and of a high-class hotel and resort infrastructure demanded by this specific tourism segment. While the regional elite and the international investors make huge profits from the global integration of the regional economy local people are still marginalized from economic development. Recent socio-ecological processes in the context of this arid mountain environment can be seen as an expression and as a result of the continuation and adaptation of traditional power-dependence relations to new global logics. While gated second-home communities in the small town of Cafayate count on privately owned wells and artificial lakes local people in some

neighborhoods are still suffering from water shortages. The strong demand for land caused by the growth of wine and tourism industry has led to a rapid increase of property prices, making it impossible for local people to buy land. The spatial expression of this socially uneven access to land, well-known from South-American cities, is the strong contrast between secluded or even gated resorts with high-quality infrastructure, leaving the municipality bereft of tax revenues and densely populated neighborhoods lacking basic infrastructure.

## C08.15-10 - Tourism and Regional Development 3

*Chair: Dieter Müller, Dallen Timothy*

### A Journey to Self-employment: Tourism and Ethnic Minority Enterprise in Thailand

*Alexander Trupp (University of Vienna)*

The highland ethnic minorities of Thailand ('hilltribes') are one of the major tourist attractions of the country. In ethnic tourism, the visited ethnic groups are marketed and presented as exotic as possible in order to fulfill the tourist's quest for authenticity. Tourists visit peripheral regions in order to 'consume' the local inhabitants and their cultural practices. Since recently, however, one can observe an inverse development. Due to lack of land rights and no perspectives for education and job opportunities in their home regions as well as a variety of other factors an increasing number of ethnic minorities move to richer urbanised areas to seek sources of income and opportunities to work. While most urban-based minorities who work at petrol stations or restaurants remain invisible for tourists and other outsiders, one part of a migrant group visually stands out and is about becoming an integral feature of Thailand's urban and beach-sided tourist centres such as Bangkok, Phuket or Pattaya. Eye-catching female Akha handicraft and souvenir sellers, often wearing colourful and richly decorated hats, became part of an informal sector that is linked to the global tourism economy. This PhD project deals with the ethnic minority of Akha, and specifically Akha women, who have been migrating into Thailand's tourist areas in order to sell handicrafts and souvenirs. They have become entrepreneurs or self-employed street merchants at international tourist destination. In this research, I study the embeddedness of female Akha entrepreneurs in social networks and in wider economic and political-institutional structures and ask how they deal with the constraints of such structures. Moreover, I explore the strategies Akha migrants employ to become successful entrepreneurs by asking how they obtain and transform different forms of capitals. In order to explore the migrant's agency and mixed embeddedness, I am using participant observation, semi-structured interviews and personal network analysis. Such an approach is able to indicate that ethnic minority entrepreneurs are not entirely controlled by some external structural forces but have shown themselves to be active agents who pursue their own goals and ideas.

### Impacts of Destination Image on the Formation of Tourism Space: A Case Study of Ecotourism Development on Yakushima Island in Japan

*Fumika Kanetaka (Hiroshima University)*

Yakushima Island was registered as World Natural Heritage in 1993. Ecotourism developed in Yakushima; the number of visitors rose to about 400,000 people after the

registration. Although located in the periphery of Japan, Yakushima now is a famous destination as an island richly endowed with nature and tourism has become the most important economic sector. About 200 eco-tour guides are active on the island; 160 mainly small-scale facilities offer accommodation. Many people from other areas of Japan have moved to Yakushima to enjoy life close to nature and make a living in tourism. The purpose of this study about Yakushima is to examine impacts of the destination image widely acknowledged by tourists on the regional development of the destination. We will also discuss the spatial characteristics of the destination image of Yakushima. For this study, interviews were conducted and data collected over a period of three years to analyze the actions of the administrative organs such as Yakushima Town and Kagoshima Prefecture, and the awareness of residents who are involved in the tourism industry such as eco-tour guides and accommodation owners concerning the destination image of Yakushima and problems in its tourism structure. An important key word for the spatial characteristics of the destination image of Yakushima is 'Concentration' and 'Decentralization'. Overuse became a problem as the number of tourists increased, and the negative influence on the natural environment is feared. Especially, tourists' concentration on the Jomonsugi, a cedar tree hidden in the mountains that is the symbol of tourism has aggravated the load on nature. The administrative organs are taking a central role in dealing with this problem and rules for use and the limitation of the number of climbers have been discussed in several committees. Moreover, it is seen as a problem that the ecotourism of Yakushima excludes the culture and the tradition of the island, and recently efforts are made to promote eco-tours in the settlements that use cultural resources. On the other hand, the Jomonsugi is indispensable for the residents to make a living. Many have a negative opinion on the introduction of visitor limitations to the Jomonsugi. However, there are a lot of people who feel a sense of discomfort about the concentration of tourists. Some guides and residents introduce less well known sightseeing spots. It can be said that the destination image of Yakushima has a strong brand power that attracts tourists and has spurred regional development based on tourism. However, it has created spatial patterns of concentration of the tourist's destination, the tourist season and the tourist's attention, and various problems have been caused in the tourism space, so that decentralization is an important issue.

### Tourists' perceptions of world heritage destinations: The case of Guimarães

*Paula Remoaldo (University of Minho), José Santos (Institute of Accounting and Business - Porto Polytechnic), Laurentina Vareiro (Polytechnic Institute of Cávado and Ave), José Cadima Ribeiro (University of Minho)*

Tourism is seen as one of the main drivers of socio-economic progress in both developed and developing regions. Although the evolution of tourism over recent years has been somewhat irregular, domestic and international tourism industries continue to expand in response to growing markets, stimulated by consumers' increased leisure time and relative wealth (UNWTO, 2011). The competition among tourist destinations is fierce due

to the increasing number of cities that envisage attracting international travelers. In this context, destination images are important as they influence people's perceptions of place and can affect their choices and behavior. The city of Guimarães, in the northwest of Portugal, is a world heritage site (UNESCO) since December 2001, and will host the European Capital of Culture (ECOC) in 2012. Taking the opportunity of this important event, the Portuguese organisers of ECOC elicit as one of their main goals to enlarge and reinforce the city image. This exploratory study examines the image of Guimarães as a world heritage tourism destination and the motivations underlying the selection of the city by tourists. Another research objective is to investigate the tourists' satisfaction on the city destination. A quantitative methodology is used making use of the data of a survey implemented. A self-administered structured questionnaire was designed to obtain information on motivations, attitudes and demographic characteristics of tourists that visited Guimarães between December 2010 and August 2011. Given the seasonality of tourism in the city, which also occurs elsewhere in the country, it was decided to apply the questionnaire in three different periods: December 2010 (corresponding to the low season - 90 questionnaires); April 2011 (corresponding to the mid season - 90 questionnaires); and, July and August (corresponding to the high season - 96 questionnaires). A total of 300 questionnaires were filled in, of which 276 were properly completed and provided usable data. The preliminary results suggest that being a world heritage site and the possibility of touring around in the region have a significant effect on tourists' choice of Guimarães. A few particular attributes of the city seem also to shape the image of the destination perceived by tourists.

### **Characteristics and motivations of backpackers in the Cape Coast-Elmina conurbation, Ghana**

*Frederick Dayour (University of Cape Coast)*

Successful tourist destinations today are seriously engaging in studies to identify new trends in order to build specific tourism product or destination brands. Research has shown that the backpacker market is one of the tourism markets that economically benefit the local community than the mainstream tourist market. The main objective of the study was to assess the characteristics and motivations of backpackers in the Cape Coast-Elmina conurbation. The study was guided by the positivist philosophy of research - quantitative. Questionnaires were used to collect data from 184 backpackers in the Cape Coast-Elmina conurbation, Ghana between the months of September and October, 2011. Factor analysis was used to determine the underlying factors that accounted for backpackers' motivations to Ghana. The independent sample t-test, one way analysis of variance (ANOVA) and chi-square statistic were used to determine differences and relationships. The study revealed that backpackers who visited the Cape Coast-Elmina conurbation were young students who organized their own trips and depended largely on the internet and word of mouth for information on Ghana. They favoured budget accommodation facilities and public transportation systems, and were staying in the

country for more than 1 month. Furthermore, six (6) main orthogonal push-pull related factors (Historical & cultural, heritage, services, ecology, escapism, adventure) were found to have explained backpackers' motivation to Ghana. Moreover, a comparative analysis of backpackers and mainstream tourists average daily expenditure revealed that mainstreamers spent more than backpackers' in the area. Drawing on the findings, it was concluded that backpackers are young independent travellers whose main sources of information are the internet and word of mouth. It was also concluded that backpackers are budget travellers since they mostly used public transport and budget accommodation facilities in the Cape Coast-Elmina conurbation. Though six factors account for backpackers' motivation to Ghana, motivations vary among their background characteristics. The relative long stay of backpackers coupled with the demand for local products suggest they economically benefit the local communities. Therefore, it is recommended that the Ghana Tourism Authority should rigorously market Ghana on the internet by providing sufficient quantity and quality of information about the country. Service quality in the tourism industry may be achieved through education, effective control, effective tracking of visitors complains and provision of incentives to tourism practitioners. Lastly, the Ghana Tourism Authority should formally recognize hostel accommodation facilities, and also regularize monitoring services in these facilities to ensure quality standards.

## C08.15-11 - Tourism Mobilities and Urban Space

*Chair: Anne-Marie d'Hauteserre, Julie Wilson*

### Dynamics of the homestay market in the Kumasi Metropolis of Ghana

*Elizabeth Agyeiwaah (University of Cape Coast)*

Homestay is an emerging phenomenon in Ghana's tourist accommodation. The Kumasi Metropolis has over the last couple of years witnessed its fair share of this market. Using a sample of 151 international guests in the Kumasi Metropolis, dubbed the 'cultural hearth' of Ghana, this paper examined Ghana's homestay market. Specifically, the survey profiled guests of homestay market and their reasons for choosing this type of accommodation. The study found that guests in the homestay market included students, teachers and volunteers and they chose homestay facilities for socio-cultural, economic and security reasons. Similarly, an in-depth interview with 10 host families revealed that socio-cultural, economic and linguistic/educational reasons propelled host families into this business. Although culture shock was a major challenge faced by both guests and host families, the latter described it as educational and insightful experience. Inadequate marketing and promotion by the Ghana Tourism Authority (GTA) and delayed payments by some intermediaries were also challenges faced by homestay operators. As a sustainable tourism development tool, there is the need for the GTA to help market and promote homestay to ensure local participation in the tourism agenda. Moreover, timely payment by intermediaries is critical for a successful homestay operation. Finally, a closer collaboration between GTA and the intermediaries with the view to ensuring quality service delivery will greatly enhance the homestay phenomenon as an addition to the existing tourist accommodation market.

### The Cultural Tourist's Consumption of Place: Game or Play?

*Dominik Kremer (Universität Bamberg), Christoph Schlieder (University of Bamberg)*

Functionally, tourism has been characterized as "a leisure activity which presupposes its opposite, namely regulated and organized work" (Urry, 2002). This is surprisingly close to what cultural scientists beginning with Huizinga in his *Homo Ludens* (1938) have identified as the essence of playing. We ask whether this functional correspondence can be exploited in the geographical study of tourism. From computer game research it is known that the timing of activities has a major impact on the gaming experience (Salen and Zimmerman 2004). The game research pioneer Roger Callois contrasted *ludus* (game) with *paidia* (play). *Ludus* is associated with an external timing of activities implemented by strict rules while *paidia* follows a self-determined temporal scheme. At first sight, among the many forms of touristic activities, the cultural tourist travelling individually or in a small group seems least subject to external timing. On the other hand, there are reasons to

doubt that the activities of cultural tourists are just guided by "improvisation and joy" which according to Callois characterize play. In recent years, close monitoring methods such as self-employed photography or GPS tracking have become increasingly popular in tourism research (e.g. Balomenou and Garrod, 2010). The main focus of these studies has been on places, for instance, on mapping changes in place popularity (Ratti et al. 2008). While time is often recorded as a dependent variable, the issue of the self-determined temporal structuring of a visit has rarely been addressed. We present a data set that consists of interviews and spatial data which we have collected in 2011 from visitors of a classical destination for Western cultural tourism, the Old Town of Bamberg, Germany, a UNESCO world heritage site. In agreement with other studies (e.g. Barten and Isaac, 2010), we found that the visit is structured by phases of activity which alternate with phases of rest. However, because of the high spatial and temporal resolution of the data, we could additionally distinguish phases of spatially focused activities from phases of spatially defocused activities. In our contribution we describe how to identify these in the data set and argue that the former are related to *ludus*, the latter to *paidia*. Our data suggests that after a phase of rest, the spatial activity pattern often changes from focused to defocused. The fact that all tourists in our data set started with spatially focused behavior can be related to the phenomenon which has been described as tourist angst: the fear of missing something. A qualitative analysis of the photographs reveals that there are different levels of visual involvement with a place. Interestingly, low and high levels of involvement occur as well with spatially focused as with spatially defocused activities. It seems that intensive visual experiences are possible in both modes, *ludus* and *paidia*, game and play.

### A Critique of Policies to Increase the Attractivity of Urban Areas in New Zealand

*Anne-Marie d'Hauteserre (University of Waikato)*

The Ministry for the environment in New Zealand had proposed an Urban Design Protocol because New Zealand cities and towns are not world renown as 'visitable places' the way its beautiful natural environment is. The implementation of the protocol should help these urban areas become 'competitive places that thrive economically and facilitate creativity and innovation; liveable places that provide a choice of housing, work and lifestyle options; environmentally responsible places that manage all aspects of the environment sustainably; inclusive places that offer opportunities for all citizens; distinctive places that have a strong identity and sense of place; well-governed places that have a vision and sense of direction'. Considering how the celebration of speed, movement and power has transformed urban places into assemblages of more or less distanced economic relations which have different intensities at different locations and where 'cyborg' men and women walk with a plug in their ear, oblivious to what's around them, can such a protocol truly be implemented to provide competitiveness. Planning is the ideology of how we define and use space, but space is currently dominated by the values

and logic of global capitalism. Societal forces have been geared to maximizing profits and narrowly defined efficiencies, providing competitiveness through 'attractive' consumption spaces. Culture and knowledge have been harnessed to ensure such attractiveness as economies have taken on a cultural and experiential turn. For Purcell (2009: 142), the logic of neoliberalism 'has come more and more to occupy a hegemonic position in urban policy'. The principal preoccupation of planners has been with the branding of cities and the advanced infrastructure required by global capital, to which Auckland and John Key's National government have responded more readily than to the 'good' intentions of the protocol. Innovation and learning are central tenets of economic growth, no matter what the industry or the location. Universities, however, are not included as anchors for clusters of economic development. Cultural industries have received even less attention. The New Zealand Urban Protocol is focused more on design and seems to have missed on the hard turn to the aestheticisation of urban areas at the service of profit. The city of Auckland, however, is creating areas to encourage consumption linked to the Rugby World Cup. The main question then is whether New Zealand can compete internationally, to establish a unique position and relational status for its cities.

### **The Distribution and Function of Lodging Facilities in Osaka, Japan: Implications for Urban Restructuring and Inbound Policy-making**

*Yoshihisa Matsumura (Hannan University)*

The Japanese government initiated in 2003 a promotion program with a strong focus on inbound tourism. However, in 2011, numerous unfortunate incidents, such as the Great East Japan Earthquake, the resulting nuclear accident in Fukushima and the extremely strong yen, have had a negative impact on inbound tourism. As a result, the Japanese inbound policy now needs to tackle these damages. The Kansai region, where the Kansai International Airport and five world cultural heritages including ancient capitals of Kyoto and Nara are located, is one of major tourist destinations in Japan. As Osaka city is its geographical center, expectations are high for it to become the major base for inbound tourism in Kansai. According to statistics of 2006, there are 838 lodging facilities in Osaka city, with a total capacity of more than 54,000 rooms. This is a much larger capacity compared to those of Kyoto and Nara, providing the main reason why it is widely perceived to have a great potential to boost inbound tourism. However, after having examined the reality of these facilities, it is problematic to uphold this assumption. By analyzing the distribution and function of lodging facilities in Osaka, this paper attempts to explore the various aspects of urban restructuring and to consider the implications for inbound policy-making. Lodging facilities in Osaka are generally divided to five categories, such as "tourist-specialized hotels", "budget hotels" used by tourists and businessmen, "flophouses", "Japanese-style ryokans" and "love hotels". Surprisingly, about 300 lodging facilities in Osaka are de facto love hotels, which are considered unfit to tourists. Nearly 180 budget hotels and flophouses don't have English websites and are reluctant to deal with foreigners, because of communication and cultural barriers. Most of

70 ryokans are very limited in capacity. In total, Osaka's actual situation for receiving foreign tourists is unexpectedly vulnerable. The "Airin district" in Osaka used to be a day-laborer's area until the 1980's, but has since then declined into typical inner city area. Here, in recent years, several flophouses have changed their business into international guesthouses, and have experienced considerable success in attracting foreign budget tourists and backpackers. This case has attracted much social attention as a kind of areal rejuvenation mixed with social inclusion. In Osaka, two large urban redevelopment projects in the "Umeda North Yard Area" and "Abeno Area" are in progress now. Both projects offer optimal access to transportation links and attracting new luxury hotels, and will certainly promote further implementation of urban restructuring. Amid the mounting criticism towards love hotels and illegal lodging facilities, a new wave of urban restructuring is likely to reach their cumulated areas.



## C08.15-12 - Transforming Tourism Geographies in the Global South

*Chair: Sanette Ferreira, Gustav Visser*

### The developing business of international business tourism in Africa

*Chris Rogerson (University of Johannesburg)*

In common with trends in tourism scholarship as a whole, research on business tourism is overwhelmingly 'Northern' biased. In many respects this situation is not surprising as contemporary African tourism research mainly is rural-focused to the oversight of significant questions relating to tourism in cities. One of the most under-researched yet important aspects of African tourism economies relates to the activity of city business tourism. It is often overlooked that business tourism is of critical importance across several African countries. In Ghana 30 percent of inbound international tourists visit for purposes of business, conference or meetings and by 2009 conference tourism was the fastest expanding segment of Kenya's tourism economy with an estimated higher financial impact than leisure tourism. Geographically the industry of business tourism is dominated, however, by South African cities, especially Cape Town, Durban and Johannesburg. New work on business tourism undertaken in Ghana, Kenya, Ethiopia and South Africa points to an important research agenda around the promotion and maximisation of the local impacts of international business tourism in Africa. This urban-focused research agenda requires re-focusing attention on often neglected tourism assets such as hotels and convention/exhibition centres. Using examples from sub-Saharan Africa this paper reviews the emerging agenda for business tourism in the global South and analyses in particular the developing business of international business tourism in South Africa.

### Segmentation and the changing geography of the South African hotel sector 1990-2010

*Jayne Rogerson (University of Johannesburg)*

In many respects the accommodation or lodging sector remains one of the most under-researched aspects of the tourism economy. International research on the lodging sector has focused inter alia, on issues such as the expansion of multinational branded hotel chains, the segmentation of the accommodation sector particularly in North America and Western Europe, hotel investment strategies, and the hotel as property asset class. Within Africa, the development and changing organization of the hotel sector has been a neglected issue in tourism scholarship with the exception of scattered works on Kenya, Mauritius, Rwanda and South Africa. In South Africa there has been some research undertaken on the growth of the country's hotel sector during the apartheid era, the expansion of Southern Sun and Sun International hotel chains, and work which

investigates the historical change in the focus of the country's hotel industry from liquor to leisure. This study addresses the contemporary phase of development of the South African hotel industry. The aim in this paper is to examine the growth, changing organization, segmentation, and spatial dynamics of the South African hotel industry from 1990-2010. It is argued that during the post-apartheid era the hotel industry of South Africa has been radically transformed and re-organised. Key changes have occurred in response to South Africa's re-entry into the international tourism economy. An analysis of the changing hotel sector during 1990-2010 discloses a phase of growth and upgrading in the hotel sector as a whole. In addition, changing geographical patterns of hotel development in the post-apartheid era are recorded. With the award to South Africa of the hosting rights for the 2010 FIFA World Cup, considerable optimism was generated about the potential for tourism development in South Africa. This optimism fed through into a surge of new hotel establishments during the late 2000s. This surge has resulted in a situation that the contemporary hotel economy of South Africa is exhibiting signs that in certain geographical areas and in certain market segments of over-saturation. This paper documents the growth and changing dynamics of the hotel sector in South Africa.

### The social impacts of second homes development in rural South Africa

*Gustav Visser (University of Free State)*

Over the past two decades second home tourism has received considerable research attention in the developed North. In the recent past the investigatory net has been cast wider with second home tourism in the developing world becoming established as a research niche, not least within the South African context. The growing body of research has focused on the economic impacts of second home tourism on host communities and its contribution towards the development of post-productivist countryside. However, no investigations have been undertaken to understand the social impacts of second home tourism on host communities in rural areas. The paper makes a contribution towards addressing this investigatory oversight focusing on the different types of relationships that develop between different host community cohorts and types of second home owners. The paper highlights the complex manner in which second home tourism impacts the social geography of host communities.

### Combining Knowledges – Innovative Standards in Tourism as a Mediator in Global Sustainable Production and Consumption

*Simone Strambach (Universität Marburg), Annika Surmeier (Universität Marburg)*

There is a broad consensus in science and policy regarding the need to develop tourism in a sustainable way. It is still open to discussion as how to achieve sustainability. Although manifold approaches do already exist, research is still needed on how the desired economic development effects can be reached and how possible negative ecological and social effects can be reduced in the long run. This current lack of

knowledge is due to complex regional specific determinants, multi-dimensional tensions, as well as contradicting interest of diverse actors. Recently, the development of standards and certification programs has gained importance on a global level. They are used as tools to guarantee compliance with sustainable business practices and are a means to prevent the so-called greenwashing. Main drivers of these standardization processes are changes in consumer behavior and rising awareness of sustainability in the so-called North. Nevertheless, standards in tourism are hitherto focused to a large part on the ecological dimension of sustainability. Additionally their range is often regionally limited. Until now, there had been only a limited number of standards in place with an explicit focus on the social dimension. Our paper is dealing with 'Fair Trade in Tourism South Africa' (FFTSA), one of the first innovative service standards in this field. We claim that the knowledge dynamics in the creation of this standard is fostering the processes of standard implementation in terms of time and space. The specific way of combining heterogeneous knowledge bases in the development process has had a double-sided effect. Due to the regional embeddedness of this standard, it has fostered the acceptance on the producer's side. Moreover, there is empirical evidence that this facilitates the integration of regional certified service providers into global value chains (GVCs), thus linking previously disadvantaged tourism suppliers to the global tourism industry. These integration processes are due to a high level of trust in the certification scheme starting from the beginning since actors from the North, along the GVC, were asked to bring in their specific knowledge in the process of the standard setting. By using the empirical example of FFTSA, we will analyze the socio-economic impacts at the micro-level of the firms. Furthermore, we will show that standards can act as mediators in global production and consumption networks and, while taking into account the ecological, economical and social dimension, support sustainability.





# C08.17

## Global Change and Human Mobility

## C08.17-01 - Global climate change and human mobility in coastal areas: the SECOA Project 1

*Chair: Armando Montanari*

### SECOA: European comparative analysis in human mobility, 1982-2012

*Armando Montanari (Rome University)*

In the year 2009 the European FP7 Research Project SECOA have been approved. It will operate in the period 2009-2013. SECOA consider two global issues, climate change and human mobility which overlap in coastal settlements. The coastal zone is a difficult geographical area to manage. Major problems have global origins but have to be managed at local level. Different national and local public bodies, responsible for different aspects of the same physical area and uses of the coastal zone, have also to consider the often competing needs of the numerous stakeholders. Considering the diversity of interest and pressure groups, of stakeholders and authorities, which converge on coastal settlements, conflicts are almost inevitable. SECOA analyses the different typologies of conflicts, the analogies among subjects and variables in order to identify coherences and contribute in this way to the solution of conflicts. Such a complex research project need the cooperation of a large number of disciplines, but geography plays a basic role having the possibility of using the advantages of a solid experience of cooperation which sees the support of physical, human, social and economic geographers. SECOA has also taken the advantages of three decades of intercultural, multinational and multidisciplinary researchers in the field of human mobility. It is not by chance that the IGU Commission on Global Change and Human Mobility (Globility), established in the year 2000, has been the location for the presentation and discussion of the early outputs of SECOA. In the year 1982 the volume "A study of growth and decline" with some the results of the Cost of Urban Growth (CURB) project have been published. This was one of the first European projects, based on the contribution of geographers, which has considered the role of human mobility within metropolitan areas. From CURB to SECOA several other projects have considered urban settlements changes as results of human mobility and vice versa. The oral presentation will try to identify possible methodological continuity within a certain number of European projects, the role of geographers in contributing in the development of the intercultural approach, and the great merit of geography when is able to play a bridging role among disciplines for the advantage of society.

### The SECOA Project: Are extreme hydrological events on the rise in South Asia?

*Vishwas Kale (University of Pune)*

The monsoon rainfall over the Indian sub-continent is often characterized by heavy to extremely heavy rainfall events leading to devastating floods. Such extreme hydrological

events often have severe impact on every sector of the economy and the environment. The exceptionally heavy rainfall (945 mm) in Mumbai on 26th July 2005, the megaflood on the Kosi River in August 2008 and the catastrophic floods on the Indus River in August 2010 have once again brought to the forefront the enormous risk posed by hydrological events in South Asia. In addition to these extraordinary events, several large-magnitude floods have been recorded on many other rivers in the region during the last few decades. Such extreme hydrological events have raised concern that climate change, associated with anthropogenic global warming, is perhaps causing increase in flood frequency and magnitude. It is therefore, important to systematically establish whether monsoon rainfall or flood data provide any evidence of increasing trends during the last few decades. This could be achieved through the analysis of a number of long time-series. In this paper an attempt is made to analyze the long-term trends in monsoon rainfall and large floods in South Asia. The results of this study and studies undertaken by other works indicate that extreme rainfall events have shown an increasing trend over some parts of western and central India as well as the Himalay. An important finding that emerges from the analysis of annual maximum flood series is that the frequency of high-magnitude floods was significantly higher during the post-1950 period.

### Coastal ecosystem changes under human impacts

*Lan Tran Dinh (Institute of Marine Environment and Resources)*

The high diversity in physical environments and socio-economic conditions among European and Asian countries creates various types of coastal ecosystems. Then changing analysis of coastal natural ecosystems will provide a global assessment of natural resources use by human beings. Selecting the same coastal ecosystems for changing assessment is impossible. Therefore, the main criteria were set out to select coastal ecosystems to analyse changes, including the importance of these ecosystems, available information and data enough for analysis. Methods applied for the assessment include the DPSIR (Driving force, Pressure, State, Impact and Response) framework analysis and further employing of sustainability index for ecosystems and the environment. In Belgian case studies, from 2001 to 2007, the use of coastal ecosystems was in unclear changing tendency. Indian case studies with mangroves and marshlands assessed show from 1997 to 2008 the degradation, indicating the increasing tendency of unsustainable use. Israeli coastal ecosystems show a largely unsustainable system further degrading over time from late 1990's to late 2000's. Land use and land cover in coastal ecosystems of case studies in Italy were changing from sustainable use to unsustainable use during 2000 to 2006. Coastal ecosystems in the two Portuguese case studies from 1990's to 2000's were in sustainable use, but showed steady declination. In the United Kingdom currently, all areas have adequate management and implemented measures that will support their sustainability in the short and medium terms. However, the increasing pressure from areas of Medway, Langstone Harbour, Portsmouth Harbour, Thames Estuary, Benfleet and Swale were evident, respectively. In Vietnam case studies,



coastal ecosystem assessed show an absolutely degradation. Generally, three tendencies of coastal ecosystem changes under human impacts are observed. The coastal ecosystems were in degradation, from sustainable use to unsustainable use in case studies of Asian countries. Coastal ecosystems were in sustainable use in most of case studies in European ones and in unclear changing tendency (e.g. changing from sustainable use to unsustainable use with different periods) typically in case studies of Belgium. A general trend is found as the conversion of natural ecosystems into artificial ecosystems and the increasing pressure from human impacts.

## C08.17-02 - Global climate change and human mobility in coastal areas: the SECOA Project 2

*Chair: Vishwas Kale*

### Critical analysis of environmental and natural hazards of coastal areas: The case of the coastal area of Rome

*Prestininzi Alberto (Rome University)*

In frameworks of Work Packages 1 and 2 of European FP7 Secoa Project several Departments of University Sapienza (Rome, Italy), carried out studies about the environmental sustainability of the coastal area of Rome. Regarding the WP2 environmental stresses and the use of resources for sustainable development, an analysis on land use variations affecting the whole roman coastal areas, spanning from Civitavecchia to Anzio, has been performed. An index has been calculated based on artificial, agricultural and natural land use data from Corine Land Cover, for the period between 2000 and 2006. Then, the research focused on the analysis of two environmental local issues: - Coastal water quality in XIII District of Rome The DPSIR study was focused on coastal water quality assessment; sea was assumed as the final receptor of all pollution coming from land, internal channels and Tiber river; the following indicators have been built: fecal coliforms, transparency, pH, balneability; a sustainability index has been then calculated. The most critical aspect for water quality is shown to be the sewer system, as it was initially designed only for dry weather sewage collection, being nowadays also used to convey rainwater and therefore manifestly insufficient; during rain events, the storm overflow at the pumping stations causes a remarkable contamination of the natural system. - Air quality in Municipality of Civitavecchia In the area there are two specific factors of burden concerning air quality: Civitavecchia is an import seaport for goods and passengers, number of cruise ships and passengers has soared over the past ten years; is now the first cruise port of call in Europe and is seat to two thermoelectric power plants, for a total output of 3440 MW. Ambient air quality can be assessed based on the concentration of pollutants; NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub> have been monitored and indexes have been developed accordingly to national and regional environmental agencies. For framework WP1 - Climate change and natural hazards - an analysis on hazards related to hydraulic and hydrogeological setting has been undertaken by the Research Center CERI and Department of Earth Sciences. The analysis focused on the coastal area of the XIII District of Rome due to its peculiarities, as it is highly urbanized and partially reclaimed. Attention was addressed to the evaluation of effects of the hypothesized sea level rise. The study is divided into three main phases: Setting up of a geodatabase with available data; reconstruction of the present setting (piezometric surface and its relationship with the salt wedge and local hydrography; flooding scenarios; detailed reconstruction of reclamation structures/infrastructures); assessment of variation of hydrological and hydrogeological setting after potential scenarios of sea

level rise (such as areas invaded by marine ingression and/or groundwater rise, implications on flooding scenarios and salt wedge ingression).

### Sharing Data in a Multi-National, Inter-Disciplinary Team – The Importance of Metadata

*Claire Ellul (University College London)*

Metadata (information describing datasets) has long been understood as a fundamental component of any Geographical Information System (GIS) or Spatial Data Infrastructure (SDI, which promote data sharing and reuse). Metadata provides information relating to discovery, evaluation and use of datasets and describes their quality. Having good metadata about a dataset is fundamental to using it correctly and to understanding the implications of issues such as missing data or incorrect attribution on the results obtained for any analysis carried out. Traditionally, spatial data was created by expert users (e.g. national mapping agencies), who also created appropriate metadata. Much of this metadata was standards-based and complex. Increasingly, however, data used in GIS and spatial analysis comes from multiple, less 'official', sources. It could be captured or used by non-expert users - for example academic researchers - many of whom are from non-GIS backgrounds, not familiar with metadata and perhaps working in geographically dispersed teams. This paper examines the applicability of traditional standards-based metadata in an academic context, using a multi-national coastal/environmental project as a case study. SECOA - Solutions for Environmental Contrasts in Coastal Areas seeks to compare and contrast environmental data relating to seventeen Case Study locations in the UK, Italy, Sweden, India, Belgium, Vietnam, Israel and Portugal. Different capture and analysis methods, source dates, completeness, temporal and spatial extents can be identified when examining the data captured and submitted for each Case Study. Metadata is thus fundamental to ensuring that correct scientific comparisons are made across the project. This metadata must be captured by the project teams. The SECOA metadata team has identified three key research themes relating to the use metadata in this multi-national, inter-disciplinary, academic project. Firstly, team members must be introduced to the concept of metadata and helped to understand its importance. Secondly, they must be persuaded to create metadata (a process that is often considered time-consuming and laborious, and left to the end of a project) and thirdly the quality of the metadata must be such that other members of the team can make use of it - in other words, detail and consistency is also required. The paper will describe how each of these themes has been addressed, and successes and issues will be highlighted. The work to date has resulted in a number of suggestions for good practice for Academic SDI, as well as identifying additional research questions. Such research will become increasingly important in future, particularly given the increased levels of data sharing and reuse required by UK and EU funders.

### **A GIS-Based Approach for Assessing the Costs of Sea Level Rise (SLR) and Extreme Flooding at the Local Level**

*Michal Lichter (University of Jerusalem), Daniel Felsenstein (University of Jerusalem)*

This study presents a systematic framework for assessing the costs of sea level rise (SLR) and extreme flooding at the local level. The method is generic and transferable. It is built on coupling readily-available GIS capabilities with quantitative estimates of the effects of natural hazards. This allows for the ex-ante monetization of the main costs related to different scenarios of permanent inundation and periodic flooding. This approach can be used by coastal zone planners to generate vital information on land use, capital stock and population at risk for jurisdictions of different sizes. The simple mechanics of the method are presented with respect to two examples: one relates to the two largest coastal cities in Israel (Tel Aviv and Haifa) and the other to the Northern Coastal Strip region containing a variety of small towns and rural communities. The paper concludes with implications for coastal zone planning praxis

## C08.17-03 - Global climate change and human mobility in coastal areas: the SECOA Project 3

*Chair: Lan Tran Dinh*

### Modeling urban development and environmental conflicts in coastal areas

*Maria Caterina Bramati (University of Rome), Flaminia Musella (University of Rome)*

The aim of the paper is to propose a conceptual framework for the modeling tasks of the FP7-SECOA project. Modeling is here considered as the statistical formulation of a conceptual model which should help in understanding the links between urban development in all its component related to environment and human activities, and the occurrence of various types of conflicts. The statistical model helps not only in describing the connections between conflicts and urban development, but also for forecasting future conflicts according to various scenarios of environmental and demographic changes.

### Climate change adaptation and emerging coastal conflicts in Southern Sweden

*Andrea Morf (University of Gothenburg), Per Knutsson (University of Gothenburg)*

Sweden, like in many other European states, there is an increasing need to identify and formulate climate change adaptation strategies at national as well as regional and local level. The Swedish 2007 national report by the Commission on Climate and Vulnerability concluded that Sweden have to make a start in climate adaptation through increased responsibility on behalf of the municipalities in adapting physical planning to the risks of climate change and through the key role of the County Administration Boards in coordinating adaptation efforts at the regional level. Since then, municipalities vulnerable to climate change impacts has started to identify and propose adaptation measures (under the coordination and support by the County Administration Boards), and a few municipalities have even started the process of integration adaptation measures into their physical planning. However, the integration of adaptation measures into comprehensive plans is a new and complex task, causing 'new' conflicts of interests to emerge. For example:

- Between the interests to retreat from, defend against or adapt to future climate risks
- Between present and future nature- and human values
- Between existing national and regional regulations of local physical planning and the need for local flexibility in physical planning in responding to uncertain, future climate change risks
- Between national, regional and local interests in relation to climate change adaptation
- Between different social groups (for example between temporary and permanent residents)

Through a case study of the municipality of Vellinge, located in the southwestern part of

Sweden with a population of approximately 30 000, we analyze the potential consequences (in terms of emergence of new conflicts of interests) of the detailed, physical adaptation measures that have been put forward in the draft municipality comprehensive plan of 2010. Furthermore, we discuss potential strategies to mitigate such emerging conflicts.

### Resolving Coastal Conflicts in the Context of a New Mode of Regulation and Changing Policy Paradigms

*Gidon Jakar (University of Jerusalem), Eran Razin (University of Jerusalem)*

The coast in recent years has become a highly disputed zone in the environmental policy and development arenas, and is a focus for environmental conflicts that include an increasing number of stakeholders and decision-makers. These conflicts are related to two main issues: (1) unique coastal attributes and an associated increase in demand for a dwindling supply of coastal land, and (2) changing coastal policy and planning paradigms. A shift from "the coast as a backyard" paradigm, characterizing the industrial era, to "the coast as a front-yard" paradigm of the post-industrial era, has intensified friction of waste, infrastructure, ports and transport facilities with tourism, recreation and waterfront redevelopment serving as a flagship of urban regeneration efforts. Frictions have further intensified with the emergence of a new paradigm - 'environmental sustainability and the coast as a public-domain' - characterized by increasing environmental awareness, rejecting further development that negatively affects natural ecosystems and restricts public access. We first argue that these paradigmatic changes are a major source of coastal conflicts. We then argue that attributes of coastal conflicts in Israel demonstrate the emergence of a new mode of regulation: increasingly complex governance networks accompanied by changing rather than diminishing role of central state agencies. We finally discuss mechanisms for the distribution of cost-burdens associated with resolving coastal conflicts, particularly those resulting from the above changing paradigms, arguing that theses are not fully operational and suitable to the emerging new mode of governance; hence leading to prolonged delays in resolving conflicts. The study begins with a survey of all coastal conflicts in Israel, suggesting a typology and identifying the role of changing paradigms and the involved parties, followed by in-depth analysis of three Israeli case studies: Haifa port, Netanya sandstone cliffs and Palmachim Beach. Results demonstrate the relevance of changing paradigms in triggering conflicts, particularly the challenge of reversing approved plans for tourism development that face new conservation agendas. Conflicts also reveal the emerging new mode of regulation, an increasing influence of NGOs, grassroots activists and the fragmentation of public stakeholders, making top-down conflict-resolution less likely. The lack of fully operational mechanisms for distributing burdens of financing investments and compensations needed to resolve coastal conflicts lead to prolonged delays in reaching final decisions, thwarting any attempts at finalizing solutions. Alternative mechanisms for distributing these cost-burdens will be discussed.

## The role of end users in the methodological and practical approach of SECOA project

*Francesca Romana Luger (ISPRA Institute for Environmental Protection and Research), Nicola Luger (ISPRA), Rosanna Augello (ISPRA)*

Climate Change (CC) affect the natural balance of our planet in a dramatic way; the awareness of what is happening is now being transferred to the whole society by the research world. However, it is reported a lack of common policies aimed at mitigating the serious effects of CC and the development of new sustainable equilibrium. Human mobility is closely related to the effects of CC: extreme meteorological events, not only cause impoverishment, but also bring about the abandonment of territories, thus rising as a new, fundamental, cause of the increase in migration, until recently mainly due to the dramatic socio-economic-political conditions of many countries of the so-called third world. Paradoxically, the tourism industry provides to these new actors with 'touch and go' package tours, adding nothing, quite the contrary, depriving them of the cultural significance of traveling and making an environmental impact on the destination areas, by operating a chain reaction of transformation (in a negative sense) of the local equilibrium. On the contrary, different kinds of human flows are increasing, showing an opposing trend in the complex scenario of human movement. A relative perfusion of the affluent society in the booming economy countries, inclined new segments of the world population towards the leisure, starting a mass-diffusion of traveling. There is a dichotomy between the power of economy and the requirements of ecology: in this contrast, the research world raises the alarm, analyzing scenarios and creating models in order to find a solution, but still without success in finding answers from the policy makers. A holistic approach which considers environmental and social ecosystem on the whole, is thus imperative. The SECOA project runs this methodological line referring to one of the most sensitive problems of the socio-environmental arrangement. The contrasts in Coastal Environmental Areas are the result of a complex field of forces, that shows even more increasing pressures -consequences of the phenomena described in the introduction- acting on coastal areas, moreover extremely intrinsically sensitive for the geographical location (interface between terrestrial and aquatic environment) and socio-economic (historic land settlements). Particularly, the role of end users helps provide a range of methodological and practical purposes, thus ensuring to the project concrete results, effectiveness in the projections, concrete applicability. In this case, the participation of ISPRA in the SECOA project allows the use and application of geological maps (CARG project) and other GIS based cartographic products, as well as their integration with similar analyses performed by SECOA partners, in order to compare the results of the multi-thematic studies and to suggest new strategies, practicable within the participating countries, aiming to a common solution for the socio-environmental problems.

## C08.17-04 - Global climate change and human mobility in coastal areas: the SECOA Project 4

*Chair: Yoshitaka Ishikawa*

### Environmental Contrasts in Coastal Areas: The Artificial Neural Networks as a strategic method of analysis

*Luca Deravignone (La Sapienza), Marco Ramazzotti (La Sapienza), Alessandro Londei (La Sapienza)*

The FP7 European project Secoa (Solutions for Environmental Contrasts in Coastal Areas) produced an elevated volume of data formalized in different complex matrices. Using statistical methods is now possible to explore the articulated picture of each data set complex world and hypothesize some tendencies useful to compare macroscopically the analogies and the differences between each area. The Artificial Neural Network methods give now the opportunity of creating a bottom-up model of this complexity that can be explored as a virtual hyper-surface of linear an/or non-linear, symmetrical and/or asymmetrical, regular and/or fuzzy relations between variables. The results of these explorations on the virtual hyper-surface can also be organized and displayed in the geographical space using GIS technology and Graph Theory, in other words the results of these explorations will produce a synthetic interpretation of some tendencies related to selected aspects of the so called SECOA human mobility.

### Modelling coastline land use conflicts through GIS-based cellular automata and neural network analysis

*Paulo Morgado (CEG/IGOT/UL), Carlos Ferreira (University of Lisbon), Inês Boavida-Portugal (CEG/IGOT/UL)*

Trafaria and Costa de Caparica are two coastal parishes of the Almada municipality, located in the River Tagus' mouth (south bank) / coastline. Land use conflicts in this area mainly due to touristic uses (e.g. beach activities and water leisure) and urban pressure related with permanent/seasonal housing growth, facing its environmental assets, namely landscape value and coastline protection. This is a densely populated area of the coast exposed to several natural, technological and environmental hazards. The Trafaria and Costa da Caparica coastal section is subjected to intense coastal erosion due to its sandy soil composition. Often, the effects of coastal erosion - both long term shore line retreat and extreme events - are the destruction of man-made structures and the loss of soil with value to economical and social use. Critical events that triggered conflicts arise from the lack of housing and urban planning and to the urban sprawl with no care for environmental and risk conditions or land uses. Sea retreat cycles from one side, and Tagus estuary mouth silting from the other side, forced the long shore drift to change,

and has been causing significant environmental and touristic impacts. Coastal protection measures became a regular procedure for preventing and mitigating the effects of coastal erosion on human land use. The conflict between human settlement and mobility and the ecosystem services provided in this coastline (e.g. landscape value, preservation of the natural environment and risk prevention) is being tailored both by institutional responsibilities and regulations (or the lack of it), the urbanisation process and the long term action of nature (sometimes with sudden and fierce events). By considering two different scenarios in which coastal defences are lessened or strengthened, we propose a bottom-up, due to the high number of variables and the density of relations between them, approach methodology for modelling land-use conflicts integrating coast-line evolution. The system is based on a probabilistic Cellular Automata (CA) model that divides the study area in a grid, and uses Artificial Neural Network (ANN) to calibrate the weights of the transition rules, so the model could learn from the past and project the future. Finally, we will use Geographical information Systems (GIS) environment, to assemble together different types of data and overlap them in an efficient way, which would be very hard or impossible to do otherwise. Also, once we set on a GIS environment we will be able to test and calibrate our model with some other non-linear spatial analysis methods such as fuzzy logic analysis.

### The SECOA model: A proposal for the interpretation of conflicts in coastal areas

*Barbara Staniscia (Rome University)*

The SECOA model derives from the homonymous Project. This is a logical and interpretative model built on the basis of the analysis of 26 different conflicts taking place in coastal areas of 17 metropolitan areas in 5 European and 3 Asian countries. The analysis is multidimensional and multidisciplinary. Metropolitan areas have been studied taking into account their natural, environmental and socio-economic characteristics. Topics such as urban development, human mobility, regulatory systems and modes of governance have not been neglected. Conflicts were examined with regard to several aspects of their occurrence: objects, type, intensity, duration, parties involved. The disciplines involved, consistent with the approach, were several: geography (physical, human, economic), human ecology, sociology, statistics. The analysis was carried out using approaches distinctive of each discipline; different languages and different methods have, therefore, been used. A first model was imagined at the beginning of the SECOA project and has been used as guideline for the analytical phase. Once that stage was completed, the model has been re-designed starting from the characteristics of metropolitan areas and conflicts, thus generating a new interpretation about their conceptual relationships.



## Building on the Seventh Framework Program experience towards HORIZON 2020, the new European Union Framework Program

*Riccardo Carelli (Consorzio Sapienza Innovazione)*

Consorzio Sapienza Innovazione is a public-private entity created at the moment of the launching of the Seventh Framework Programme, in order to enhance the academic participation to international programs. Since then it has managed, with good results and only from the administrative and financial point of view, several FP7 projects. Those project presented, on the one hand, similar problems, while, on the other hand, each of them had its own peculiarities, which had to be taken into account for a successful management. In particular, the SECOA project, which addresses Global Change and Human Mobility in coastal areas, is particularly challenging from the managerial point of view, because, apart from keeping together 7 partners from 5 European countries and 3 partners from Israel, India and Vietnam, it foresees the active involvement of several end-users, at regional and national level, such as municipalities, environmental agencies, etc., as well as international stakeholders such as UN-HABITAT, the International Housing Federation, etc.. All of them are essential for the early up-take of the results obtained within the project and for reaching the public at large. For this reasons, SECOA is representative of a typical FP7 project and is in itself an interesting case study Those who gained significant experiences with FP7 projects, will now have to face new challenges and opportunities, on the light of the content of the new European Research and Innovation Programme, Horizon 2020, recently presented by the European Commission, which contains several innovations, including: 1) the merging, for the first time, into a single programme all EU investments on research and innovation, with the aim of transforming scientific progresses into products and innovative services able to offer entrepreneurial opportunities as well as to improve people quality of life; 2) the significant increase of the overall budget up to (provisionally) 80 billion Euro for the period 2014-2020; 3) a single set of rules.

## C08.17-05 - Global climate change, economic crisis and human mobility 1

*Chair: Armando Montanari*

### Mapping foreign residents in Japan: Its importance and an introduction of maps

*Yoshitaka Ishikawa (Kyoto University)*

Since Japan's population began to decline in 2005, the reception and settlement of foreigners has attracted great attention. The population decline is one of the country's most serious issues for the 21st century. In contemporary Japan, however, regional differences in spatial distribution have been largely neglected. Nevertheless, since most data on foreigners in public statistics are available as digital files, it is not difficult to map them, suggesting that Japanese geographers can make an atlas of foreign residents to address the above problems. Such an atlas is expected to contribute to the academic research on foreign residents as ethnic minorities and offer a convenient tool to national and local government policy-makers. With these considerations in mind, in March 2011 we published an atlas entitled Mapping Foreign Residents in Japan. It consists of the following chapters: "Postwar chronological table in relation to foreigners," "Explanation of maps," main body, "Definitions of data mapped," and "References." The main body contains six sections: 'Spatial distribution and its changes,' 'Sex, age and nationality,' 'Residence status,' 'Work,' 'Life,' and 'Residential concentration and migration.' Each section consists of a few subsections, including more than one hundred colorful maps on prefecture/municipality scales. Short explanations are added to each subsection, and photos are often inserted. These maps are drawn chiefly from such public statistics as the Population Census of Japan, Statistics on Foreigners Registered in Japan, and the Vital Statistics of Japan. Micro data of the 2005 Population Census are utilized as well. The maps shown in the atlas provide many interesting findings that can be used for confirming the generality of previous results in existing literature, and they are expected to be a point of departure for new, previously unexplored research areas. In this presentation, various maps from the atlas are introduced as examples, and the significance of each is discussed.

### Migration, multilocality, and social resilience

*Daniel Göler (Bamberg), Zaiga Krisjane (University of Latvia)*

The context of globalisation and transition at the beginning of the 21st century entail manifold economic, political and social changes as well as new forms of migration and mobility. This concerns also the labor migration, which tend to intensify the last years. Obvious consequences are mutual interactions between sending and the receiving countries. Therefore we examine the various effects of these interactions on several

scales. Main objective of the research is the study of new social practices and multilocal activities of migrants. We discuss the topic with theoretical evidence and sustain the argument with short empirical sketches taken from the new EU-members and Southeast-European transition countries. The case studies show the ability of migration-subsystems to cope with internal and external caused shocks, to re-organize in this process in a novel and creative manner and, if necessary, to define themselves as a new social system. Main characteristics of this system are a wide-spread multilocal social network led by migration, individual migration experiences, and migration culture. Migrants are in this sense interpreted as agents of societal transformations, which are able to adapt social practices from different economic, social and cultural contexts. Such kind of resilience as a performed social practice is based on creativity, knowledge and other individual and personal skills and capacities of the participants of the network. This approach enables us to introduce the concept of social resilience into an agent-based interpretation of consequences of migratory movements in the sending and the recipient societies.

### New trends of mobility in Europe and USA. Evidence from the TIGER Project.

*Barbara Staniscia (Rome University)*

Migratory and tourist flows represent two of the main vehicles of relations and contamination among countries. Mobile and immobile societies present distinctive characteristics and the effects of more or less intense human mobility are clearly visible in a global context. Mobility - both permanent and temporary - is favoured or discouraged by several factors, widely investigated and discussed by the scholars. The research presented here has been developed in the framework of the TIGER Project, funded under the ESPON Programme. The main purpose of TIGER is to analyze the effects of globalization on the ESPON space highlighting the role it plays in a global context and the relative positions - of strength and weakness - of its regions and its cities. The research relies on three main pillars: (i) the characteristics of spatial structures analyzed in a comparative perspective, (ii) global flows - goods, capital, knowledge, people - and their effects in the re-shaping of national and regional geographies, and (iii) the dynamics of the existing networks of international cooperation among countries. Among the global flows analyzed, human flows have a prominent position. The human mobility perspective - characterized by a double dichotomy: production-led vs. consumption-led mobility, temporary vs. permanent flows - has been adopted. Attention has been focused on the issues of migration (permanent flows linked to production) and tourism (temporary flows associated with the consumption). This presentation aims at presenting some emerging trends of the human mobility - migration and tourism - in the global context, in the last decade, comparing the European and the US spaces. The final goal is highlighting the main differences between those two macro-regions and the main changes with respect to the past.

## Classifying the Japanese in London using Geodemographics

*Keiji Yano (Ritsumeikan University)*

International migrants from advanced countries coming to major world cities such as New York, London and Tokyo greatly contribute towards developing the global economy. The rapid growth in the global economy in the last quarter of a century has involved economic and migratory exchanges between countries with similar levels of economic and social development. The purpose of this paper is to classify Japanese residents in London on the basis of their social and economic characteristics, and reveal their spatial patterns by making best use of the 2001 UK census and geodemographics. Based on official figures it is apparent that in the 1980s there has been a dramatic increase in the number of Japanese residing in the UK. The number grew from 800 to 2,800 in 1970, 10,900 in 1980, 44,400 in 1990, 53,191 in 2005, and peaking at 56,355 in 1993. After 1972, the Japanese register also provides data on gender-specific occupation as well as transient and permanent expatriates. The objective of this paper is to classify the Japanese in London and identify their residence at small area unit. For this we will need to use another data source by smaller area unit. The smallest areas of the UK census geography in 2001 are Output Areas. White and Hurdley (2003) highlight few characteristics of spatial patterns of the Japanese in London, based on a map of the Japanese-born population in 1991 by Ward. Japanese-born people are distributed in a series of disconnected clusters and sectors, and that in certain cases these incorporate both inner city and suburban zones. However due to limited geographical data about disaggregated population at small area units, we cannot find the spatial pattern of the above kind of Japanese residents in London from census data. The geodemographic data source, Mosaic UK, has been applied effectively to clarify the characteristics of these residents. Geodemographics is a typology of residents at small area unit (Sleight, 2004; Harris et al., 2007). The number of Japanese-born people by Mosaic type is estimated by the Output Area in London, using the number of population by Mosaic type at unit postcodes. As a result, it is supposed that these four types of Japanese residents basically correspond to the typical Japanese company mover, as also indicated by White and Hurdley (2003). The paper illustrates the spatial pattern of Japanese residents by Mosaic type at small area units in London. There are several types of Japanese residents in London, for instance the typical Japanese company mover, non-company group, university & college students, and permanent expatriates. It is revealed that although we can identify segregation between the Japanese residents in London, there are different spatial patterns according to the type of Japanese residents. The differences in spatial patterns based on type will be explained on the basis of the location of their work places and some facilities for Japanese.

## C08.17-06 - Global climate change, economic crisis and human mobility 2

*Chair: Yoshitaka Ishikawa*

### Career paths of the Latin immigrants in Spain: growth and crisis (2004-2011)

*Josefina Domínguez-Mujica (University of Las Palmas), Ramón Díaz-Hernández (University of Las Palmas)*

The migratory flow from Latin America and the Caribbean to Spain experienced an unprecedented growth during the last change of century, matching the economic expansion of 1995-2007. Such migrants were different in terms of country of origin, gender, education level and professional career; however they all shared qualities such as endurance and desire of surmounting and a common integration into the local labor market. Further, the late-2000s global recession has affected all working migrants in a similar manner and hence their employment situation and attitude towards a potential return has also been homogenized. The aim of the communication presented hereby is to analyze the common ground and career paths of the Latin and Caribbean migrants through the study of quantitative and qualitative sources. Quantitatively, we have used some innovative data coming from different administrative records, such as the statistical exploitation of the population register, the constant sample of working lives (MCVL in Spanish) and the provisional results of the 2011 population and housing census itself. We have also evaluated other tools such as the national survey of immigrants (ENI in Spanish), a large-scale survey undertaken in 2011 to scrutinize the demographic and social characteristics of the migrant population in Spain. Qualitatively, we have conducted eight in-deep interviews to different migrants following the BNIM (Biographic Narrative Interpretive Method), which have been crucial to understand better their motivations, perceptions and general feelings. Lastly, once this research has been performed, we have set out as working hypothesis, whether this homogeneous and unique behavior of the migrants is due to the demand and structure of the labor market, or it rather comes from the cultural heritage that they share among themselves and also with the local population of Spain.

### Socio-geographic factors behind the integration problems of the Roma population in Hungary

*István Süli-Zakar (University of Debrecen), Mihály Tömöri (University of Debrecen)*

Many researchers believe (including the authors of the present paper) that the integration process of the 600-650 thousand Roma people will be a fundamental question in

Hungary's social, economic and political future. According to the optimistic scenario it is hoped that after the end of the economic crisis, along with an economic upturn, the number of employees (including Romas as well) will rise significantly. However, we should not forget that due to the generally lower educational level and working morale of the Roma population a decrease in the number of unemployed Romas is questionable. Nevertheless, our field studies have proved that Romungros, accounting for two-thirds of the Hungarian Roma population (representing a higher-level of social integration) are willing to work. On the other hand, the work motivation (willingness to work) and the social integration process of the Olahs, accounting for one-third of the Hungarian Roma population, are going to be problematic even if a positive scenario is realized. If a negative scenario is realized a prolonged economic crisis and deepening social and economic problems will have to be taken into account. The slowing integration process of the Roma population may result in strengthening political and criminal problems. It is expected that the demographic boom among Romas can slow down only in the long run. If a negative scenario is realized it is expected that Roma emigration from Hungary will strengthen. This potential Roma emigration from Hungary (along with emigration from other countries such as Romania, Bulgaria, Slovakia, the Czech Republic, etc.) can result in serious social and economic problems in Europe's future. Altogether, it is believed that (no matter which scenario (pessimistic or optimistic) will be realized) the problems of the 10-12 million Roma people have to be addressed at a Pan-European-level. The implementation of the European Roma Strategy, elaborated during the Hungarian EU presidency, can serve as a good starting point to achieve this goal.

### The dynamics of residential perception and redistribution in German suburbia

*Klaus Friedrich (Martin-Luther-Universität)*

Residential suburbanization has shaped significantly the German agglomerations during the post war period. In course of this the former compact central cities expanded by a population and housing sprawl into the urban vicinity. While this process started in West Germany already in the 1960s and continues until today it was significant in the new Länder after reunification in the early 1990s only for a decade. East Germanys residential suburbanization was driven mainly by consolidated family households, originally residing in the socialistic type of prefabricated multi-story housing compounds. Since 2003, however, the central cities experience a slight population growth. Controversial discussions explain this reversal of the spatial population pattern either as indicator of the turnaround in urban shrinkage, or as a tendency towards city renaissance and re-urbanization, respectively. Aim of this presentation is to evaluate the future prospects of the existing suburban residential locations mainly in the light of demographic change both using structural indicators characterizing the living environments and also taking into consideration the perspective of the aging residents. A brief comparison of the settlement structure and population processes in East and West Germany will be joined by the



analysis of space-related behaviors and attitudes of the people living in suburbia. The statements concerning the latter mentioned context are based mainly on the latest results of a major survey currently carried out in the East German Saxony-Anhalt including field studies in about 1.100 suburban sites, where a total of more than 1.000 interviews and 20 in-depth interviews were conducted. The ageing of the relatively homogeneous group of former in-migrants will generate new challenges tackling the timely provision of age-appropriate social infrastructure, especially in non-integrated neighbourhoods. And there are many other uncertainties, in particular concerning the spatial behaviour of suburban residents as well as the residential styles and requirements towards their living environments. A central question of our project is how people perceive indicators like common aging, decreasing demand for and values of residential properties in suburban areas and also, how they react on these challenges. Therefore we have asked for the assessment of the following four dimensions: 1. living environment and infrastructure 2. integration and spatial participation 3. intended transfer of real estate 4. perspective of residential location The mentioned interviews were conducted to validate the inhabitants views concerning the quality of residential areas as crucial factor that affects the identification and satisfaction with the living environment.

## C08.17-07 - Global climate change, economic crisis and human mobility 3

Chair: Barbara Staniscia

### Geographies of migration, citizenship and belonging in contemporary Italy: Recent developments at the light of the economic global crisis

*Davide Papotti (Università di Parma), Carlo Brusa (Università del Piemonte Orientale)*

The most recent analyses of current immigration trends in Italy (ISMU, 2011; Caritas, 2011) show a quite remarkable decrease in the numbers of foreign immigrants entering the country. This decrease, at least partially explainable with the global economic crisis that is striking the country with particular intensity, goes together with an increase in the percentage of people landing on the coasts of Southern Italy and a growing access by immigrants to the Italian citizenship, in spite of a highly restrictive legislation (a country 'with the door only half opened', to use the communicative image used by Etienne Piguët in his study on immigration in Switzerland; 2009). While the first phenomenon can be explained by the political and social instability of the North-African countries that are just across the Mediterranean from Italy, the second one shows evident signs of the growing (request for) stabilization of the immigrants in the Italian society. Drawing from Michael Samer's (2010) recent theoretical contribution to the geographical approach to migration studies, and framing the study of immigration flows within the larger phenomena of 'glocality' ('Global change and human mobility'; the effective neologism is also the name of a Commission of the International Geographical Union devoted to the study of these topics), this paper wants to offer an overview of the contemporary immigration trends in Italy focusing on three main issues: the most recent changes in the composition of the immigrant flows (regarding country of origin, sex ratio, age, religion), the processes of acquisition of the Italian citizenship (following the debate started by the President of the Republic who, in November 2011, publicly criticized the current rules related to a *ius sanguinis* legal system that still postpones to the major age the acquisition of the Italian citizenship by the second generations who were born and grown in Italy), and the growing debate on the processes of integration of the immigrant groups in the country. Bibliographic references Caritas Migrantes (2011), Dossier Statistico Immigrazione 2011 - 21° Rapporto, Roma, Idos Fondazione ISMU (2011), XVII Rapporto sulle migrazioni 2011, Milan, FrancoAngeli Etienne Piguët (2009), L'immigration en Suisse - Soixante ans d'entrouverture, Lausanne, Presse polytechniques romandes - Collection "Le Savoir Suisse", 2009 Michael Samers (2010), Migration, London-New York, Routledge <<http://130.54.245.7/geo/glocality/index.html> >

### The economic crisis and the influence of the feedback mechanisms in the migration flows to Portugal among Brazilians, Ukrainians and Moroccans

*Maria Lucinda Fonseca (University of Lisbon), Alina Esteves (Centre for Geographical Studies), Sónia Pereira, Jennifer McGarrigle*

After the remarkable migration inflows that occurred during the nineties and the first decade of the 21st century, which altered the position of Portugal in the international migration scene reaffirming its position as a hosting country, the recent economic downturn of the national economy has led many foreign citizens to look for jobs elsewhere in Europe or even in other continents. The news about the poor performance of the Portuguese economy was not only visible in the media, and thus available to potential migrants who might consider this Southern European nation as a possible destination, but was also disseminated by foreign workers already living in Portugal through word of mouth to relatives, friends and acquaintances in the home country, in what is called feedback mechanisms. There is a considerable body of literature on the role of the information transmitted back to the sending regions and the possible effects on future patterns of migration flows in which the authors focus on the transformation of the initial processes and on the change induced over time both in origin and destination areas, namely on positive vs negative feedback, amplification vs counteraction of the decision to migrate and concomitant flows of goods, capital and ideas (Bakewell, de Haas & Kubal, 2011; Mabogunje, 1970; Bilsborrow & Zlotnik, 1995). Using qualitative data from 90 in-depth interviews conducted in the scope of the NORFACE-sponsored THEMIS project, the goal of this paper is to explore the kind of feedback that Brazilian, Ukrainian and Moroccan nationals living in the Lisbon Metropolitan Area and in the Algarve region send to their home places. Particular attention will be given to endogenous feedback mechanisms (networks, remittances, for example) and contextual feedback mechanisms (for example, entrepreneurship, cultural change) - de Haas, 2010 - that may alter the intensity and composition of the flows between origin and destination, set in a macro condition of meltdown of the Portuguese economy. References Bakewell, O.; de Haas H. ; Kubal, A. (2011) Migration systems, pioneers and the role of agency. Paper 4, IMI, Univ.Oxford. Bilsborrow, R. ; Zlotnik, H. (1995) The systems approach and the measurement of the determinants of international migration, in R. van der Erf & L. Heering (eds.), Causes of International Migration - Proceedings of a workshop, Luxembourg, 14-16 Dec. 1994:61-76. Luxemb.de Haas, H. (2010) "The internal dynamics of migration processes: a theoretical inquiry", Journal of Ethnic and Migration Studies, 36: 1587-1617. Mabogunje, A. L. (1970) "Systems approach to a theory of rural-urban migration", Geographical Analysis, 2:1-18.

### Human mobility, economic crisis and tourism in the Balearic Islands (Spain)

*Pere A. Salvà-Tomàs (Universitat de les Illes Balears)*

The mass tourism development in the Balearic Islands (Spain) with more than 12 million tourists that consumed more than 110 million overnight stays in 2011 it has impacted in an intensification of the human mobility. The tourism has been a basic factor of a call-effect so much for an economic labour as residential immigration type that globally almost represents 90 percent of the population's growth in the last 15 years. The high immigration index a presence of more than 240.000 foreigners (the 22% of population's resident) that he is defined through a model "New California migration type" in which coexists an and/or entrepreneurial economic immigration and a leisure residential immigration. The dynamism of the economic activity implied the arrival of a high number of economic migrants (labour and /or entrepreneur). But the current economic crisis has implied a decrease of the arrival of tourists, a crisis of the construction sector and a recession of the family expense. This fact has important consequences on the labour market that reduces its work offer and the phenomenon of the unemployment appears, with hypothetical processes of the labour migrants return. On the contrary the economic crisis has not affected from a significant way to the residential immigration (basically German and British people). Of they are deduced it behaviours differed according to the migration typologies and the motivations for migrate to the Balearic Islands. The paper seeks to contribute knowledge on the interrelation among human mobility, economic crisis and tourism.

### Toward structural migratory wars?

*Stéphane Rosière (Université de Reims)*

This presentation aims to consider international migratory flows as the source of a global and structural conflict. This conflict results from the distortion between the neoliberal economy and the demographic evolution of the planet. The neoliberal economic system produces concentration of richness in North and structural underdevelopment in South, at the same time the growing population of South looking for employment, richness and political stability is pushed Northwards. But North countries are closing their borders. The « rebordering of the North » (Andreas and Biersteker, 2003) generates the construction of smart borders and new walls and fences all around the world (part 1). The 'teichopolitics' (Ballif and Rosière, 2009), or politics of territorial closure (esapecially on borders) is developped all over the world. Most of the new border-barriers (often high-tech fences) are erected to prevent illegal migrations (while their role against terrorism or smuggling seems rather marginal). We can analyse the process of border-barriers construction as a paradoxical answer to underdevelopment (Part 2). Beyond this macro-economical and political analysis, we suggest that furthermore contemporary world is now confrontate to a low-intensity structural migratory war. Do we enter a 'new history' characterized by a structural migratory war located at the contact of North/south - According to such creations of Warfare as number of casualties, the up-to-date situation on main

North/South borders can be identified as a War (Singer and Small, 1972). This undeclared War is clearly a consequence of the capitalist development which can not be anymore considered as a peaceful system avoiding crisis and armed conflicts (as expected by 'end of history' and such theories).

## C08.17-08 - Global climate change, economic crisis and human mobility 4

*Chair: Josefina Domínguez-Mujica*

### Population Flows in Post-Socialist Rural Area: Case of Latvia

*Zenija Kruzmetra (Latvia University), Liga Rasnaca (Latvia University)*

The current research interest is due to remarkable population changes in rural territories at the beginning of 21st century which is determined by transformations in the Latvian political and economical systems and global processes. The authors' focus to find out regional differences of population flows in post-socialist rural area in Latvia. Latvia is characterized by intensive labor out migration during last two decades in different intensity. The situation is complicated by the negative natural growth. These processes mostly characterize post-socialist Central and Eastern European countries, as opposed to Western Europe and the United States. Authors are interested how these processes could be explained by theory of space of flows in post-socialist countries. The research goal included analysis of connectedness of flows with labor market relations in rural areas. Terry Marsden, professor at the Scottish University of Aberdeen, researcher of rural development apply network theory author's American sociologist Manuel Castells theory of space of flows, underlining the influence of people, capital and knowledge on labor market relations in rural areas. There is a lack of protection mechanisms in rural areas against dangerous influence of space of flows, to allow maintain a local labor market. As a result people in rural areas are unprotected against necessity of out migration. Quantitative and qualitative social research methods were used to describe the population inflows and outflows in different rural areas. One change that has attracted particular attention is the shift in the meaning of rural areas for local residents. During the latter half of the 20th century, people all over the world began to change their human value orientations, and wealthier people began to look for living spaces outside of the city centers - in suburban areas and in closer or more distant rural territories. This process led to a new inflow of residents and, consequently, to an increase in population numbers and substantial changes in population structures. The authors analyzed changes in population numbers between 2005 and 2008 in Latvia and the areas which surround the eight largest cities of Latvia in order to assess the peri-urban territory development situation. The author's analyzed data related to increases in population numbers, including those that can be attributed to migration. The post-socialist features of population in rural areas are expressed as nostalgia for large industrial type enterprises that would employ a large number of the local population. It is expressed repeatedly in the interviews with municipality chairpersons, which could be interpreted as barrier for involvement of new forms of employment and to encourage outflows dimension of rural population. Key worlds: space of flows, population inflows and outflows, regional differences

### Booming cities and cross-border migration to rural towns

*Birte Nienaber (Saarland University)*

Borders can have different characteristics of being. They can be barriers, filters or open spaces (LEZZI 1994). With the Schengen Agreement, the countries which signed this agreement opened their borders for the freedom of movement of people, traffic, capital and goods. Germany is surrounded by nine neighboring countries which have all signed the Schengen Agreement. Schengen as well as other EU regulations have made it possible for each person living in the EU to move to another EU country to live there. This freedom of movement has brought new cross-border arrangements. People e.g. from Luxembourg, the Netherlands (see also van Houtum/Gillies 2006 ) or Poland are moving to the nearby rural German peripheries where the living costs are comparably low, but still work in their home countries and build up transnational, cross-border societies. Especially the booming cities of Luxembourg and Szczecin lead to a pressure on the rural real estate market on the German side of the borders. This presentation will show the development of cross-border transnational migration systems and possibilities of cross-border governance of this phenomenon along the German borders based on the results different research projects carried out since 2009.

### Post-socialist urban population: Commuters and commuting in the Riga metropolitan area

*Maris Berzins (University of Latvia), Zaiga Krisjane (University of Latvia), Andris Bauls (University of Latvia), Artjoms Ivlevs (University of the West of England)*

Recent years have witnessed important changes in geographical mobility of the population in post-Socialist countries. The commuting field of R'ga enlarged due to residential suburbanisation and the intensity of commuting from the suburbs to R'ga increased in the 2000s. Besides, formation of the R'ga metropolitan area (RMA) is associated with specific features of Soviet urbanisation characterised by industrialization, concentration of investments into large cities and immigration. Among in-commuters to R'ga industrial workforce made more than 40% during the Soviet period, but situation changed in the 1990s because of demographic decline, rapid economic restructuring and related adjustments in the labour market. The aforementioned changes over the past decades also affected all aspects of commuter's composition. Therefore the main focus of our study is to contribute to the understanding of post-socialist population mobility. The aim of the current paper is to examine the patterns of commuting in R'ga metropolitan area by identifying different groups of commuters and to identify compositional differences between commuters and non-commuters. The analysis is based on an extensive survey of the R'ga metropolitan area, Latvia. To determine the individual characteristics which affect commuting probability, we estimate binary regression models. The results of the study indicate that people who suburbanised over the past decade were more likely to be commuters than were long time suburban





residents and suburban in-migrants from non-metropolitan regions. Thus, the impact of recent suburbanisation pattern is evident and confirms the previous results that residential suburbanisation, rather than labour-market change, contributed to the increase of commuting in the RMA. Regarding the compositional differences, we found that commuters differ from non-commuters both in R'ga and in the suburbs in regard to most of the demographic and socio-economic variables studied. Similarly, the compositional differences among commuters were found.



# C08.18

# Hazard and Risk

## C08.18-01 - Earthquake and Tsunami special session

*Chair: Shigeko Haruyama*

### **Tsunami impacts on a threatened island ecosystem**

*Ingo Hahn (Universität Münster)*

Tsunamis, like the 2010 tsunami in Chile, have severe impacts on the human life along the coast side. For 3 % of the human population of Robinson Crusoe Island this event was mortal. This Chilean island, although having only an area of 47 km<sup>2</sup>, is the prime conservation hot-spot within the country, e.g. hosting c. 20 % of the endemic bird species. Very little is known in general about the impacts of tsunamis on endangered floras and faunas. On Robinson Crusoe the endemic hummingbird, the Juan Fernandez Firecrown *Sebanoides fernandensis*, showed a total population size of about 1100 individuals. As a nectar feeder it highly depends on flowering plants, and has co-evaluated with an endemic Asteraceae species which is mainly found along the coast side. In this study we investigated how a tsunami functions as an example for a natural catastrophe endangering a critically endangered bird-plant system.

### **Potential Flooding by Tsunami in Coquimbo, Chile**

*Jose Novoa (University of la Serena)*

As part of the Diagnosis of the Risk Areas in Coastal Cities of Coquimbo Region (MINVU) and the project of Regional Planning for Risks Management of Coquimbo Region (MIDEPLAN, SERPLAC and the Agency of International Cooperation of Japan), presented the map for potential flooding by tsunami in Coquimbo (Chile). Methodologically based on models of the spread of tsunami (model TUNAMI-N) and the historical background (1730, 1922 and 1943 events) that have affected the bay of Coquimbo, are established by tsunami flood elevation and the height of the layer of water flooding above the ground in 3D supported by topobathymetric charts. The results obtained allow determine the most problematic situation from playa Changa southward, reaching the level of the 13 metre curve and a thickness of maximum flooding of 10 meters in the coastline that affects coastal environment that possess an important tourist and residential occupation altogether.

### **The North Sea Tsunami of June 5, 1858**

*Juergen Newig (Universität Kiel), Dieter Kelleter (University of Duisburg-Essen)*

Tsunamis along passive continental margins are rare, and those in shallow shelf seas mostly unknown. A thorough study of old reports, newspapers and other sources, however, gave a lot of useful hints for a tsunami in the North Sea Basin on June 5th, 1858, culminating in run up values up to 6 m along the southern west coast of Denmark.

The reports from official authorities and eyewitnesses, mostly published directly after the event, contain all phenomena known from ancient and modern tsunamis: single waves approaching with a loud noise, wave groups separated by longer time spans, extremely long wave crests, withdrawal of the sea in front of the first wave, extraordinary wave/run up heights during calm weather and low tide, and much more. The arrival time of the first wave in an area from the southern English Channel to the central west coast of Denmark give hints to a tsunami source in the wider Biscay region or south of it, sending one wave around the British Isles entering the North Sea from the NW, and another one entering from the English Channel and the Straits of Dover. As plenty of wave events are well known from the North Sea region, but nothing similar has happened since the last 150 years and long before 1858, there is no doubt that this extraordinary event was a tsunami and not another kind of wave phenomenon. In detail many questions (e. g. contradictory observations) remain unanswered. With this contribution we are only at the beginning of the study of tsunamis in the North Sea.

### **Influences of landforms on the extreme tsunami disaster caused by the 2011 off the Pacific coast of Tohoku Earthquake in the lower reaches of the R. Natori and the Sendai Plain, northeast Japan**

*Hiroshi Shimazu (Rissho University)*

The extreme tsunami caused by 'the 2011 off the Pacific coast of Tohoku Earthquake' attacked the east coast of Japan. The Sendai Plain was flooded widely by the tsunami and suffered heavy losses. The strong flood flow also ascended the lower reaches of the R. Natori in the Sendai Plain. Videos and photos which were taken during and after the tsunami event indicated that damages varied as to landforms. This Study aims to reconstruct the geomorphic processes of flood flow and ebb flow caused by the tsunami along the R. Natori and to discuss the influence of landforms on the tsunami disaster in the central part of the Sendai Plain. Firstly analyses on surface sediments, the micro-landforms and type and scale of the damages to the agricultural facilities were performed on the dry riverbed in the lower reaches of the R. Natori. The dry riverbed is separated by artificial dykes from the floodplain and which is used for farmland. Secondly extent of the tsunami flood and a diversity of the tsunami damages in the plain were reconstructed using videos and aerial photographs. And they were compared with the landforms. Height of the tsunami along the coast of the Sendai Plain was estimated over 3 meters. Although the devastating tsunami came into the plain, it was dammed by an elevated motorway which parallels the coast across the plain and is located 2.5 kilometers from the coast. The flow through underpasses of the motorway was weakened and reached an elevation of about 3 meters, 4 kilometers from the coast. The flood flow also went up the R. Natori and reached the points, 9 kilometers upstream from the river mouth along the channel and 6.5 kilometers on the dry riverbed. Both of the points are at an elevation of about 4 meters. In the lowest 2.5 kilometers reaches of the R. Natori the strong flood flow and ebb flow caused erosion on the dry riverbed and the river banks. In the next 1.5

kilometers reaches, although the flood flow was still devastating, there was no sign of the ebb flow. Because sedimentation process was dominant, sandy sediments were deposited. In the reaches between 4 and 5 kilometers from the river mouth, the flood flow went upstream gently on the dry riverbed. Relatively elevated islands surrounded by former channels, were not affected by the flood flow. Around the margin of the tsunami flooding the dry riverbed was inundated and thin tsunami deposits were left on it. In the plain between the coast and the motorway the strong tsunami flood went over the surface relief, such as beach ridges and natural levees, and destroyed most houses and high tunnel greenhouses. Tremendous woody and rubble debris were left on the plain. The weakened flow through the underpasses of the motorway traced former river courses and went up the plain. In this area the houses on natural levee were not damaged. After the tsunami disaster, floodwater widely covered the plain except beach ridges and natural levees within several days.

## C08.18-02 - Hazard and risk for future mitigation 1

*Chair: Shigeko Haruyama, Victor G. Jetten*

### **Toyooka 2004 flooding and community activities for mitigation**

*Shigeko Haruyama (Mie University)*

It is important that the hydrological infrastructure construction along the river, such as embankment and dam, is planning for natural hazard prevention works, however, the suitable land use planning and its methodology based on geomorphologic view are the most important for disaster mitigation and to make social capital supporting the evacuation activities and expeditious activities for interdependence assistance in each residence under emergency. In this study, the author clarified the flood features of 2004 Flooding in Toyooka City Area, Hyogo pref. in Japan and the community-based activity for disaster response of Toyooka City Area, paying attention to following points, 1) geomorphologic land classification map showing flood vulnerability factors related with flood characteristics of the Maruyama river basin, 2) relationship between land use change and land form should be understood for future sustainable land use planning, 3) local community-based activities for natural disaster reduction, specific flooding reduction. The specific local community in Toyooka City Area for disaster reduction is strongly demonstrating their local characteristics cultivated under their area history between flooding experience and prevention works against flooding. The author will discuss the flood vulnerability assessment of Toyooka City Area along the Maruyama river basin and the local community-based activity for disaster reduction of 2004 flooding in Toyooka City Area.

### **Locating choke points and mapping land use changes in select river systems of Metro Manila: Historical mapping of constriction and disappearance of waterways in urban settlements**

*Doracie Zoleta-Nantes (Australian University), Simeona Martinez (University of the Philippines), Rocelyn De Vera (University of the Philippines), Paulo Caparas (Department of Geography), Mart Cyrel Geronia (Department of Geography), Marie Joyce Ilagan (University of the Philippines), Neil Eneri Tingin (University of the Philippines)*

A historical mapping of constriction and disappearance, and the land use changes on the banks (20 m easement), of creeks and river systems in five study sites in Metro Manila, Philippines was undertaken during the last quarter of 2011 using GIS and participatory community mapping. The primary objective was to identify the 'choke points' and constricted portions of select waterways due to factors that are associated with unplanned conversions of river banks into concrete spaces due to the rapid urbanization

of Metro Manila and a number of adjoining towns and municipalities in Rizal and Laguna Provinces. These factors had greatly contributed to the widespread flooding that paralyzed human communities in most areas of the metropolis due to the flood events that were brought about by Tropical Storm Ketsana (Typhoon Ondoy - Philippine local name) on the last week of September 2009. A mapping of the flood depths that were experienced by the human populations in the urban settlements that developed in areas adjacent to the river systems was also undertaken. This was done to illustrate the physical-geographical-economic and social contexts of the 2009 flood events that devastated hundreds of communities in Metropolitan Manila area. The resulting maps and data bases are being incorporated into a risk assessment of urban communities in low-lying areas that are adjacent to some select waterways and river systems in the metropolis. The over-all long-term objective is to reduce the vulnerabilities and increase the resilience of prone urban settlements to flood events that are projected to recur more frequently due to the changing patterns of extreme weather events in the Philippines.

### **Landslide Hazard Zonation**

*Masood Beheshtirad (Azad University)*

Identification of regions having potential for landslide occurrence is one of the basic measures in natural resources management. Different landslide hazard zonation models are proposed based on the environmental condition and goals. In this research landslide hazard zonation map using multiple regression model was provided and applicability of this model is investigated in Bagh Dasht watershed. Dependent variable is landslide inventory map and independent variables consist of information layers as Geology, slope, aspect, distance from river, distance from road, distance from fault and land use. For doing this, existing landslides have been identified and an inventory map made. The landslide hazard zonation map is based on the multiple regression provided. The level of similarity potential hazard classes and figures of this model were compared with the landslide inventory map in the SPSS environments. Results of research showed that there is a significant correlation between the potential hazard classes and figures with the area of landslides. The multiple regression model is suitable for application in the Bagh Dasht Watershed.

### **Atmospheric droughts over North Eurasia since the middle of 20th century**

*Andrey Shmakin (Russian Academy of Sciences), Valeria Popova (Russian Academy of Sciences)*

Detailed statistical study of atmospheric droughts over North Eurasia is carried out for the period 1950-2011 based on daily meteorological records. Criteria for the atmospheric droughts include both low precipitation and high maximum daily temperature. Regions with high frequency of the atmospheric droughts include south of East European plain, south of Western Siberia, and parts of Eastern Siberia and Far East. Large-scale



atmospheric circulation situations favourable for the atmospheric droughts include combination of anomalous values of West Pacific and some other indices such as North Atlantic Oscillation, Polar-Eurasian, etc. Changes of the atmospheric drought frequency over the North Eurasia during the last decades are explored and mapped. Overall, the frequency of the atmospheric droughts has increased, especially over certain parts of Siberia and Far East, as well as over East European Plain (the latter due to the 2010 event). To a significant extent, increase of the atmospheric drought frequency is related to the changes in the large-scale atmospheric circulation. The statistical relationships between the atmospheric drought frequency and atmospheric circulation indices can vary on the decadal scale. Since the beginning of 1980s, there is a significant trend in some of the circulation indices values, resulting in changes of the atmospheric droughts frequency over North Eurasia.

## C08.18-03 - Hazard and risk for future mitigation 2

*Chair: Shigeko Haruyama, Victor G. Jetten*

### **The Research of the Residents' Experience and Behavior vs. the Local Government's Land Use Strategy under the Influence of Extreme Weather**

*Robert Y.S. Chen (Kaohsiung University)*

The long-term research focuses of geography lies on how people cope with environmental perception and their adaptation to mitigate the impact caused by hazards. Typhoon Morakot invaded Taiwan on August 7, 2009, leading to large scale of hazard, causing death toll of 673 people and 26 people missing, 24,950 people were evacuated as a result. It was also known as the worst flooding ever since the August 7 Flood in 1959. The rainfall hit the worst on August 8, winning itself the reputation of August 8 Flood in Taiwan. This research explores the coastal area of Pingtung County. Due to the blossom of fish farming, this area has been suffering badly from the groundwater extraction for over 30 years. Linbian and Jiadong Township have become the worst locations with the most serious problem of land subsidence. According to the survey the maximum cumulative subsidence has reached up to 3.02 meters, its current altitude is close to the sea level, resulting in habitual flooding during raining season as well as the nightmare of the local residents. While coping with general flooding issue, the residents have developed a series of contingency mechanism to reduce the threat to life and property caused by flooding. Nevertheless, August 8 Flood produced a record-high rainfall of 2500 mm, creating the most devastating hazard in Linbian and Jiadong Township. As to the residents, the power of flooding had gone far beyond any imagination derived from any flooding experiences they have had in the past. Consequently, the hazards derived from coping with current flooding based on their old experience have outweighed any harm before. Qualitative research method is applied to conduct in-depth interviews in an attempt to investigate environmental perception of residents in the research area, hoping to explore the adaptation of residents while coping with environment hazard after August 8 Flood. The preliminary research investigation discovers that the residents have suffered from flooding hazards and developed adaptation behaviors to cope with flooding. While facing the extreme abnormal rainfall in August 8 Flood, either hazard intensity has exceeded residents' imagination. Accordingly, traditional flooding adaptation methods are no longer useful. While being unable to be evacuated, most residents were trapped within the disastrous areas. Key words: Extreme Weather, Environmental Perception, Behaviors, Local Government. [1] This study is supported by the National Science Council of Taiwan. [2] Assistant Professor, Department of Geography, National Kaohsiung Normal University, Taiwan. [3] Professor, Department of Geography, National Kaohsiung Normal University, Taiwan.

### **Impact of Quaternary Climate Changes on Slope Instability, Case study: Molab Mountain Basin (Zal River), Iran**

*Manijeh Ghahroudi (Shahid Beheshti University)*

Problem statement: Glacial periods in mountainous countries of Middle East same as Iran have several glaciers due to the high altitude mountains of snow-line and also climatic and topographic conditions such as temperature, wind direction, rainfall and slopes which huge volume of their deposits was carried to slope and foothills by ice flow. Dry climate in the interglacial period caused to remain most of these deposits in the slopes and foothills and which causing instability for human activity and settlements. Zal sub-river basin of Molab basin is located in the middle of Zagros Chains (the south of Lorestan province) with an area of 660 square kilometers and its coordinates 32°47'50"N 47°59'50"E to 33°9'10"N 48°25'52"E. Glacial activity has been existed in this Basin especially during glacial periods and works digging of the glaciers are remained as circus and glacial valleys. More than 27 percent of the geological formations of the basin is Asmari limestone and the rest are respectively, Amiran, Gachsaran and Gurpi Formations. These four groups make all of the limestone formations in the sub basin, area of 415.2 square kilometers which is about 63 percent. The amount is sensitive to cryoclastic and it caused to destroy in the cold period. Other glaciers works in the basin are being deposited glacial sediments on the slopes and river beds which causing mass movements. Approach: In the research was determined domain of glacial deposit by using Topographical maps 1:50000, Radar data of Aster Sensor, LISS III and Pancromatic images of IRS Satellite and climatic data during 1985-2005. Fuzzy-Logic analyst was carried out in order to determine zones of instability in Zal sub-basin, because of using different variables, compared their and also coefficients are presented for each of the variables. Sum, Product and Gamma functions were used to assessment slope instability in the sub-basin. Results: The results showed that there is high unstable in Zal sub-basin. High and very high unstable domains are conformity with slopes of cirques and valleys end to cirques. Also the terraces on the edge of river valleys are unstable. Especially the terraces remained at altitude of 1600 meters near the upstream which is formed glacial deposits are the most unstable parts of the area. Fans and terraces of this river basin were exposure drastic changes. Conclusion: The nature of the glacial deposits and irritability of their through human economic activities have created hazardous conditions, so that Land on the terraces is affected by landslides. Several falls has occurred in valleys of the edge roads which during rainfall to dam front of water and with material and a sudden flood waters can threaten roads and bridges.

## Planning and Implementation of the Dyke Systems in the Mekong Delta, Vietnam

*Cong Huu Pham (Can Tho University)*

Floods are a dangerous threat and an implicit risk for farming communities in rural floodplains of the Mekong Delta (MD). The Vietnamese government decided the dyke system construction to control floods and ensure safety for life and livelihood of flood affected communities. The case study of this dissertation refers to Can Tho city, an average floodplain community of the MD, covering also 9 districts. Here a comprehensive dyke system has been constructed to control flood risks. This thesis investigates the existing problems in the dyke system planning and its implementation, dyke impacts on the natural environment and socio-economic development as well as the adaptability of the flood affected farming communities in the protected floodplains. The study used both qualitative and quantitative research methods to collect information and data. Besides Global Positioning System (GPS) and a digital camera were used to identify the location of the most important samples in the field and during the fieldwork. Fieldwork itself was mainly based on the two rural communes of Thanh Thang and Thanh Phu, which are representative for the overall rural situation in Can Tho city and the MD. The study found that the Vietnamese government had made a basically correct decision concerning the necessity of flood risk control by the construction of a dyke system. Dykes have practically guaranteed safety for agricultural livelihoods of the flood affected farming communities and positively contributed to agricultural farming transformation from rice into integrated rice-fish production and rural road improvement. However, a centralized top down approach was strongly applied thus not considering the experiences and all expectations of public organizations and local people. The individuals and local organizations played a very weak role in the whole planning and implementation process. Dyke system construction consequently created conflicts between central planners and local people. In addition, the negative impacts of the dyke system have become a great threat for sustainable development in terms of water pollution, natural fish exhaustion, soil fertility reduction, erosion and in some instances, also due to increasing inundation of the fields. Thus, the dyke system construction and planning as well as implementation strategies need to be studied further to minimize the negative impacts of dyke systems and to ensure a stronger inclusion of local people and their knowledge in further planning approaches. Key words: Dyke planning, implementation strategies, flood control, impact on and adaptability of rural communities

## Flood Risk Analysis for the Territory of Russian Federation

*Pavel Tersky (Moscow University)*

The research is concentrated on creating the system of quantitative evaluation of natural flood risk for the territory of Russian Federation. This system takes into account natural and social preconditions of flood forming. The taxonomical units are the federal subjects because of several reasons: planning of flood reducing activities and its financing,

collecting the hydrological and meteorological information, planning of economic and social activities usually carries out on federal and municipal level. To create the complex system of quantitative evaluation of natural flood risk there were solved two main goals - to define the most important hydrological characteristics (which determine the potential flood) and social-economic indicators (which show economic conditions on the one hand and the estimation of potential finance loss on the other). The main natural hydrological characteristics are: maximal depth of floodplain inundation; probability of water levels of riverside areas flooding; total duration of floodplain inundation; part of inundated area (compared to federal subject area); reach of river channel with the most probable floodplain inundation, which is defined by riverbed process type. The main characteristics of social-economic vulnerability are: population density; part of population which lives on potential floodable territory; human development index; long term assets; anthropogenic conditionality of natural disaster risk. According to expert opinions the most significant factors are the total duration of inundation and the part of population which lives on potential floodable territory. Flood risk is determined by these two groups of factors. Natural flood is multiple-factorial phenomenon and the risk assessment requires multivariate analysis. One of the methods of quantitative non-parametric analysis is PATTERN (Planning Assistance Through Technical Relevance Number). The final result of the research is the typological demarcation of Russian Federation by flood risk, expressed in numerical values for each federal subject. The flood risk is classified into 5 classes - from 'low risk' to 'extremely high risk'. The map of potential flood risk was created according to this typological classification. The typological classification of flood risk was verified on the different data. It corresponds to the list of the most vulnerable regions and regions with the highest flood losses. Also numeric values of natural flood risk and social-economic vulnerability correspond to the prevented damage data (correlation coefficient is 0.68). The highest potential flood risk is typical to Zabaykalsky, Krasnoyarsky kray, Kabardino-Balkaria and Severnaya Osetia republics. The safest regions are Vologodskaya oblast, Karelia and Altay republics.



## C08.18-04 - Hazard and risk for future mitigation - Poster session

*Chair: Shigeko Haruyama, Victor G. Jetten*

### Study of rockslide regions in the territory of Republic of Armenia

*Marat Grigoryan (Yerevan University)*

Modern processes and phenomena, such as rockslides, destructions, rockfalls, settlements, downpour, are wide-spread in the territory of RA, which affect country's economy, as well as became reasons for human victims. Among mentioned processes and phenomena in the Republic of Armenia the rockslides are very dangerous, which by their development, abundance are very dangerous. The wide abundance of rockslides is caused by seismic activity of the territory, geological, hydro-geological structure, slope's tilting, and geo-morphological conditions. The activity of the latter is mostly caused by human activity, wrong construction on slopes, wrong land development for agricultural purposes. In order to eliminate the results of the rockslide enormous means are spent (according to the latest data about 7 billion AMD annually). According to the data of latest studies, about 3500 rockslides are registered in Armenia. The total surface of rockslides is 122 thousand sq. km · Rockslides' phenomena are registered in 233 communities · Road with length of 240 km is damaged by 280 rockslides' Phenomena. A railway with length of about 5 km is damaged by 10 rockslides. In accordance with the data of rockslides' study the direct damage from rockslides' phenomena is about 43 mln USD, and the potential damage is about 54 mln USD. Depending on the level of places' danger in the past, huge engineering-geological, hydro-geological, geo-physical, geo-morphological, drilling, geodesic and other types of work have been performed in the territory of the republic. Today 387 most dangerous rockslide territories of RA consist danger of rockslides phenomena activation and even fall in several regions. Today the issue is raised from the viewpoint of estimation of anti-rockslide arrangements effectiveness as a result of rockslides phenomena study.

### Landslide hazard at the flysch-carbonate contact in SW Slovenia

*Matija Zorn (Slovenian Academy of Sciences and Arts), Blaž Komac (Slovenian Academy of Sciences and Arts)*

In Slovenia flysch rocks occupy app. 6.5% of the territory. They can be found in western and southwestern Slovenia where they are bordered with carbonate Dinaric Mountains. In the Vipava valley this lithological contact is expressed as a thrust between Mesozoic carbonate rocks of the Trnovski gozd high karst plateau and the underlying impermeable Eocene flysch rocks in the Vipava valley. During the Pleistocene, up to 50 metres thick slope debris accumulated on the base of the slopes which extend from 100 m to 900 m a.s.l. The accumulations are mobile due to numerous karst springs which appear on the

surface or below the sediments at the contact between carbonate and flysch rocks. Until now, about 70 landslides have been registered on the slopes above the Vipava valley between the Razdrto village and the town of Nova Gorica at the distance of app. 50 km. Most of the landslides have been registered during a recent motorway construction. Some of the fossil landslides were reactivated due to this construction. Sediments of a large Pleistocene landslide were found near the village of Selo measuring up to 150 million m<sup>3</sup>. In the last decade some large landslides were triggered due to heavy precipitation. In November 2000 the Slano blato landslide was triggered. The landslide is more than 1300 m long, from 70 to 150 m wide and about 10 m deep with a volume of about 1.000.000 m<sup>3</sup>. Landsliding at this place has been known there for four centuries at least. The Slano blato landslide did not cause major infrastructural damage but it endangered the village of Lokavec. The cost of major mitigation measures which have been undertaken is almost 10 million euro. After heavy precipitation in autumn of 2010 that caused large floods in Slovenia, another two landslides were triggered in the area. The Stogovce landslide which covers app. 15 ha destroyed the road to the Trnovski gozd high karst plateau and blocked a minor stream. Infrastructure was heavily damaged. Some weeks after several 100.000 m<sup>3</sup> of material were moved by the Znosence landslide. The landslides on the carbonate-flysch contact present a constant threat to local population. On one hand, the movements can be accelerated and at least some of the landslides (e.g. Stogovce landslide) may provide mobile material for dangerous debris flows. On the other hand, landslides on steep flysch and rubble slopes constantly damage roads and other infrastructure, such as waterworks and the electric power supply system for the karst Trnovski gozd high karst plateau. In the long run some of the landslides may endanger the motorway of the fifth European transport corridor from Barcelona to Kiev which has been built exactly on the slopes prone to landsliding.

### Urban floods in the Arouca village (Portugal): Influence of surface runoff network and land use dynamics

*Inês Marafuz (University of Oporto), Alberto Gomes (University of Oporto)*

Urban flooding is a phenomenon which reflects the increasing urbanization process of the territory. Although not intensively studied in Portugal, urban flood episodes are growing throughout the country in frequency and affected areas. This type of flooding, assuming in many cases the flash floods characteristics, is the result of water concentration in topographically depressed areas during episodes of intense rainfall over short time. This floods events are enhanced by soil sealing and by malfunction or undersized pluvial rainwater drainage systems. The most critical phase of these events occurs when the capacity of this underground drainage system is exceeded, causing the inversion in flow direction and consequently, its concentration in nodal points and emergence at the surface. To understand the dynamics of the surface runoff in the Arouca urban area (Portugal), it was analysed the role played by each element of the urban grid towards the surface runoff process. For this, it was considered: (1) the slopes that favor the rapid and

intense spread of the flow, (2) the topography and the urban morphology that interfere directly in the surface drainage pattern. By the interpretation of aerial photos and recent orthophotos, it was also analysed the evolution of land use in the last five decades, aiming to understand the effect that gradual sealing promoted in the increase of the superficial flow component. The collected inventory has enabled the identification of the most susceptible areas in the village and the exposed elements to this risk. The most problematic areas corresponds to the lower areas of the village and some streets where occurs a dual concentration of the runoff, i.e., the surface and the pluvial drainage flows. On the other hand, there was an increase of 21% on artificial surfaces, as a consequence of forest and agricultural areas decline between 1958 and 2005. The chosen methodological approach and the obtained results are a contribution to improve the land planning on the Arouca municipality.

### **Centurial channel and landcover change of the valley floodplain and its implication on flood hazard, Kaoping River, Southern Taiwan**

*Su-Min Shen (Taiwan University)*

The Kaoping River (KPR) is a small mountainous river with a length around 170 km, the area of 3250 km<sup>2</sup> and a very high sediment yield (11,000 t km<sup>-1</sup> yr<sup>-1</sup>). Its main trunk and major tributaries are characterized by braided channel pattern wherever the valley is wider. As many river valley around the world, its floodplains have experienced significant human modification over the 20th century. In 2009, Typhoon Morakot, with extremely intensive rainfall (> 150-year return period), caused severe flood hazards and has aroused great concern of the floodplain management especially when it is suspect that the frequency of extreme weather events is rising in Taiwan. This study aims to investigate the landcover change of the valley floodplains of KPR's two major tributaries, the Nantszhsien Stream and the Laonon Stream, over a century and its implication on the flood hazard. Landcover and geomorphic interpretation are completed by using historical maps, aerial photographs and orthomaps from early 20th to 2009 (after the typhoon) on a GIS platform. It is found that along with the process of channelization, the former floodplain has been reclaimed, mainly for agricultural purpose. The flooded area induced by Typhoon Morakot was within the former active-channels zone identified from 1948 aerial photos and historical maps published in 1920s for the study area. These pictorial materials together provide a good baseline for delineating the so-called 'fluvial territory' that is wide and continuous enough to guarantee the floodable areas to minimize the risk to the inhabitants. It also contrasts the space of the 'river reservation zone', in which the development is prohibited by law.

## C08.18-05 - Vulnerability and Resilience 1

*Chair: Shigeko Haruyama*

### **Spatial and Social Inequities in Exposure to Flood Hazards: A Case Study in Miami, Florida**

*Jayajit Chakraborty (University of South Florida), Timothy Collins (University of Texas), Sara Grineski (University of Texas), Marilyn Montgomery (University of South Florida)*

Under the rubric of environmental justice (EJ) research, many quantitative studies have focused on investigating whether environmental hazards are distributed evenly across society, or if minority and low-income communities are disproportionately exposed to such hazards. While EJ studies in the U.S. have traditionally focused on the unequal distribution of anthropogenic hazards such as air pollution or hazardous waste facilities, Hurricane Katrina and subsequent government failures in responding to this disaster have prompted researchers to examine the EJ implications of geophysical events such as hurricanes and floods. Our paper contributes to this emerging literature on social vulnerability to natural hazards by analyzing racial/ethnic and socioeconomic inequities in the geographic distribution of flood risk in the Miami metropolitan statistical area (MSA), Florida. With a population of 5.6 million (2010), the Miami MSA is one of the largest coastal metropolitan areas in the U.S. and encompasses the three most populous counties in the state of Florida. Located between the Gulf of Mexico and Atlantic Ocean, Miami is one of the most hurricane-prone urban areas in the world and also one of the most ethnically and socially diverse MSAs in the U.S. The spatial extent of flood exposure is typically measured using 100-year flood hazard zones (areas with a 1% chance of flooding per year) provided by the U.S. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps. These 100-year zones serve as the basis for U.S. flood insurance policy and control structures, and have been used in recent studies to assess social vulnerability to flood risk at the neighborhood level. Our study, however, extends this approach to make a meaningful distinction between different types of flood zones, based on the assumption that social characteristics of residents exposed to flood risk depends on the location/nature (coastal vs. inland) and frequency/probability (100-year vs. 500-year) of flooding. This study thus seeks to determine if the significance of various socio-demographic predictors of flood risk differs across relevant flood zone categories in the Miami MSA. Potential flood risk is measured as the proportion of a block group's area within the boundaries of 100-year coastal flood areas, 100-year inland flood areas, 500-year flood areas, and areas outside flood zones. Statistical analyses are based on locally derived spatial autoregressive models that explicitly account for spatial autocorrelation. Preliminary results indicate that racial/ethnic minorities are more likely to reside outside flood zones, but minority residents are significantly overrepresented in inland flood zones compared to coastal zones. Our findings underscore the need to distinguish between

various flood zone categories in future studies on social vulnerability to flood risk. This research is supported by the U.S. National Science Foundation (CMMI 1129984 and 1130191).

### **Public participation and institutional alignment in river governance: Multi-stakeholder platforms for Tanshui River Basin Management**

*Sue-Ching Jou (Taiwan University), Yu-Ling Wang (Taiwan University), Yu-Ping Wu (Taiwan University)*

The purpose of this paper is to use the concept of "multi-stakeholder platforms (MSPs)" to identify mechanism of institutional alignment for public participation in integrated watershed management in Taiwan. It focuses on examining the role of intermediary organizations in participatory river governance by using Tanshui River Basin Management in the capital region of Taiwan as case study area. In accommodating severe flooding and landslide hazards in the capital region, Taiwan government has allocated huge amount of budget for flood control measures and have also been actively calling for public participation in watershed management since the mid of 2000s. However, this mode of public participation is apparently characterized by and limited in organizational participation. Although this is highly related to the contextual development of democratic governance of Taiwan's environmental management, this form of institutional alignment is worthy of further empirical investigation to reveal the nature of public participation in Taiwan's integrated watershed management. By investigating the activities that civic organizations and NGOs take part in and issues they concern the most for Tanshui River Basin Management since the year 2006 to current dates, this paper tries to summarize the characteristics and modes of participatory river governance in Taiwan. It aims to find out institutional and quasi-institutional platforms that have been exercised as new mode of collaborative governance in watershed management between the state and the civil society in Taiwan.

### **Reduction of urban flood vulnerability by collaborative modelling**

*Mariele Evers (Universität Wuppertal), Andreja Jonoski (UNESCO-IHE), Leonie Lange, Aklilu dinkneh Teklesadik, Cedo Maksimovic (Imperial College London), Susana Ochoa Rodriguez (Imperial College London), Vivian Juliette Cortes Arevalo (CNR-National Research Council)*

This paper presents an attempt to enhance the role of local stakeholders in dealing with urban floods and reducing flood risk. The concept is based on the DIANE-CM project (Decentralised Integrated Analysis and Enhancement of Awareness through Collaborative Modelling and Management of Flood Risk) of the ERANET CRUE programme. The main objective of the was to develop and test the advanced methodology for enhancing the resilience of the local communities to flooding. Through collaborative modelling together with stakeholders and citizens, a social learning process was initiated which will enhance

the social capacity of the participants and multipliers due to the interaction process. The other aim of the project was to better understand how data from hazard and vulnerability analyses and improved maps, as well as from the near real time flood prediction, can be used to initiate a public dialogue (i.e. collaborative mapping and planning activities) in order to carry out more informed and shared decision making processes and to enhance flood risk awareness. In detail the objectives of the DIANE-CM project were: Development of a shared understanding of current flood risk Development and evaluation of alternatives for FRM Flood risk alternative simulating and testing under different scenarios Support for negotiation and selection of commonly agreed alternatives The concept of collaborative modelling was applied in two case studies: (1) the Roding river/Cranbrook catchment in the UK, with focus on pluvial flooding, and (2) the Alster catchment in Germany, with focus on fluvial flooding

### **Vulnerability Wiki – A collaborative knowledge platform**

*Antje Wegner (Karlsruhe Institute of Technology), Bijan Khazai (Center for Disaster Management and Risk Reduction Technology)*

The term vulnerability is used in various disciplines and contexts ranging from disaster management and reduction to ecology, public health or climate change and adaptation. Within the last 20 years such a multitude of ideas about how to conceptualize and measure vulnerability was discussed and published that one can hardly keep track with the developments. The challenge for newcomers, practitioners and even experienced researchers to derive appropriate methods, indicators and criteria for a specific vulnerability assessment is broadly acknowledged and described. Vulnerability Wiki ([www.vuwiki.org](http://www.vuwiki.org)) is a collaborative knowledge platform based on Semantic Media Wiki and provides researchers and other stakeholders in the field of disaster vulnerability assessment helpful tools to structure and access information about vulnerability assessments. In comparison to conventional wikis a semantic wiki enables the organization of content through an ontology, which could be understood as a hierarchical representation of concepts and their interrelations in a certain knowledge domain. The aim is not at 'synthesizing' any kind of holistic and comprehensive model for vulnerability, but to develop a uniform ontology that allows the annotation of key categories and properties of vulnerability studies so that assessments can be made comparable and easily accessible at a glance. The wiki considers vulnerability assessments from four different perspectives: What is the vulnerable system, what are the drivers of vulnerability, which (spatial and temporal) reference framework is set in the assessment and finally, which methods are applied to assess or measure vulnerability? The ontology was elaborated through an iterative participatory process with an interdisciplinary research group at KIT. The semantic structure was validated and revised through 'test-cases' and discussing the 'fit' of the terminological structure to the content which should be organized by it. The ontology is implemented in a semantic wiki through a step-by-step form which allows for capturing structured information on the vulnerability study and

semantically encoding it at the same time. Currently about 50 assessments are populated in the wiki as a 'basic stock'; a number which is expected to increase after the official release of the wiki in December 2011. Like in most taxonomic approaches in vulnerability research or social science in general we will always encounter some difficulties in "classifying" all potential objects by a predefined set of categories and properties. Nevertheless the aim of the project was to provide an initial ontology framework for vulnerability studies and implement this in a collaborative platform. This provides a good starting point for organizing structured discussions regarding the different approaches to vulnerability assessment.

## C08.18-06 - Vulnerability and Resilience 2

*Chair: Shigeko Haruyama*

### Socio-Economic Dimensions of Vulnerability to Flooding in Selected Communities in Lagos, Nigeria

*Adeniyi Gbadegesin (University of Ibadan)*

Nigeria is a disaster prone country. The environmental problems associated with uncontrolled expansion and poor management has increased the vulnerability of Nigerian cities to major disasters. The combination of physical development on unsuitable lands such as wetlands, slopes, flood plains and other environmentally sensitive areas, and overcrowding, all exacerbate environmental degradation and vulnerability to environmental hazards in many of these cities especially Lagos. Flooding has become a major problem and a major issue on the political agenda in Lagos in recent years due largely to the increased frequency and intensity of these events. Climate change and anticipated increases in flooding will exacerbate the existing poverty among the urban poor which are in most cases worstly hit. Thus, this study examines the nature of livelihood systems and how these shape victims' perception of floods on one hand, and the implications of the existing patterns of vulnerability created by gender, income and social position including the nature of physical infrastructure on the households' ability to adapt to the effects of flood and coping among victims in Lagos. The study is hinged on a comprehensive conceptual framework and terminology of vulnerability that facilitates the integration of the different research traditions involved in vulnerability and adaptation to climate change research. The study utilized data from both primary and secondary sources. The primary data include questionnaire administration and Focus Group Discussion sessions among the flood victims in the affected areas. The secondary data on the other hand, include data from the Lagos State Emergency Management Agency and the Ministry of environment on flood victims in the State. Questionnaires are drawn to reflect the gender characteristics of respondents. This is to address gender differences in coping practices and adaptation. The result of the study is useful in designing appropriate institutional interventions capable of transiting victims from being painful victims to developing adaptive capacity to live with recurring floods. Key Words: Climate change; Urban vulnerability; Adaptation; Coping mechanisms, Flooding, Nigeria

### Persistent resilience and political opportunism: Glimpses of everyday life in Delhi's summer

*Chandra Kumar (Aberystwyth University)*

Study of resilience has focussed on the inherent capacity of the communities and its ability to devise innovative coping strategies to reduce the impact of any risk. This paper travels further and analyses the entry of political opportunism which encashes the

condition of persistent resilience for political gains and in the process makes the resilience less valuable. In the extreme heat of Delhi's summer, households use various coping strategies to fulfil their daily water requirements. Since centuries, the city residents have developed a rich system of water resilience in the form of cultural practices and behaviours. These practices and behaviours are time-specific and locale specific, and reflect persistent resilience of the communities during extreme summer every year. However in politico-technocratic era of urban water supply system, such cultural norms have been given little space for obvious reasons. It has made Delhi's summer more difficult in terms of water availability for the household and the communities. State has realized it and has started promoting the age-old water practices and behaviours. However, local politics favours the situation of water crisis, in place of water resilient practices, to capture public support. Not only it affects the inherent coping capacity of the communities, but also it devalues the resilience. Using qualitative and quantitative analysis, this paper will argue for better understanding of political use of persistent resilience in the context of urban waters in the global South. Key words: persistent resilience, Delhi, political opportunism, waters, global South

### Is vulnerability 'a mere matter of social-physical problem' in urban areas? – A case study in Bantul District – Indonesia

*Dyah Rahmawati Hizbaron (Gadjah Mada University), Martin Coy (Universität Innsbruck), Muhammad Baiquni (Gadjah Mada University), Junun Sartohadi (Fachhochschule Koeln), Rijanta Rijanta (Gadjah Mada University)*

Scientific endowment has evolved around finding feasible solution towards many urban problems including minimizing vulnerability towards natural disaster. Herein, the vulnerability refers to classic separation between social vulnerability (SV) and physical vulnerability (PV) which address pre-existing condition of being unfavorable due to seismic hazard expressed on a scale from 0 (no loss/damage) - 1 (lethal/full damage) based upon these following criteria, i.e. physical, demographic, social-economic, losses, hazard, and built-up environment. In accordance, this research aims to evaluate whether vulnerability is 'a mere matter of social-physical problem' in urban areas using a case study of vulnerability integration into spatial plan in Bantul District, Indonesia. Bantul has exposed to (1) seismic hazard; (2) rapid land conversion; (3) economic transition and (4) is predominantly inhabited by poor to medium scale households. It experienced 6.2 Mw earthquakes in May 27th, 2006 which caused damages nearly 80% out of the 508 km<sup>2</sup> total area. The research method covers two phases, (1) generate SV and PV scenarios using spatial multi criteria evaluation (SMCE) based upon weighted criteria and (2) evaluate its integration into spatial plan using semi-structured questionnaire to reveal hidden criteria which contribute to vulnerability. The research findings are twofold. First, SV and PV scenarios have revealed that densely populated and developed areas have exposed to higher vulnerability compared to other areas. Second, the spatial plan has not served as familiar policy direction that assists local people to avoid hazardous areas,

which may increase their vulnerability. Ineffective spatial plan triggers intensive land development in certain nodes which are subjected to seismic hazard, escalates accumulation of people and their assets, and induces vulnerability. In summary, the vulnerability is not 'a mere social-physical problem' however it is embedded within policy making process. Thus, policy formulation, implementation, monitoring and evaluation processes have somehow hold formidable role to determine vulnerability level in the research area.

### **Vulnerability and resilience: Complementarity, interdependence or subordination?**

*Iulian Catalin Stanga (University of Iasi)*

In the last three decades, vulnerability and resilience have become two basic concepts in risk assessment and crisis management. No scientific study can be realized, no technical measure can be implemented, and no political or administrative decision can be or should be adopted, without having to know the susceptibility of any system to be damaged by a destructive event, its capacity to cope with a crisis or to recover from a disaster. Although in the scientific literature, semantics of vulnerability and resilience is somewhat clear and unitary, many perspectives and distinct points of view can be cited due to very large conceptual sphere and to different fields of application: ecology, social sciences, psychology, economy, health care, risk assessment etc. However, are they complementary, interdependent or subordinated to each other? This article aims to answer this question by creating a conceptual framework, applicable on global, regional or local level and in relation with different categories of hazards. In this purpose, an exhaustive list of factors that influence vulnerability and resilience was created based on literature review and on our own studies. To create a logical scheme, all factors were grouped in several main groups: habitat and technical urban facilities, infrastructure, economical indicators, social and demographical variables, education, health system, environment quality, emergency management etc. A general graph matrix was created to assess the degree of determination or subordination of each factor on a dichotomous query: 'Does factor X affect factor Y?' ('yes'=1; 'no'= 0). This matrix allows calculating the influence score (the number of Y factors influenced by X), dependency score (the number of Y factors that influence X) and the general level of determination applying a mathematical relation. A second matrix allows the identification of correspondence and/or connectivity between vulnerability and resilience factors and to assess the degree of complementarity, interdependency or subordination. Yet, vulnerability can be the attribute of a larger category of systems than resilience is. Moreover, there are four extreme situations: low vulnerability - low resilience; high vulnerability - high resilience; low vulnerability - high resilience; high vulnerability - low resilience. Each case must be analyzed individually or it is possible to set up a model based on scale/level and factor analysis?



# C08.19

# Health and Environment



## C08.19-01 - Access to Care 1

*Chair: Wuyi Wang, Mark Rosenberg, Thomas Krafft*

### Victims of location: Access to health care in the Lake Bosomtwe Basin of Ghana

*Charles Adu-Gyamfi (University of Cape Coast), Albert Abane (University of Cape Coast)*

The paper examines the spatial distribution of health care facilities, and factors that determine access to health care facilities in the lake Bosomtwe basin of Ghana. The study employed a descriptive design to examine the effect of the location of health care facilities on access to the facilities. Employing both quantitative and qualitative methods, primary data was generated for the study using interviews, questionnaire and observation. 120 respondents were selected through a simple random sampling technique for the quantitative aspect while 10 health care personnel and 6 chiefs were purposely selected for in-depth interview. Quantitative data were processed using SPSS version 16.0 for windows; the data were analysed using chi-square and simple frequency and findings presented in tables and graphs while qualitative data were categorised into appropriate themes and analysed accordingly. Health care facilities were found to be inadequate and sparsely distributed with only two clinics located in the study area serving residents of 22 towns. Capacity of the health care facilities within the study area was found to be low in terms of infrastructure, staffing and supply of equipment, therefore affecting utilization. The study also reveals that factors such as distance to health care facilities, poor quality of roads, lack of transport to convey sick people, are influential factors in the geographical context of access to health care facilities. The paper concludes with recommendations for interventions such as improvement in the road network and increase in the number of health care facilities in the area as well as ensuring the use of the lake as a means of transport for mobile clinics in the communities along the lake front.

### Telemedicine in tropical and subtropical African countries against the backdrop of similar solutions implemented in Asian countries

*Izabella Lecka (University of Warsaw)*

Telemedicine in tropical and subtropical African countries against the backdrop of similar solutions implemented in Asian countries This paper concerns the use of telemedicine in tropical and subtropical African countries in the years 2000-2009, as well as the comparison of this process with analogical developments in tropical and subtropical Asian countries. Basic information on telemedicine projects come from the MEDLINE database. This is a part of a larger publication, therefore due to the limited time available it has to be abbreviated. This paper includes a definition of telemedicine, together with a

characteristic of the telemedical solutions in Africa and Asia and geographical conditions (referred to as the country-of-origin effect), supporting (or not) introduction of such solutions. In order to carry out a synthetic analysis, it has been suggested to make use of the method referred to as the 'melting pot of forces'.

### Migration and health in Nicaragua

*Cecilia Gustafsson (Umeå University)*

During this session I will present results from my on-going Ph.D- study, which explores interconnections between migration and health in Nicaragua using a mixed methods research design. Migration and health is connected in a multitude of ways. As migration processes are embedded in peoples' lives (as well as in societies as a whole) they naturally affect and are affected by several aspects of human existence, including health and care. In order to understand the enactment of the migration-health nexus in the Nicaraguan setting, this study approaches the topic holistically, and emphasizes the importance of the socio-economic and political contexts in which the nexus takes place. Migration is common in Nicaragua; internal migration flows mostly go from rural to urban areas, and international flows are predominantly directed towards Costa Rica and the United States. The majority migrate in search for job opportunities since these are scarce on the Nicaraguan labour market. Results from my study show that the implications for health and care - for both the migrants and their family members left behind - are complex, multifaceted, and often of both positive and negative character. Migrants may face dangers on the move (especially if they cross borders without legal documents), and they often have to endure tough working and living conditions in new and sometimes hostile environments. Access to health services in the destination country may also be constrained for migrants, especially if they are undocumented. The left-behinds may improve their living conditions (food, housing, education, etc.) if they receive remittances from the migrating family members. Statistics and survey data in this study also show that remittances are used to pay for health care and medicine, thus ameliorating access to health care. This may in fact be a reason behind migration decisions for some, since not all health care services and medicines in Nicaragua are free of charge. The migrants and their family members also go through much psychological stress, particularly due to the separation from their loved ones. The separation between family members also has consequences for care structures, e.g. when parents leave their children in the care of others.

### Adherence to Antiretroviral Therapy in Botswana

*Fabian Schlatter (Universität Erlangen-Nürnberg)*

Botswana is one of the countries which is most affected by the HIV/AIDS epidemic. The Botswana government, with aid of foreign donors, has launched a comprehensive antiretroviral (ARV) program (MASA) with the outcome of now having achieved universal



access to ARVs (according to 2010 WHO ARV-guidelines). Antiretroviral therapy requires a regular and lifelong intake of medicine and thus not only puts a stress on the health care sector which has to attend a great number of patients and which also has to ensure long-term funding. It also puts stress on the people affected by the disease. They not only have to visit the clinics on a regular basis for checkups, but also have to take the medication on a daily basis and have to deal with possible side effects. An adequate adherence to medication is essential not only for the patients, but for the success of the program in total and in result for successfully combating the epidemic. On the other side, non-adherence can lead to therapy failure and cause drug resistance of the virus. Several factors have been identified to influence the adherence of ARV treatment. These include (among others) traveling costs to the clinic, knowledge about HIV/AIDS, stigma, and alcoholism (see Kip et al 2009). Yet, while data that ground these findings were mainly taken from clinical studies, little is known about how people deal with lifelong medication outside the clinical setting in their everyday life in the context of this highly discriminated and stigmatized disease. To better understand how medication is embedded as a daily repeating routine first empirical results from the ongoing study will be presented. The research was conducted in Gaborone, the capital, and in rural settings of Botswana. Some core questions that will be addressed are: How is a lifelong medication regime embedded into daily life and what consequences does this bring on an individual and societal level? How is the perception of HIV/AIDS changing due to the introduction of HIV medication? Where are spaces of adherence; and spaces of risk to non-adherence not only on a physical, but also on a social level? What institutional settings enable or inhibit and structure adherence to anti-retroviral therapy?

## C08.19-02 - Access to Care 2

*Chair: Wuyi Wang, Mark Rosenberg, Thomas Krafft*

### **The Role of Community-based Health Care Centre on the Health Outcomes of the Elderly: A Lesson to Learn from Indonesia**

*Evita Hanie Pangaribowo (University of Bonn)*

The increasing trend of aging population in Indonesia and other developing countries is not only an indicator of demographic momentum, but it also leads to more consequential matters for socioeconomic condition of elderly people. On the economic aspect, the increasing of elderly means increasing more budgets on social security. In the case of developing countries where social security functions have not been well established and performed optimally, the role of community and extended family is largely significant to maintain the quality of life of the elderly. Using the case of Indonesia, this study examines the role of Posyandu Lansia (Health Care Centre for the Elderly) on the quality of life of the aged. The determinants of elderly participation in Posyandu Lansia are also investigated. This study employs the rich longitudinal data of Indonesian Family Life Survey (IFLS). IFLS collects longitudinal data on household characteristics, the communities in which they live, and the health and education facilities they use. IFLS round 2007 provided a particular section of Posyandu Lansia in the community questionnaire. The results show that education attainment and knowledge on health facility and service increases the probability of participation in the community health care centre. Participation varies across regions. In addition, the presence of health care centre for the elderly in the village has a significant role in enhancing quality of life of elderly people through maintaining physical and mental health of the elderly. Controlling for individual characteristics and socioeconomic variables such as education, income, and access to formal health care facilities, the elder people who participate in the health care centre for the elderly in the village have less sickness period and lower level of depression. Hence, it can be concluded that the health care centre for the elderly in the community might provide informal support for people who have no mean or lack of formal support. The establishment of health care centre for the elderly in Indonesia is an alternative strategy to promote the quality of life of elderly which can be applied in other Asian countries, particularly the developing countries which might experience elderly explosion in the future.

### **Spatial Justice and Hungarian healthcare policy**

*Viktor Pál (University of Szeged)*

The paper deals with the most important connections between the transformations of the Hungarian health care system, the health care policy, and the spatial aspects of the equal opportunities. The issues related to equal chances and spatial justice are ones of the

most important questions regarding the healthcare policy in postsocialist countries. Before the neoliberal turn of these economies the finance of the welfare systems was manageable. Therefore the spatial justice could play a major role in the organization of healthcare provision. However, the demographic and economic processes and increasing expenses of healthcare caused paradigm shifts and 'western' societies moved further from the principles of equal chances. Effectiveness and financial sustainability became central guiding principles of the territorial organization of healthcare provision. Therefore, the two main (and often conflicting) ideas - equal chances and effectiveness - formed the healthcare policy in the last decades. The aim of the paper is to analyze the role of the concept of spatial justice in Hungarian healthcare policy during the reform processes of the last years. The Hungarian case could contribute to the better understanding of the postsocialist healthcare policy tendencies in general, too. The study is based on the analysis of development documents, regulations, documents related to legislation, articles and media reports on healthcare reform and interviews with key actors of the reforms. The research also seeks to answer the question that whether it is possible to adopt a policy which considers the principles of equality and effectiveness in the same time. Or is it an utopia, and spatial justice is the antagonist of the effective a financially sustainable system?

### **The Romanian health care system, between crisis and reforms**

*Liliana Dumitrache (University of Bucharest), Zamfir Daniela (University of Bucharest), Dumbraveanu Daniela (University of Bucharest)*

The paper aims to achieve an analysis of Romanian Health Care System during the post socialist period, highlighting the challenges and failures in the process of redesigning the whole approach of healthcare. During socialist period Romanian Health Care System was organised according to the Semashko model: totally centralised, state owned, financed by state budget and coordinated by Ministry of Health; increased costs of medical assistance coupled with reduced budget, low quality of medical services resulted into a crisis of HCS requiring its reform. The reform of the Health Care System has started in 1990, and the main change has occurred at the level of financing the medical services through introducing as mandatory the health social insurances (Bismark-ian model) along with other sources of financing (Health Insurance Law, 1998) administered by National Insurance House that contracts services from providers. Despite good intentions, the reform experienced many difficulties leading the system in numerous situations of crisis; after years of struggling with under financing, (2,9% of GDP in 1990 and 3,6 % of GDP in 2010) Romania has some of the worst health indicators in Europe. The higher demand of medical assistance, the inequitable and inefficient resources allocation, has resulted into depreciated health care services and limited access of population to them while informal payments to the doctors determined the development of a parallel economy of healthcare, expanding the health care inequalities in terms of access and quality. Even if the private health care sector experienced a powerful development after 2004 and it is

perceived as an alternative to the public health care system the accessing is still restricted for particular population categories due to its high costs and location. The population ageing will increase the pressures on health care and consequently the health care expenditure while the migration of health skilled professionals (considered as public employees and affected by numerous wages cuts) towards western European countries is threatening again the system sustainability. These are requiring radical changes within the health care system in order to improve the management of health care services and to increase the costs-efficiency of future health expenditure. The new health care reform will start in 2012 supposing mainly the transfer and the administration of public funds through Private Health Insurance Houses. However, even if many health professionals are well agreeing with the new Health Law (in public inquiry at present) many aspects still remain unclear and population perceives it as a way to transfer some costs directly or indirectly to the patient. The current financial crisis makes even more difficult implementation of health care reforms and their support with numerous essentially correct but producing negative effects on some population categories.

#### **Factors affecting utilization patterns of health care facilities among residents of Lake Bosomtwe basin of Ghana**

*Charles Adu-Gyamfi (University of Cape Coast)*

Accessibility and utilization of health care facilities are important elements which are factored into any policy or programme aimed at improving the health status of citizens of every country especially developing countries. Employing both quantitative and qualitative techniques, the paper examines factors which determine health care utilization patterns of residents of Lake Bosomtwe basin of Ghana. The study used a questionnaire and an interview guide as the main instruments for data collection, and selected 120 household heads for questionnaire administration through a multi-stage sampling procedure; 10 health care personnel and 6 chiefs were also purposively selected for interviews. The study employed the human ecology of disease triangle model to assess how residents utilize health care facilities within and outside the basin. Chi-square tests were run to establish the relationship between independent variables such as age, marital status, place of residence and utilization of health care by residents in the study area. The study found that residents utilize health care facilities both within and outside the study area with the utilization of local health care facilities being low among respondents, a situation which was attributed to the inadequacy of health care facilities, lack of qualified staff and equipment. Place of residence, the role of family members and friends, as well as health insurance policy holding and quality of staff were found to be important determinant factors in one's decision to utilize a particular health facility. Culture was found not to be an influencing factor in the utilization of health care facilities by respondents. The paper recommends that equipping the health care facilities within the basin, posting qualified health care personnel to the area and educating residents on the importance of health insurance will enhance residents' utilization of health care facilities.

### C08.19-03 - Access to Care 3

*Chair: Wuyi Wang, Mark Rosenberg, Thomas Krafft*

#### **Injuries among young people growing up in poverty in Ethiopia, India, Vietnam and Peru**

*Inka Barnett (University of Oxford), Virginia Morrow (University of Oxford), Daniel Vujcich (University of Oxford)*

Globally, unintentional injuries are a leading cause of premature death and disability in children aged between 5 and 18 years. Children from low-and middle income countries and lower socio-economic groups are most vulnerable. Yet the evidence-base for child injuries in developing countries is relatively poor, and the WHO has recently emphasized a need for more research, and (in May 2011) the World Health Assembly adopted a resolution on child injury prevention, the first ever on the topic. This paper aims to use a mixed method approach to get an in-depth understanding of some of the causes, consequences and perceptions of injuries among 15-16 year olds in India, Ethiopia, Vietnam and Peru. It analyses data from Young Lives, a longitudinal study of children growing up in poverty in Ethiopia, India (Andhra Pradesh), Vietnam and Peru. It focuses on the older cohort of children, born in 1994/5, (n=1,000 in each country), and combines quantitative survey data with qualitative in-depth interviews with a sub-sample of children in Ethiopia, India, and Peru (n=25 in each country). Our quantitative analyses suggest country-specific differences in the prevalences as well as the causes of injuries. Most serious injuries happened in India (19 % of all children), followed by Peru (15%), Ethiopia (14%) and Vietnam (8%). While work-related injuries were most common in India and Ethiopia, injuries that happened during play and exercise were most frequent in Peru and Vietnam. Qualitative data give some insight into the history of injuries and some of the longer term consequences. The paper concludes with a discussion of the implications of the findings for injury prevention programmes and policies, which it suggests are not straightforward. We suggest that risks to children need to be understood within the context of their roles and responsibilities within families and communities, as well as beliefs that mean that injuries tend to be interpreted as random events or the result of fate/destiny, and therefore not within people's control.

#### **Aging, Health and Health Care, and Social Deprivation in Canada**

*Mark Rosenberg (Queen's University), Keltie Gale (Queen's University)*

While Canada counts itself among the wealthiest and most developed countries in the world and consistently ranks near the top of the United Nations Human Development Index, social deprivation among the older population remains an issue. This paper reviews the evidence for social deprivation in Canada and what part of the older population is affected by it. A preliminary analysis is then carried out to examine whether

there are any spatial patterns to social deprivation which correlate with health status among older Canadians and their access to health services. We conclude with a discussion of why health geographers should place more emphasis on developing measures of social deprivation and using them in examining health status and health care.

#### **Accessibilité des lieux de don de sang et les communautés ethnoculturelles à Montréal**

*Gianhi Tran (Institut National de Recherche Scientifique), Marie-Soleil Cloutier (Institut Nationale de la Recherche Scientifique), Johanne Charbonneau (INRS)*

Au Canada et au Québec, moins de 4% des personnes admissibles contribuent à la banque de sang chaque année. Avec une population vieillissante, il importe de trouver des solutions afin d'assurer la réserve collective pour satisfaire les besoins futurs. Une des solutions envisagées est de se tourner vers la population immigrante, un bassin de donateurs potentiels considérable. Une population qui demeure toutefois peu nombreuse chez les donateurs, mais importante au Québec et encore davantage à Montréal. Les collectes à Montréal suivent une logique d'organisation particulière qui relève d'un système de collectes mobiles organisées par des associations locales. Cependant, les associations ethnoculturelles ne représentent qu'un pour cent des comités organisateurs au Québec. En effet, le rapport entre la pratique du don de sang et les communautés ethnoculturelles reste relativement méconnu. Afin de favoriser le recrutement des donateurs, il est intéressant de s'attarder davantage sur ces communautés en forte croissance. C'est dans cette optique que ce mémoire propose une étude de l'accessibilité perçue au lieu de don de sang chez les donateurs ethnoculturels dans la région métropolitaine de Montréal. Les collectes mobiles accroissent l'accessibilité physique et offrent un éventail de choix de lieu de proximité. Cependant, la sélection d'un lieu de don de sang est-elle influencée par la distance physique ou plutôt par les facteurs culturels? Cette étude s'appuie principalement sur les données recueillies par une enquête en entretiens semi-dirigés auprès de 29 donateurs et de 46 leaders des communautés ethnoculturelles. En sommes, nous avons constaté que les donateurs ethnoculturels se comportaient généralement de la même manière que tous les autres donateurs. La proximité a été, en effet, un élément déterminant dans le choix du lieu de don. Cependant, certains donateurs interviewés choisissaient un autre endroit en dépit d'une distance plus éloignée. En fait, plusieurs facteurs jouent un rôle dans le choix d'un donneur d'un lieu de don, selon que le donneur soit de première ou deuxième génération, la personnalisation d'une collecte - langue, l'accueil, nourriture, etc. -, pour n'en nommer que quelques-uns. C'est en jonglant avec tous ces éléments que le donneur prend la décision de se rendre à une collecte de proximité géographique ou de proximité culturelle.

## C08.19-04 - Global Health and Disease Surveillance

Chair: Wuyi Wang, Thomas Krafft, Svetlana Malkhazova

### Health risk of disinfection by-products in drinking water of the typical cities in China

*Bixiong Ye (CAS), Wang Wuyi, Yang Linsheng, Wei Jianrong*

The healthfulness of drinking water is a fundamental human concern. Chlorination is a widely used method of disinfections to protect drinking water against germs and fight disease transmitted through water in China. However, chlorine can also react with natural material in the water to form disinfection by-products (DBPs) such as trihalomethanes and Haloacetic acids. To some extent, these disinfection by-products of drinking water posed a certain threat to the health of local residents, due to their possible adverse health effect on humans. In order to determine the risk of disinfection by-products on human health, and predict the extent and seriousness of the risk of disinfection by-products, a risk assessment of the disinfection by-products in drinking water was carried out in 13 selected cities of different water system in China. The strong spatial variations of the lifetime cancer risk and hazard index of DBPs were observed on the different water systems and typical selected cities. The highest lifetime cancer risk and hazard index of DBPs ( $6.05E-05$  and  $1.08E-01$ ) was observed in Tianjin city, followed by Benbu, Zhengzhou and Wuxi city, and the lowest was in Wulumuqi city. Based on geographical information system, the geographical variations of the lifetime cancer risk and hazard index of DBPs in typical selected cities were studied. In the Songhua River system, the total cancer risk of DBPs was higher in Daqing city than in Harbin city. In the Hai River system, the total cancer risk and total hazard index were higher in Tianjin city than in Beijing city. In the Yellow River system, the total cancer risk and total hazard index were higher in Zhenzhou city than in Lanzhou city. In the Yangtze River system, the total cancer risk and total hazard index were higher in Chongqing city than in Changsha city. In the Pearl River system, the total cancer risk and total hazard index were higher in Shenzhen city than in Guangzhou city. In the Huai River system, the total cancer risk was  $4.75E-05$  in Benbu city and was almost 50 times higher than the acceptable public risk level of USEPA (10-6). In Wuxi city, a key city of Taihu Lake basin, the total cancer risk was  $3.47E-05$ . In Wulumuqi the typical inland city, the total cancer risk was lowest and the value was only  $2.86E-06$ .

### The effect of air pollutants on daily number of outpatient for allergic rhinitis in Beijing, China

*Wang Wuyi, Zhang Fengying, Thomas Krafft (Maastricht University), Bixiong Ye (CAS), Xu Jin*

To investigate the effects of urban air quality change on health, we carried out a time-series analysis of daily general practitioner consultations for allergic rhinitis (AR) in Beijing, China. The objective of this study was to assess the possible effects of air pollutants on outpatient visits caused by AR in Beijing during the period 2009-2010. We considered the lag effects of air pollutants; and also tried to find out the seasonal effects of air pollutants on daily number of outpatient with allergic rhinitis. The results shown that, the largest effect RRs of PM10 were at lag01, lag0, lag01, lag01, lag01 for the total population, male, female, young people (20-60 years age group), old people (more than 60 years age group), respectively. The largest associations of SO2 were observed at lag3, lag5, lag3, lag0 and lag0 for the total population, male, female, young people (20-60 years age group), old people (more than 60 years age group), respectively. The strongest effects of NO2 were found at lag06 for the total population, female and the young people; at lag0 for male and lag03 for elder people. RRs of the three pollutants have shown a decreased order NO2, PM10, SO2. The seasonal effect models shown that PM10, SO2, NO2 had higher risk for AR in warm season than in cold season.

### The sustainability analysis on urban life indicators

*Hui-Yu Chiu (Chinese Culture University)*

Sustainable Cities is the main target of the global development in the 21st century. When urban growth, it must be increase consume and waste. Then, the quality of life will become the first demand. Choosing 5 samples to analysis sustainability and quality of life, including International Urban Sustainability Indicators List, Global Urban Indicators, Urban Taiwan Indicators, Taipei's Sustainable Development Index, Taipei's Sustainable urban Index. The sustainability evaluation divides 4 domains of environment, economic, society and governance. And, the quality of life evaluation divides 4 domains of physical, psychological, social relationships, environment from WHOQOL. Intergrating two rules to analysis 5 samples. The result shows that the sustainability evaluation stress on environment and society aspects. And, the sustainable evaluation system contain quality of life is about 70%. It suggests the sustainable urban system could increase indicators about 3 domains of physical, psychological, and social relationships. Then, the policy-makers could improve the worst way and attain to targets of sustainable urban development.

### The restoration of resources for medical tourism landscape: A case of hot springs in Bei Tou, Taiwan

*Chung Ling Ouyang (Taiwan University)*

Hot Spring resort is one of the classical example where tourism and medical landscape both can be combined. Thus, it is meaningful in today's medical geography to discuss hot springs and its utility as resources. Hot springs were used in curing illness and improving health, long before when people knew their true efficacy. Recently, hot spring business owners in Bei-tou are expecting not only to broaden business, but also to link it up with tourism and leisure industry. This case study takes Bei-tou in Taiwan as an example, to discuss the building and the transformation of the hot spring medical landscape. The development of using Bei-tou hot springs as a business has a history of more than one hundred years (since 1896). The most important reasons are the unique site and tectonic environments that Bei-tou has, and its Japanese legacy. Within the special geological condition and Japanese colonial history, Bei-tou hot springs expanded into large scale hot spring culture and economy. This research analyzes historical documents and literature, interviews government officials related to regional development and the local developers promoting hot spring tourism, and investigate people's perceptions about (using) the hot springs, to understand how the local hot springs of Bei-tou could be transformed into tourism landscape. That includes mechanism and reasons for forming hot spring medical tourism in Bei-tou. The research results show that, during the initial stage while Japanese government colonized Taiwan, hot springs were used mainly in curing illness and improving health, only some for amusement and leisure purposes. In the 1950s, not long after Taiwan restoration from the Japanese government, Bei-tou became a bacchantic area famous for its red-light district functions. After the 1980s, with rapid economic growth of Taiwan, the local government input much effort to transform back into its original function - health care and leisure. Just recently, local government and residents make special efforts in protecting the hot spring historical monuments and hot spring culture. The owners of hot spring hotels and resorts are also promoting the tourism values of spring resources to the public, so that they could understand the local multi-facet hot springs. Due to the role transformation of Bei-tou hot springs, this area is now enriched by its culture and landscape.

## C08.19-05 - Ground truths: Advancing **children's** geographies through including children as researchers 1

*Chair: Christina R. Ergler, Wuyi Wang, Thomas Krafft, Robin Kearns*

### Researching Play, playing researcher: Improving the understanding of children's physical activity

*Christina R. Ergler (University of Auckland)*

While many children's geographers seek to work with children instead of on their behalf, only a handful of researchers integrate children directly in the research process. In this paper, we address the opportunities and challenges faced when working with children aged 8-10 years old to design and carry out a follow up study. This investigation revisited drawings and GPS travel logs collected earlier as well as including a neighbourhood walk guided by children for non-local children. The paper shows that by going on a neighbourhood walk and discussing elicited drawings and GPS logs the children themselves became de facto researchers and involved in the follow up meeting in different ways. Although this process requires a greater time commitment for the child as well as adult researcher, integrating children into the research process from the beginning is valuable: not only are the interests of the adult researcher on the agenda, but also the curiosities and ideas of the child researcher can be incorporated to shed new light on the original research question. This approach can foster children's well-being in two ways: enjoyment of collaboration on a research project and possible policy implications for children's health gained through a deeper understanding of children's worlds.

### How children manage risk in agricultural work in Andhra Pradesh, India

*Virginia Morrow (University of Oxford)*

This paper explores children's accounts of risks they encounter in agricultural work in Andhra Pradesh, India, drawing on research carried out by Young Lives[1], a longitudinal study of children growing up in Ethiopia, Andhra Pradesh in India, Peru and Vietnam. International and national policies aim to protect children by eliminating all child labour. Previous literature on 'hazardous' child labour tends to focus on single industries or crops, overlooking the variety of activities that children undertake in subsistence farming, often within their families. Very little research has explored children's descriptions of their experiences of risks and how they manage them. The paper is based on analysis of survey data, and qualitative data gathered from young people aged 15-16 years, in group discussions and interviews, using body mapping. The paper describes risks and injuries children experience at work, how they deal with these risks and take measures to protect themselves. The paper also explores children's accounts of perceived benefits of work, and (controversially) what might be lost if they are withdrawn from work. The paper suggests that the most effective form of protection may be to build on existing knowledge

and experience, working with children, families and communities to develop strategies to make work safer. [1] Young Lives is funded by the UK Dept for International Development (DFID) and follows 12,000 children, in two cohorts, over 15 years. A variety of methods are used to collect survey and qualitative data at the individual, household and community level. See [www.younglives.org.uk](http://www.younglives.org.uk) for further details.

### Fotonovela as a Collaborative Research Process with Children: Transgressing Research Boundaries through Embodiment and Playful Storytelling

*Michael Emme (University of Victoria), Anna Kirova (University of Alberta)*

In addressing the issue of adult-designed research on children's experiences (Greene & Hill, 2005; Kellet et al, 2004), this presentation describes an arts-based participatory research method, fotonovela, developed by the researchers in collaboration with children. The method was developed as a negotiation between researchers and participants from diverse epistemological, visual, and cultural traditions. The processes involved collaboratively negotiating research themes, engaging in arts-based inquiry, and developing the photographic narrative format of the fotonovela by combining visual elements, structures and embodied, reflective performance together with written text. Primary consideration of narrative sequence and the body language of lived and observed experience, supported through framing, proximity, point of view, color, and composition, can communicate meanings at the levels of image, sequence and words where each of these layers of representation can be both interdependent and independent. As no one layer of representation can dominate meaning in fotonovela research, the method supports a form of cultural collaboration between the researcher and the participants that offers unusual openings for multiple voices, and results in a product that feeds back and affects the context that it represents. As a vehicle for collaboration on the conceptualization and communication of academic inquiry in response to changing social, pedagogical, technological, and cultural contexts (Voihofer, 2005), it opens possibilities for negotiating authorities in the research process in which 'understanding does not entail agreement, and multiple perspectives are valued' (Clark & Moss, 1996, p. 522). As a research process, fotonovela constructs a hybrid photo-image-text opening new spaces for collaborative dialogue, resistance, and layered representation that simultaneously complicates knowing, saying and seeing, potentially changing the author's and the reader's self-understanding. Based on fotonovela produced by child-collaborators, in this presentation we propose that the visual and the linguistic not only complement each other in capturing children's experiences in school, but allow the reader to engage with the text in multiple ways. As researchers we had access to the 'polyphonic expression' of multiple voices, 'allowing for consensual, dissenting and conflicting perspectives to emerge and exist' (Veale, 2005, p. 269), and the children had opportunities to embody and narrate stories they identified as needing to be told for an audience they identified as needing to see and hear them. The presentation

will examine fotonovela as 'good' arts-based research, highlighting its illuminating effect; its generative quality; its incisive-ness, and its capacity to invoke identifications ranging from the personal to the socially symbolic (Barone & Eisner, 2004)

### **Negotiating Power and Responsibilities: Ethical and Methodological Issues in Child-Centred Research**

*Francesca Meloni (McGill University)*

This paper aims to explore the ethical concerns of ethnographic research with vulnerable youth. Drawing on fieldwork on undocumented youths and well-being in Montreal, this examination will articulate an ethical framework and propose methodologies for conducting research with these populations, pointing to multiple ethical concerns about both their migratory status and their age. In this respect, I will examine different questions and practices emerging with the new notion of youth and children as social actors and moral agents, so as to say subjects capable of assuming autonomous responsibility for their own actions, and conscious of their moral experiences. In particular, I will identify and discuss three main issues: 1) questions of ethical symmetry and power; 2) informed consent; 3) issues of youths' rights and researchers' responsibilities. Drawing on different disciplines, such as sociology, geography and nursing, and providing with an anthropological approach, my discussion will refer to theoretical discussion and ethical dilemmas that I faced during my fieldwork. Specific methodologies, such as participatory action research and interview methods, will be suggested in order to negotiate power imbalances and navigate researcher's responsibilities in regards to socially marginalized youths.



## C08.19-07 - Health Geography and Public Health 1

*Chair: Helmut Brand, Sarah Lovell, Wuyi Wang, Thomas Krafft*

### Spatial distribution of mental retardation in Iran

*Ali Goli (Shiraz University)*

Medical geography applies the theory, methods and analysis tools of the geography science to the study of human health, disease and health care systems. As the Geographic Information System (GIS) has evolved since the mid twentieth century, it uses spread in geography related knowledge. Medical geography also uses of GIS in study and analysis of health and diseases researches. Mental retardation (MR) is a subset of developmental delay (DD), a broader classification of childhood disability. Spatial analysis is useful for the identification of areas with MR people. Identification of clusters based on MR provides an important tool to investigate risk exposures. However, even though mental retardation (MR) is a substantial public health problem, there are no previous analyses of spatial clustering of MR using individual case data. In this paper, we examine the use of the spatial analysis approach in the analysis of MR clustering. We used data from 2006 census data, in which address number of MR data are available in county level. MR cases with unknown cause were identified in the study population. Local statistic indices used to identify of spatial clusters of MR and its corresponding P-value for each geo-coded location, and the P-value surface was contoured as a heat image to identify the MR clusters. The characteristics of the study population were analyzed using Moran's I value and Getis-Ord Gi statistic and the results confirm that clustering does occur for MR. The shapes of the identified MR clusters were found in counties with high illiteracy percentage. Also MR clusters area was found in counties with high rate of rural residence people.

### A spatial-epidemiological approach on mental well-being in Dhaka slums

*Oliver Grübner (Universität zu Berlin), Md. Mobarak Hossain Khan (Bielefeld University), Daniel Müller (IAMO), Sven Lautenbach (Helmholtz-Zentrum für Umweltforschung GmbH), Alexander Krämer (Bielefeld University), Tobia Lakes (Universität zu Berlin), Patrick Hostert (HU Berlin)*

A spatial-epidemiological approach on mental well-being in Dhaka slums Oliver Gruebner, MMH Khan, S. Lautenbach, D. Müller, A. Krämer, T. Lakes, P. Hostert Urban mental health is of global concern because the majority of the world's population live in urban areas. Mental health problems (e.g. major depression) are particularly prevalent in the rapidly urbanising megacities of developing countries, where a growing number of residents live in slums. Yet, little is known about the spectrum of mental well-being and health promoting socio-physical environments in urban slums. Using a spatial-epidemiological approach, this paper identified factors that contribute to mental well-

being in the slums of Dhaka, the capital of Bangladesh, which currently accommodates an estimated population of more than 14 million, including 3.4 million slum dwellers. The baseline data emanates from a cohort study conducted in early 2009 in nine slums of Dhaka. Data were collected from 1,938 adults (>15 years). The WHO-5 Well-being Index was used as a proxy for self-rated mental well-being. Additional information was obtained from very high-resolution land cover data. We used generalised linear regression and spatial autocorrelation analysis to test for the hypotheses that mental well-being is associated with the socio-physical environment and that it is spatially structured among sub-populations in slums. A WHO-5 scored 13 or above is supposed to be indicative for good mental well-being in higher-income country settings. In our study, good mental well-being was found in 20% of the slum population sample. When controlling for individual factors such as age, gender, and diseases, mental well-being was significantly associated with several features of the natural environment, flood security, good sanitation, and the quality, sufficiency and durability of housing. Population density, job satisfaction, and income generation were further significantly related to mental well-being. Significant spatial clustering of poor and good mental well-being among population subgroups was found. Those spatial clusters were further significantly associated with the most of the above mentioned features from the socio-physical environment. Considering spatial clusters as small-scale neighbourhoods, we can conclude that large inequalities of mental well-being existed in slums and that these inequalities refer to different socio-physical environments in those neighbourhoods. Given that mental well-being is related to physical well-being, our paper provides crucial insights for developing better health care and disease prevention programmes in slum dwellings of the developing world.

### Natural-endemic diseases in Russia: Diversity, geography, mapping

*Svetlana Malkhazova (Moscow University), Natalia Shartova (Moscow University), Dmitry Orlov (Moscow University)*

The aim of this investigation is to determine diversity in the geography of natural-endemic diseases in Russia and elaborate cartographic approaches for its mapping including mathematical-cartographical modeling. More than 20 natural-endemic diseases were selected to carry out the medical-geographical assessment of the natural environment. A characteristic feature of these selected nosological units is that the potential existence of the pathogens, carriers and intermediate hosts of them in an area fully depends on natural conditions, and the realisation of these natural preconditions is related to social and socio-economic circumstances. Besides, these diseases are principal in the population pathology and perform not only a medical but also a socio-economic problem. This typical natural-endemic diseases for Russia are : alveococcosis and echinococcosis, anthrax ,brucellosis, hemorrhagic fever with renal syndrome, hydrophobia (rabies), different leptospirosis, plague, pseudotuberculosis, tick-borne borreliosis, tick-borne encephalitis, tick-borne rickettsiosis, tularaemia, etc. Information about geographical distribution of the natural-endemic diseases and intensity of their development was

acquired from official statistical data, archival materials, literature, field expeditions, etc. for 10-15 last years. Mathematical-cartographical modeling used as a tool of analysis and mapping. Principles and application of medical-geographical assessment of territories including methods of such modeling based on investigations made in Lomonosov Moscow State University are discussed. Concept of medical-geographical atlas of Russia 'Natural-endemic diseases' is proposed. The atlas of such kind is a high priority for Russian Federation. The medical-geographical atlas will be the first experience of compiling and public presentation of diverse and multifaced information about natural-endemic diseases of Russia. General methodology of its elaboration is outlined. Atlas combines maps, graphics, remote sensing materials and the text. They form the basis for identifying the causes of diseases and carrying out preventing measures. Atlas includes seven sections: Introduction, Natural conditions, Demography and Socio-economic situation, Hosts and carriers of natural-endemic diseases, Regional nozogeography, Public health's organizations and preventive measures. The main maps scale for the territory of Russia is 1:20 000 000, for certain regions - 1:4 000 000 and 1: 10 000 000. Atlas is intended for administration, public health services and for the wide public. Its target - to provide an objective assessment of the medical geographical situation in regard to natural-endemic diseases as a part of scientifically based approach to control and emergency response.

### Urban health disparities in newly industrializing countries: Perspectives from Pune, India

*Mareike Kroll (University of Cologne)*

Urban health disparities have gained increasing attention among researchers in the field of health geography. While a lot of research has been done on cities or regions in Western Countries, lack of data in many newly industrializing countries such as India impedes comprehensive studies about differences in health status among different population subgroups. Further, intraurban health disparities have been neglected in India over the last decades due to a long-standing focus on the urban-rural divide. Though, the current rapid urbanization process in India induces multiple changes in the physical and social environment of cities inducing changing disease burdens. In the emerging megacity of Pune, the population has doubled in the last 20 years from 2.6 to 5 million inhabitants, overstretching massively the existing infrastructure. Economic growth is giving rise to an emerging middle class and at the same time to a growing number of slum dwellers through immigration. The increasing social polarization of the urban society causes an unequal distribution of positive (e.g. educational opportunities, access to health care) and negative (e.g. environmental pollution, stress) effects of urbanization within the population. The heterogeneity of the urban society and the steep socioeconomic gradient among different socioeconomic population groups are leading to different epidemiological profiles within the population: infectious and communicable diseases are associated with poverty, inadequate living conditions and lack of basic infrastructure. At the other hand, so called

'lifestyle diseases' such as diabetes and hypertension or cardiovascular problems which are usually linked to the middle and upper class have an increasing share in the overall disease burden. Yet the increasing fragmentation of the urban society and changing urban environments create new vulnerabilities for all socioeconomic strata towards old and new infectious diseases (e.g. tuberculosis and swine flu) but also chronic and degenerative diseases due to environmental pollution, increasing stress levels and changing behavioural patterns. The paper will present results from a doctoral thesis undertaken at the Department of Geography at the University of Cologne, Germany. The work focuses on a holistic view on the disease burden and major health determining factors in different socioeconomic groups using quantitative and qualitative methods. Central tool is a household survey in Pune which has been conducted in three slums and three middle class neighbourhoods in three different parts of the city. Target of the research project is to analyse and explain different epidemiological profiles of different socioeconomic groups in Pune as a deeper understanding of intraurban health disparities is essential to derive appropriate measures to promote and safeguard public health in cities.

## C08.19-08 - Health Geography and Public Health 2

*Chair: Helmut Brand, Dr Sarah Lovell, Wuyi Wang, Thomas Krafft*

### **Analysis of environmental health condition at Algarve region, Portugal: A method using quantitative indicators and opinion-based measures**

*Daniel Canavese (University of Paraná), Margarida Queirós (University of Lisbon), Neli Regina Siqueira Ortega (University of São Paulo)*

Geography and Public Health domains have examined the relationship between health and environment in an interdisciplinary way in the last few decades. Both research areas are contributing to the knowledge of the intense socio-environmental changes, as those ones that arise from demographic growth, tourism and urbanization and that have been establishing different situations regarding the quality of life. This research aimed to investigate the environmental health condition of Algarve, in the Southern part of Portugal. The objective was to analyze the environmental health condition of Algarve using quantitative indicators and opinion-based measures. A linguistic model based on quantitative indicators and experts' opinions was designed to examine the environmental health condition of Algarve's cities in Portugal. A wide range of quantitative indicators frequently used by local Ministry of Health agency was selected. Four Ministry of Health professionals, have constituted the panel of experts whom have provided some opinion-based classifications about the quantitative indicators. Using some principles of Complex Theory, Fuzzy Logic and specific software, the linguistic model was designed in order to give a synthetic measure about the condition of environmental health of each city. Results demonstrate two patterns in the regional reality of environmental health. Although Algarve, in general, has a developed condition in environmental health it also shows important specificities. The best condition of environmental health was registered in the majority of cities located in the center part of the region and in the east part by the border of Spain. In these areas the seasonal tourism is more frequent and could explain investments previously made that now reflect better standards of health and environment. On the other hand, the worst condition is located in the west and interior parts of the region where some cities have no coastline and have been facing population decrease in the last decade. This study reveals inequalities in an apparent homogenous region. The understanding of unequal patterns is important for the development of plans focusing on public policies to improve the referred conditions.

### **Socio-spatial distribution of airborne exposures in Berlin**

*Annegret Kindler (Helmholtz Centre for Environmental Research), Ulrich Franck (Helmholtz Centre for Environmental Research)*

Air pollution is one of the serious environmental problems in urban agglomerations impairing human health. But, human exposure varies within one city. Therefore, the

question arises about relations between environmental exposure and social situation of population aiming at minimization of health risks and enhancement of the quality of life and well-being. Particulate matter (PM) and nitrogen dioxide are significant air pollutants in urban areas. Particulate matter is often categorised according to its aerodynamic diameter into the following size groups: PM10 (<10µm, inhalable), PM2.5 (<2.5µm, respirable). Environmental epidemiological studies indicate that even small amounts of particulate matter impair human health. This means that there is no known threshold value below which no effects are to be expected. Besides the studies showed that nitrogen oxides (NOx) in the air can also damage health.. Especially in urban areas, traffic is a significant source of both airborne pollutants. In most northern and western European cities, traffic is a dominant source of air pollution. On the example of Berlin the spatial distribution of airborne exposures of PM10, PM2.5, NOx and NO2 was determined for the 447 planning areas (PLA) each characterized by about 7500 inhabitants, unique structure of buildings, types of roads, and rather homogeneous social structure. PM10 and NOx concentrations, additional reference data for selected monitoring stations and for street sections were used to calculate the area weighted annual average values for all planning areas. PM2.5 and NO2 air pollution was determined from the PM10 and NOx values. Traffic sources have been taken into account as an additional contribution to background concentrations. In order to investigate socio-spatial distribution of PM2.5 and NO2 at the PLA level the air pollution was statistically and spatially correlated with the development index of the Social Urban Development Monitoring. In addition, the number of people was determined exposed to different levels of air pollution in relation to PLA and social status. The assessment of combined exposure by PM2.5 and NO2 shows increased frequencies of highly or very highly affected PLA within the low emission zone and adjoining PLA to the west, southwest and north. Air pollution decreases from the centre towards the outskirts of the city. Assessing the combined exposure, 15% of the PLA are lowly, 59% medium, 12% highly and 14% very highly polluted. About 10% of Berlin's population live in PLA with a very low or low development index and with very high or high air pollution levels and thus are discriminated twice. The lower the development index in a PLA, the higher is the share of population with high air pollution.

### **Environmental impact on the quality of life (on the experience of the central regions of Russia)**

*Tatiana Trifonova (Moscow University), Natalia Mishchenko (Vladimir University), Alexey Krasnoshchekov (Vladimir University)*

Nowadays the rate of environmental conditions is changing so fast that people does not manage to adapt to the subject. In this respect it is principally important to establish the relationship between varied environmental factors and level of human health in order to provide the preventive activity in the field of health protection. We suggest to assess the habitation comfort factors according to three groups of parameters: nature-anthropogenic, social and medico-ecological one. Vladimir region, located in the central

part of Russia, has been chosen as a investigated object. We offer to study the factors at the regional level by using the GIS- technologies. To estimate the comfort level for population we introduce the integrated database for Vladimir region. The researched area zoning has been performed according to the population habitation comfort indices in various territories. The most favorable items for that have been defined, i.e. the higher comfort level is determined by the better socio-economic and medico-ecological conditions, that is obviously determined by the vicinity of major economically developed megapolises like Moscow and Nizhniy Novgorod. The territories of the lowest comfort level have been revealed, as well, being basically connected with the worst nature-anthropogenic and socio-economic conditions. Medico-ecological ranking of Vladimir region has been carried out by approach on the basis of typical population sickness rate regarding the principal nosologies. Environmental impact on the regional population health has been studied in connection with air pollution and anthropogenic activity load. Developed approach is the universal and can be applied to any territory.

### Modern Tendency of Population Mortality of Far East of Russia

*Tatiana Komarova (ICARP FEB RAS), Efim Frisman (ICARP FEB RASc)*

Our investigation is aimed at the study of economic and social factors influence on mortality and health of the population in the Russian Far East. The prevailing reasons for the mortality and morbidity increase are identical anywhere in the world representing lowering of living standards, poverty, unhealthy nutrition, health services system degradation, contamination of the environment. Strengthening these reasons is the economic crises in Russia that has stimulated a further deterioration of the situation in the Russian Far East. The population death rate has been steadily growing since 1993. A crude death rate in Russia had increased 1.3 times for the period of 1990 -2008 (accounted per 1000 heads), in the Far East this showing being 1.6. It should be pointed out that until the above-mentioned period average showings of mortality over Russia had exceeded those in the Russian Far East, the age structure of the population being younger in this region, as compared to the rest of the country. But during the period of 1990- 2008 mortality had increased 30.3% in Russia (calculated per 1000 heads), and in the Russian Far East - 65.8%, while in most countries of Europe it had decreased (16% in Austria, 19% in Great Britain). Among the socially stipulated factors of increase in male mortality a leading place belongs to unhealthy life style, first and foremost to alcoholism with the men of able-bodied age. It actually takes 100% in the structure of mortality caused by mental frustration (psychoses and poisoning). In 1995 the showing was much lower taking only 19.7%. Life expectancy is one of the overwhelmingly important demographic categories, representing a kind of generalizing characteristics of human mortality. The mortality crises growing in the Russian Far East, during the period of 1998-2006 average life expectancy of its citizens had reduced for 2.77 years, while over Russia this showing was 2 years. However, there is a striking difference in absolute values of life expectancy: 65.07 years, as average Russia parameters, and only 62.42 years - in the

Far East. Since 2006 it has been observed some growth of life expectancy in both Russia and the Far East, but still there remains a gap of about 12 years between male and female life expectancy. To reveal basis factors affecting mortality of the population in the Russian Far East, the coefficients of correlation between life expectancy, mortality and separate showings of living standards were calculated. As a result, it has been revealed that the greatest influence on the population death rate in the region is exerted by the level of living wage ( $r = + 0,82$ ), income of the population ( $r = + 0,8$ ). The inverse correlation between mortality and housing conditions is less vividly expressed.

## C08.19-09 - Health Geography, Vulnerability and Global Risk

*Chair: Wuyi Wang, Andreas Rechkemmer, Thomas Krafft*

### Influence of regional road network and mobility on spatial diffusion of dengue fever between Brazilian counties

*Marcos Ferreira (UNICAMP)*

The aim of this research is to evaluate the influence of road network structure and mobility on dengue fever outbreaks sprawl at regional scale. The methodology is based on cartographic modeling of spatial diffusion of dengue fever epidemics, using network analysis techniques and GIS. Data from 109 counties, organized in epidemiological weeks related to a dengue fever epidemic that occurred in 2001 in northwestern Sao Paulo state, were used to map the spatial diffusion of cases. The methodological procedure is structured in five phases: the phases one to four join exact objects and continuous fields models with single and multiple times slices sequences. The phase five is based on network analysis of connections between counties. At the last phase, urban node connections are spatially analyzed using road network analysis techniques, to map potential for contagion between counties and the path of spread of dengue fever over the region as a whole. The results show the spatial diffusion of dengue fever is most efficient in major highway corridors, where the daily trips are more frequent, and where has no impedance to the circulation of commodities and people. Analyzing the maps, one perceives the existence of indications of spatial contiguity in the concentration of cases, associated with the alignment of the cities that continue to present more occurrences over time. As the climatic conditions in the region are practically homogeneous, other factors have increased the potential for the diffusion of the epidemic. Since man is one of the vectors for dengue fever, the circulation of people becomes an important factor in the propagation of the disease. The mobility of the population is governed by the regional economy, where some cities act as centers of agglomeration of people due to the concentration of services and employment. The daily migration and the circulation of merchandise and services are very important factors in the spatial diffusion of the disease in this region preferential alignment of diffusion between municipalities, forming corridors of great susceptibility to contagion. It was also found that a large majority of cities where new cases appear are contiguous to cities with reports of past cases. However, this contagion occurs with greater intensity along regional corridors with more traffic. The higher incidence of cases and average velocity of contagion, occur in cities with higher nodality index values (a great number of roads cross the city) and with greater and faster accessibility to the regional highway network. These regional centers have the highest rate of demographic growth, the fastest rate of change in urban land use, and high population density in poor neighborhoods. These factors are fundamental to the

transmission of the virus by the population that migrates daily from smaller cities to these larger regional centers.

### Changement climatique et maladies réémergentes en Tunisie: Exemple de la LCZ dans la région de Sidi Bouzid

*Habib Ben Boubaker (Université de Manouba), Mohamed Kouni Chahed (Observatoire National des Nouvelles Maladies Emergentes)*

La Tunisie subit un changement climatique qui se manifeste déjà par une élévation des températures, une régression des pluies, le décalage des saisons climatiques?. Les répercussions sont déjà perceptibles, notamment dans le domaine de la santé. En effet, le pays connaît la réémergence de certaines pathologies dont le cycle biologique est fortement lié à des facteurs bioclimatiques. C'est le cas de la leishmaniose cutanée zoonotique (LCZ) qui enregistre, depuis 1982, une réémergence épidémique dans certaines régions de la Tunisie Centrale, comme celle de Sidi Bouzid. Il s'agit d'une zoonose à transmission vectorielle due à un parasite du genre *Leishmania* appelé *leishmania major*. Le parasite responsable est hébergé par des rongeurs réservoirs (*Psammomys obesus* et *Meriones shawi*) et se transmet de l'animal réservoir à l'homme par l'intermédiaire d'un moucheron de la famille des phlébotomes, de type *phlebotomus papatasi* engendrant des lésions cutanées à type de croûtes ou d'ulcérations touchant les parties découvertes du corps. La présente étude a pour objectif d'analyser la relation entre l'évolution des facteurs climatiques et la réémergence de la maladie dans la région. Elle est fondée sur les statistiques relatives au nombre de cas de LCZ enregistrés d'une part et sur les indicateurs bioclimatiques d'autre part, observés dans le gouvernorat de Sidi Bouzid entre 1968 et 2011. Les résultats préliminaires mettent en évidence 2 constats majeurs: - Une réémergence de la LCZ datant du début des années 1980, parallèlement à une augmentation des températures et une multiplication et intensification des épisodes caniculaires, attestant vraisemblablement l'effet récent du réchauffement climatique en Tunisie. - Une périodicité quinquennale des pics épidémiques de LCZ qui semble être corrélée avec la variabilité constatée du régime de pluies et du décalage progressif des saisons. D'autant plus, les années où les pluies de fin de saison prennent de l'importance, les sebkhas abritant les rongeurs réservoirs connaissent l'abondance d'une végétation, à base de petits arbustes de la famille de chénopodiacées, qui constitue l'alimentation exclusive des rongeurs réservoirs. Ces conditions sont également favorables à l'explosion des populations des vecteurs.

### Integrated assessment of vulnerability to heat stress in urban areas. The example London

*Tanja Wolf (Kings College London)*

Increasing mortality and morbidity related to periods of hot weather and heatwaves are a direct health impact from a warming and more variable climate. They are also the

consequence of demographic processes leading to an ageing population and of urbanisation which enhances the urban heat island effect. It is a challenge for public health, urban planning and risk management to protect citizens from these threats. This paper proposes the development of an index to assess the vulnerability to heat stress in urban areas. The method combines risk indicators of heat stress as identified from international literature into a vulnerability index using Principal Component Analysis. The vulnerability index is applied to Greater London to show a very heterogeneous vulnerability landscape. To test the performance of the vulnerability index, daily data on temperature from London Weather Centre and spatial data on daily mortality and ambulance callout are used. Testing methods show that it is possible to model where hot spots of vulnerability, in terms of increased mortality and a higher number of ambulance callouts, are occurring. The results encourage further research on hot spot analysis to better target intervention measures that preserve the health of the most vulnerable in a cost-effective and efficient way. At the same time, the results lead to questions on science and policy interaction that are the driving forces of decision-making.

### Place, electromagnetic fields and health risk – a case study in the northwest of Portugal

*Paula Remoaldo (University of Minho), Helena Nogueira (University of Coimbra)*

The electromagnetic pollution is a type of pollution that continues to grow nowadays. This invisible pollution can have adverse effects on the health of populations, especially at the level of chronic degenerative diseases (e.g., cancers and more specifically, childhood leukemia). However, there is no clear evidence about this influence and few research on this topic has been carried out at Portuguese, and even, international level. In this paper we try to understand the impact of electric sites and cables of very high voltage on population health. Our main concern was getting an answer to the following question: to what extent proximity (until 50 meters) of the cables of high and very high voltage can affect the health and well-being of individuals? A cross-sectional study of 173 individuals living in Serzedelo, Guimarães, in the northwest of Portugal, was performed in 2010. Serzedelo is one of the 69 parishes that composed the municipality of Guimarães and it was selected because of the high density of this kind of electric sites and cables at national level it is endowed with. 96 women and 77 men were observed. They were classified into two groups given the location of their residence according the electric sites and cables of very high voltage they were exposed to: one group included those who lived nearby, up to 50 meters; and another included those who lived at 250 meters and more far from those sites or cables. Semi-structured interviews were made, giving us information about individuals' sex, age, education, occupation, tobacco consumption, physical activity, years of residence in Serzedelo, years of residence in current home, time spent at home, use of mobile phone, health status, symptoms, diseases, number of physician visits and reason to. We used a logistic regression models to analyze the associations between the incidence of the reported diseases, life styles and factors

related to residence place. Considering cancer incidence, results pointed to a significant influence of two predictors: years of residence in Serzedelo and number of physician visits. Odds of having a cancer disease increase with increasing time of residence in Serzedelo (OR = 2,495;  $p < 0.05$ ) and with increasing number of physicians visits (OR = 1,89;  $p < 0.05$ ). Considering CVD, we found a significant influence of age, education and number of physician visits: the likely of having a CVD increased with age (OR = 1,78;  $p < 0.1$ ) and number of physicians visits (OR = 1,4;  $p < 0.05$ ) and decreased with higher education level (OR = 0,64;  $p < 0.05$ ). Considering endocrine diseases, we found a negative association with education (OR = 0,45,  $p < 0.05$ ) and a positive association with number of physicians visits (OR = 1,77;  $p < 0.01$ ). Evidence on cancer incidence highlights the need of developing deeper studies on this topic, as well as the urgent taken of action plans for sensitive residential areas, as Serzedelo.



# C08.20

## History of Geography



## C08.20-01 - Society and Environment: Conceptions and representations of nature(s) in the history of geography 1

*Chair: Bruno Schelhaas, Jacobo García-Álvarez*

### Semantic reduction of the concept of nature in geography

*Witold Wilczynski (University of Cracow)*

Geography is a field that does not have a defined, generally accepted object of study. Nature is a concept that often appears in the definitions of geography since the time of Strabo and throughout the classical period. The situation changed radically only in the twentieth century, when nature has been reduced in meaning, and then displaced from the geographic literature by other terms, such as the environment. Although the representatives of classical geography, especially the Alexander von Humboldt, considered themselves to be naturalists, their understanding of nature (and Earth) does not have much in common with contemporary meanings of these terms. Dichotomy of man and nature, which now seems to be something obvious, was not a classic feature of geography in the period of its development. The classical nature of geography is not just that part of reality, which remains after deducting the man and his creations. Alexander von Humboldt saying, "Nature," he meant the entire reality, including man and his creations. The reality of the classical period was divided into two autonomous and distinct in the metaphysical sense spheres: the natural and the supernatural. During the Enlightenment the supernatural was excluded from scientific considerations, while the nature in a broader sense began to divide into two categories: the nature in a narrow sense of wildlife and the man (culture, society). This now forgotten fact contributes to the perpetuation of dualism in the geographical literature and the organizational structure of science. Moreover, this semantic reduction of nature have affected the evolution of environmental ideas. Today, they probably would look different if modern geography was not formed under the influence of the disseminated opposition of nature and man.

### The time has come for a new concept of (geography's) nature

*Barbara Zahnen (Humboldt-Universität Berlin)*

Due to their work, historians develop a good feel for the fact that what seems to be "new" often is not really "new" at all, but rather old wine in new bottles. Nevertheless, historians also know that times can change indeed, and that new ways to see things and to be in the world can emerge. Both aspects, of course, also apply in the field of geography, and to the way geographers address "nature" and/or relations between human beings and nature. In my paper, I want to introduce a novel way of conceptualizing nature in and for geography, and I want to reveal why the time has come for this novel conceptualization. Thereby, it should firstly become clear that the novel way of conceptualizing (geography's) nature is not just another way of interpreting "nature" in addition to the sum

of interpretations that one runs across in "contemporary" geography, but that it rather touches the issue of (geography's) nature -- and the relation between human beings and nature -- in a deeper and more comprehensive way. Secondly, and at the same time, it should become clear that the possibility of the novel conceptualization is already "given" in the materials of the geographic tradition, as well as in practices of (physical) geographers, so that it comes along with understanding new possibilities of doing geography.

### Le rapport homme-nature dans les magazines grand public de géographie

*Guilhem Labinal (CNRS, Paris)*

Les préoccupations environnementales ont été devancées ou relayées dans les magazines grand public de géographie qui s'attachent à décrire l'environnement naturel des hommes. Les publications que l'on peut rattacher à la géographie par leur titre, leur origine, leur usage ou une sorte de catégorisation du sens commun sont nombreuses. L'importance de leur diffusion est connue : Geo bénéficiait d'une audience de plus de 4.5 millions de lecteurs en 2010 et les différentes versions du National Geographic étaient, à cette date, diffusées à plus de 8 millions d'exemplaires dans le monde. Le contenu de ces publications a été analysé aux Etats-Unis (T.Y. Rothenberg, S. L. Hawkins) et en Europe où les géographes se sont intéressés à leur dimension idéologique, à leurs discours iconologiques et textuels[1] mais aussi à la nature des représentations qu'ils donnent des territoires nationaux, telle l'Espagne (J. García Álvarez, coord. : recherches en cours). Dans la continuité de ces travaux, notre communication propose d'interroger le regard proposé au public sur l'environnement à l'appui d'exemples puisés sur les dix dernières années (ceux d'Ushuaia magazine notamment). Quel rapport à la nature les magazines proposent-ils et quelles distinctions peut-on établir entre eux - En quoi les choix effectués sont-ils emblématiques d'une vision particulière de la nature et du rapport que les hommes entretiennent avec elle? Pour esquisser des réponses à ces interrogations, nous examinerons les lignes éditoriales des magazines, certains d'entre eux s'inscrivant dans un discours écologique qui sacralise l'environnement. Nous analyserons également les supports (les illustrations, les titres, etc.) parce qu'ils témoignent de la façon dont le rapport homme-nature est conçu. Au terme de cette réflexion, nous aurons relevé l'aspect sélectif des représentations et montré les valeurs dont les lieux sont dotés. L'environnement n'est-il pas idéalisé à des fins militantes ou réenchanté pour satisfaire le désir d'évasion du public - L'impact des magazines est tel que les géographes ne peuvent éluder ces questions. [1] Labinal, G. (2009), La géographie des médias. Une analyse iconologique et textuelle des magazines, Thèse de doctorat de géographie, Université Paris 1. 503 p.



### Evolution of view in geography

*Musa Saikhanov (Russian Academy of Sciences), Zulfira Gagaeva (Russian Academy of Sciences)*

Geography is associated with a variety of disciplines. During many years the earth's surface is the object of research and vital people interests. Society necessities and modes of production have made correction into the subject, content and objectives of geography. The development of the philosophical views of the first centuries AD was marked by attitudes to nature as a single whole consisting from the parts (elements). Philosophical ideas of Spinoza (1632-1677), Leibniz (1646-1716), Kant (1724-1804) and others are passed the thought about that the essence of complexly organized objects is not limited by simple set of elements. By the middle of the XIX century in the natural sciences there was the lack of the knowledge about complex systems that could not be research only by expanding of the nature to elementary particles. By the end of the 'I'th and early 'II'th century the scientists realized the necessity of approach to solving scientific and economic problems from the positions of the nature wholeness, based on general connections of phenomena. Gradually accumulating research experience in different geography areas and non-uniformly scaled complex researches allowed to say about existence of the regular territorial combinations of natural components. Thus, the whole previous course of geography has prepared the base for the formation of representations of the landscape as a "new" object of study. The study about geographical sphere and biosphere (Grigoriev, Vernadsky) has enriched the understanding of landscape in the 1st half of the XXth century. The theory of the self-development and self-regulation of landscape and the views to the landscape as an irreducible element of geographic reality, landscape-brick of the earth nature are appeared in the middle of the XXth century (Armand, 1988; Preobrazhensky, 1981) The important role played the general systems theory (Bertalanffy, 1969). A. Humboldt (1866), Ritter (1864) and Dokuchaev (1948) are some of the firsts that recognized the necessity of the common theory for the research of the complex objects and diversity of nature in its unity. The systems approach predetermined the views on the landscape as a complex object. There is the integration of a set of geographically relevant elements and relations in space and time (V. Gokhman, ?, 1971; E. Neef, 1974; V. Sochava, 1975 and others). The research methods in the geography (J. Hanvell. M. Newson, 1977) has developed. I. Prigogine's (1986) and H. Haken's (1991) ideas associated with a "new dialogue with nature" and macroscopic approach to complex systems also make a meaningful object of study of geography. The concept of sustainable development, as well as W. Ebeling (1979, 2001) "covenants" allow to estimate the necessity for understanding of views on the object of research in geography.

## C08.20-02 - Society and Environment: Conceptions and representations of nature(s) in the history of geography 2

*Chair: Bruno Schelhaas, Jacobo García-Álvarez*

### The traces of ice: Albrecht Penck (1858-1945) and the emergence of geographical fieldwork in the context of the German continental ice controversy, 1875-1885

*Norman Henniges (Leibniz-Institut für Länderkunde)*

The presentation aims to examine the socio-cultural practice of geological fieldwork during the German continental ice controversy from 1875 to 1885. Dealing with the main question, how the controversy shaped a new disciplinary self-understanding, it will be discussed how conflicts in everyday mapping practices provided the basis for the formation of the new discipline of geomorphology. This will be linked to a special biographical view on the early years of the geographer Albrecht Penck who began his career as assistant geologist for the Geological Surveys of Saxony and Bavaria. By drawing on unpublished archival sources (field maps, letters, field reports etc.), we can shed further light on this debate. Which complications and situational irritations occurred against the backdrop of the controversy during the geological mapping of Saxony? How did the practice of fieldwork change as the problems increasingly went beyond the fixed geological mapping and taxonomic rules of the surveys - while quaternary phenomena more and more appeared as a fundamental research problem? Which role did the growing transnational and transdisciplinary integration of scientists play, the various thought styles and worldwide availability of observational data? What was the impact of different, colliding styles of practice and thought, as well as conflicting epistemic ideals and moral values in dealing with research objects of different scales? And finally, what consequences did all these changes have for the emergence of German geomorphology as part of geography?

### Edmund Naumann as Geographer: Neglected Aspects of the German Father of Japanese Geology

*Toshiyuki Shimazu (Wakayama University)*

This paper focuses on the way that a German geologist acquainted with geographical and cultural features of Japan acted also as geographer in several European journals and geographical societies in late 19th century. By unveiling these neglected aspects, I intend to shed some light on another dimension of the inseparable relationship between geology and geography within the context of the gradual institutionalization of geography and related sciences. Edmund Naumann (1854-1927) is hardly known in contemporary German academia, although he has been famous among Japanese geologists as 'father

of Japanese geology'. After gaining a doctorate at the University of Munich in 1874, Naumann was invited to Japan in 1875 as one of the technological and academic professionals requested to promote Japan's industrial and cultural modernization. He taught geology, mineralogy and paleontology at the University of Tokyo as professor, and then directed systematic geological surveys all over Japan except Hokkaido and compiled geological maps as de facto director of a governmental geological survey office. He wrote a lot of scientific papers, two of which appeared in Dr. A. Petermanns Mitteilungen and one of which in Verhandlungen der Gesellschaft für Erdkunde zu Berlin, and he trained his Japanese successors until his return to Germany in 1885. In contrast to this brilliant career path in Japan, Naumann's post-return academic life was not a rewarded one. While he habilitated as Privatdozent of geology and physical geography at the University of Munich in 1887, he remained in this unstable position until his resignation in 1899. He then worked for a Frankfurt-based metalworking company as mining engineer and never came back to academic life, which accounts for a relatively small portion of his post-return practices. From 1885, Naumann gave lectures on the geological and geographical features of Japan at the meetings of several European geographical societies including those in Vienna, Dresden and Berlin. He was honorary corresponding member of the Royal Geographical Society and corresponding member of the geographical societies in Leipzig and Dresden. He also read papers at the 6th Deutscher Geographentag in Dresden in 1886 and at the 6th International Geographical Congress in London in 1895, which he attended as delegate from the Geographische Gesellschaft in München and as one of the vice-presidents of the congress. Naumann as geographer wrote substantial papers in journals and proceedings including Proceedings of the Royal Geographical Society, and he became the single author of Dr. A. Petermanns Mitteilungen Ergänzungsheft Nr.108 entitled 'Neue Beiträge zur Geologie und Geographie Japans' in 1893. Naumann's trajectory suggests that he clearly recognized the interrelationships between geological structures and surface landscape features and that geology was apt to be subsumed in the broad category of 'geography' in his times.

### The Idea of Autarky: Leo Waibel's Economic Geographical Positioning Against Blood-and-Soil Ideology

*Simon Runkel (University of Bonn)*

The work of Leo Waibel (1888-1951) yet awaits its fully contextualisation. Waibels contribution to economic geography has been acknowledged by few scholars (Schätzl, Bathelt & Glückler), but his impact on German geography, American geography and Brazilian geography is not fully conceptualised yet. Due to the Jewish background of Waibels wife, he was forced out of his professorship in Bonn 1937 by Nazi laws and decided to leave Germany two years later. The geographic inquiry of Waibel was focussed on economic and agricultural aspects with a main regard on subtropical and tropical regions. Convinced by the necessity of an unified discipline ('the geographical experiment') Waibel strived for the development of a consistent vocabulary and set of

principles to understand economic geographies. Waibel was an outstanding thinker and his knowledge of theories and works in economics and in agricultural science as well as his background in physical geography enabled him to develop a consistent theoretical system. In facing increasing objection within the discipline, Waibel remained completely unaffected by the progressing amalgamation of geographic inquiry and Nazi ideology. Through his clear intellect and his personal concernment he looked through the creeping appropriation of Geography through Nazism. The idea of autarky was propagated by national socialist agrarian politics. These policies were based on the blood-and-soil ideology and Neo-Lamarckism (Darré). Waibel built a case against this ideology just before his emigration in 1937. His monography on 'Rohstoffgebiete des tropischen Afrikas' can be analyzed as an opposition to the moral discourses within the discipline. Waibel's interest was mainly concerned with the practical application and empirical work in the tropics and sub-tropics. His political idea was loosely connected to List's cosmopolitan division of labour, and colonisation was seen by him as European task. He was opposed to colonial hegemony and favored balance in international trade. The paper will contextualize Waibel's position against the effects of blood-and-soil more closely. Against the background of Waibel's academic work and his impugnement within the discipline, the paper will help to reveal the conditions and geographical imaginations of geographic inquiry during the 1930s in Germany. It will give a clue about how Geography was steeped with Nazi ideology and it will honour Waibel's merits for the discipline.

### **Nature and Landscape in the sailing instructions of Ahmad ibn Majid (15th century)**

*Marina Tolmacheva (Washington University)*

Nature and Landscape in the sailing instructions of Ahmad ibn Majid (15th century) The famous 15th-century navigator of the Indian Ocean Ahmad ibn Majid al-Najdi was a contemporary of Vasco da Gama and a witness to the Portuguese arrival in the Indian Ocean. One of the few Arab sailors of the pre-modern era to leave written instructions for the monsoon routes of the eastern and western parts of the ocean, he composed poetry and prose and was learned in formal as well as practical aspects of navigation, astronomy, and geography. Continuing interest in Indian ocean studies brings Ahmad ibn Majid firmly within the orbit of historians of regional and indigenous geography. His writings, some of which have been translated into European languages, allow s to explore the interaction of practical, popular, and scientific knowledge of geography and nature. In the more formal of his works, Ahmad ibn Majid drew on established authorities ranging from Ptolemy to Abu'l-Fida and Ulugh-Beg. But the nautical instructions, composed in rhyme for easier memorization, highlight the practical information required for guidance to sailors needing expert advice in navigation and less familiar with the wide-ranging destinations along the numerous sailing routes of the ocean. This paper will focus on the famous 'Sufaliya' poem (urjuza), so named for the city of Sofala in Mozambique and containing instructions for sailing from northwest India to southeast Africa. The long

Arabic text allows for sustained narrative and contains information about a diverse and extended, yet geographically and climatically somewhat uniform coastal area. The paper will address Ibn Majid's ideas about nature and landscape as they are present in the text and integrated into his record, consciously adapted for transmission to the next generation of learners. Examples will be drawn illustrating Ibn Majid's use of scientific knowledge of geography and astronomy, his acceptance and promotion of the regionally-specific practice, and finally, his knowledge and opinion of the indigenous knowledge of the landmarks on the coastal route.

## C08.20-03 - Society and Environment: Conceptions and representations of nature(s) in the history of geography 3

*Chair: Bruno Schelhaas, Jacobo García-Álvarez*

### Simion Mehedin'ti, a predecessor of global thinking in Romanian Geography

*Dan Balteanu (Romanian Academy)*

Simion Mehedin'ti, a predecessor of global thinking in Romanian Geography This year Romanian geographers are commemorating 50 years since Simion Mehedin'ti (1868-1962), the founder of modern Romanian Geography, passed away. After having completed his studies in Paris, Berlin and Leipzig with Paul Vidal de la Blache, Ferdinand von Richthofen and Friederich Ratzel, Mehedin'ti was nominated Professor of Geography at the University of Bucharest in 1900. In his fundamental work written in Romanian - Terra. Introduction in Geography as Science (1930) and in other of his writings the Earth is viewed as a complex system within which the four planetary covers are interacting both in terms of static's (spatial distribution) and dynamics. The complex relationships established between the four geospheres are reflected in such planetary circuits as regularly winds and Ocean currents. Man is considered to be one of the most active agents increasingly more involved in changing the relationships among the geospheres, thereby radically influencing the evolution of the Earth System. The paper analyses several significant aspects for the current development of Geography, namely, global human pressure on the environment, the impact of human activity on the biosphere and hydrosphere, global degradation of the biosphere and the relationships between the Earth's covers.

### Géographie et Naturphilosophie au 19e siècle: quelles relations dans l'aire francophone?

*Federico Ferretti (équipe EHGO Epistémologie et Histoire de la Géographie)*

Dans l'histoire de la géographie, on retrouve de nombreuses traces de l'influence de la Naturphilosophie allemande sur la formation intellectuelle des géographes européens du 19e siècle. Entre les auteurs qui ont le plus retenu l'attention des géographes on peut citer Friedrich Schelling et Lorenz Oken. Plusieurs auteurs contemporains remarquent l'adhésion de Carl Ritter à la dialectique binaire de Schelling dans sa représentation du rapport dynamique Homme-Nature, alors que d'autres reconnaissent la stricte solidarité entre les Naturphilosophen et Alexandre de Humboldt. Comme l'influence de Ritter et Humboldt sur toute la géographie européenne est universellement reconnue, il nous semble important d'analyser l'utilisation, chez les géographes, des concepts produits par cette école philosophique, à une époque où la géographie se construit comme discipline scientifique. Nous aborderons ici l'aire francophone, où plusieurs auteurs sortent directement du magistère ritterien, comme Édouard Desor, Arnold Guyot et Élisée

Reclus. Concernant ce dernier, sa lecture directe d'auteurs comme Schelling, Oken et Steffens est ponctuellement documentée par ses biographies et ses archives. On parle pour l'instant de « aire francophone » parce que cela nous permet d'aborder des auteurs suisses comme Guyot, et d'assumer l'importance des traductions françaises de Ritter et Humboldt dans ce transfert. Entre les principales questions à éclaircir, quelle a été l'importance de la Naturphilosophie pour les géographes francophones et pour la formation de leur démarche scientifique? Quels sont les concepts principaux qui marquent cette influence - Par quelles voies et par quels ouvrages passe-t-elle - Quel est, enfin, le point de rupture après lequel on peut considérer définitivement affaiblie l'influence, directe et indirecte, des Naturphilosophen sur les géographes - Nous essaierons de répondre en interrogeant les ouvrages et les archives des géographes cités, à l'aide de la littérature critique disponible et des textes principaux des philosophes de la nature. Nous remonterons chronologiquement le courant du 19e siècle jusqu'aux premières années de carrière du père de la géographie humaine, Paul Vidal de la Blache, auteur qui s'est nourri à son tour de la tradition allemande, pour évaluer ce qui restait de la Naturphilosophie au moment de la naissance de l'école française de géographie.

### Russian representations of the Caucasus between the XVIIIth and the XXth centuries

*Marina Frolova (University of Granada)*

The Caucasus evokes in the European imagery an ensemble of clichés: first of all, that ones connected to Greek and biblical legends; than the images of the XVIIIth and XIXth centuries of a strategic region, an exuberant and rich "Orient"; that one of the end of the XIXth and of the XXth century of emblematic space for research and tourism, up to most recent representations of a marginal and divided space characterized by persistent ethnic and territorial conflicts and tensions. Since the end of the XIXth century the Caucasus has been presented in Russia as a "transcontinental", rich and exotic mountain with virgin nature. The naturalist, pragmatic and imperialist representation dominated in Russian and Soviet geography and served as a scientific archetype for interpretation of other mountains. The aim of this paper is to show, within the context of production of landscape visions in the specific geographical, historical and cultural conditions of the Caucasus, the relativity of scientific interpretation of environment and its relation with social and cultural representations circulating in Russia between the XVIIIth and the XXth centuries.

### Les relations Homme-Nature en Argentine d'après Malte-Brun en 1845

*Gloria Zamorano (University of Cuyo)*

L'objectif de ce travail est celui de caractériser les relations Homme-Nature au milieu du dix-neuvième siècle, à partir de l'analyse d'un texte de Malte-Brun qui décrit l'Argentine, publié en 1845. La méthodologie consiste, d'un côté, à l'analyse sémiotique du discours

sur l'Argentine extrait du "Précis de la Géographie Universelle ou Description de toutes les parties du monde sur un plan nouveau". Dans cette oeuvre Malte-Brun traite les territoires qui comprennent l'Argentine dans deux livres du sixième tome, intitulé "Description des deux Amériques. Océanie. Table générale", en particulier sur une partie du livre cent quatre-vingt-douzième, où il s'occupe de la description des terres argentines mises en valeur à l'époque, et dans le livre cent quatre-vingt-treizième, où il fait référence aux espaces n'appartenant pas à l'époque à la Confédération Argentine, soit à ce qu'il appelle l'Araucanie, la Patagonie et les Terres Magellaniques. De l'autre côté, pour traiter la relation Homme-Nature en premier lieu nous employons l'approche hypothético-déductive que nous permet de faire une classification de la position des entités urbaines selon trois critères d'analyse des propriétés spatiales employées dès la fin du dix-huitième siècle, suivant Marie Vic Ozouf-Marignier : les critères esthétique, hygiéniste et fonctionnaliste, en les combinant avec des visions optimiste ou pessimiste (Ozouf-Marignier, 1992). Secondement, nous traitons les caractères naturels du milieu et ethnologiques des tribus qui habitaient au nord et au sud de la Confédération Argentine à l'époque, ainsi que les caractéristiques des terres désertes de la Patagonie et de l'Antarctide, d'où nous pouvons inférer des sujets typiques de l'époque, tels le dualisme civilisation-sauvagerie. Parmi les résultats, nous constatons que le texte de Malte-Brun met en relief les relations Homme-Nature avec des connotations propres à la géographie inventaire du dix-neuvième siècle. En effet, dans le discours scientifique positiviste alternant la description littéraire et la narration historique, nous apercevons non seulement l'influence du déterminisme environnemental mais aussi celle de la vision culturaliste de l'époque.

## C08.20-04 - Society and Environment: Conceptions and representations of nature(s) in the history of geography 4

*Chair: Bruno Schelhaas, Jacobo García-Álvarez*

### Nature and landscape seen through the eyes of 19th-century Mexican novelists

*Luz Tamayo (Universidad de Mexico)*

Nature and landscape seen through the eyes of some 19th-century Mexican novelists. The path to wards consolidation and recognition of Mexico as an independent and autonomous nation was tortuous. In the nineteenth century its territory was invaded, maimed and again invaded by foreign powers. In this climate of war and despair some Mexican intellectuals wrote novels that portrayed the landscape, customs and problems that surrounded them expressed through the plot of a romance or adventure story. Some 19th-century novelists described nature and landscape in particular detail, showing a nationalist fervour that was perhaps fanned by the fear and menace that hung over the land and liberty of the Mexican people. The present study analyzes descriptions of nature and landscape by 19th-century Mexican intellectuals.

### Critical inquiry into national environmentalism in modern Japan

*Koji Nakashima (Kanazawa University)*

One of the features of the studies on Japanese culture in modern Japan is an emphasis on the close link between nature and nation in Japan. As suggested in famous Japanese ethicist Tetsuro Watsuji (1935)'s "Fudo (Climate and culture)," a masterpiece of Japanese culture study, a tendency to understand Japanese nationality with focusing on specific linkages of people and nature in Japan is quite popular among various scholars including geographers in the early modern era. Especially during the wartime of the 1930s and 1940s, natural scientists such as physicist, meteorologist, geologist and forestry experts, as well as human-social scientists such as philosopher, historian, ethnologist, referred to the uniqueness of Japanese culture by stressing the uniqueness of Japanese nature. What motivates this understanding is a certain desire to differentiate Japan as an independent subject from the West. While the former is characterized by its close link with nature, the latter is characterized by its separation from nature. We can find out a similar type of discourses in some of contemporary Japanese culture studies which stress the uniqueness or superiority of Japanese culture and thought in contemporary world confronted with serious environmental problems. This paper calls such type of discourses "national environmentalism" which (re)produces the desire for "Japan" on the basis of specific articulation between nature and nation. This paper critically examines some representative texts of national environmentalism including geographers' works published in modern era and attempts to elucidate a structure of the texts which

unconsciously directs their attitude toward nature and environment. Conclusion is summarized in following four points. 1) Nature is used for material foundation of nationality, and the identity of Japanese nation is considered to be rooted in the uniqueness of nature in Japan. 2) Modern national identity of Japan is projected onto the history of relationship between people and nature since the ancient times. 3) The legitimacy of Japanese nationality is understood to depend on the scientific analyses of nature, in other words, Japanese nationality is scientifically confirmed by scientific analysis of nature. 4) Japanese national identity is made visible by producing scenic beauty of natural landscape of Japan. Discourses of national environmentalism stir the desire for "Japan" under a neutral banner of nature and raise a geographical question "what is Japanese nature?" instead of unanswerable political question "what is Japan?" An invisible subject of "Japan" appears by answering this geographical question.

### Institutionalization of landscape in Japan: Between academism and social institutions

*Tamami Fukuda (Osaka University)*

"Landscape" a key concept in geography, is translated in Japanese as "keikan." While landscape itself is a multivocal concept, the word "keikan" is more problematic because of the complicated processes through which it was translated and introduced into Japan. This paper focuses on the introduction of the term "landscape" into Japanese society and explores the institutionalization of "keikan" in modern times. The first person who translated the term "landscape" into Japanese and made it a part of Japanese academic fields was a botanist, Manabu Miyoshi (1862-1939), an important researcher who is inevitably mentioned when the history of the study of "keikan" is discussed. For Miyoshi, "keikan" was a translation of the German word "Landschaft" and meant the physiognomy of the plant community. It is noteworthy that he committed himself to the conservation of natural resources and introduced the national park system. In other words, for Miyoshi, the concept of "keikan" was inextricably related to social practices such as natural conservation. Following Miyoshi's works, Taro Tsujimura (1890-1983) promoted "keikan" as a central concept in human geography. In the 1930s, Tsujimura, a geographer and topographer, published books and articles that included "keikan" in their titles. He also explored the scientific study of "keikan" on the basis of the landscape tradition in German geography. Thus, his approach toward "keikan" has influenced Japanese geography. In contrast, landscape architects focused more on the practical aspects of "keikan" that is, in the design of gardens and parks?. The same is true for a field of engineering called architectonics, in which "keikan" is considered a manipulated object, that is, something artificially produced. Moreover, in civil engineering, "keikan" is strongly related to laws and regulations. Thus, the concept of "keikan" has been defined, studied, and institutionalized in different academic fields and for different purposes since its introduction. Geographers, if they studied it within the discipline, did not directly encounter the diversified concepts of "keikan" in other fields. All that was needed was an awareness of the current trends in

which the concept of landscape was reconsidered in sociocultural geography. However, a new category of national cultural properties, "cultural landscape," which was introduced in 2005, forced us to theorize "keikan" in chaotic circumstances. In the light of the problems that stemmed from "cultural landscape," this paper examines the relationships between academic practices in different fields and the institutionalization of "keikan."

## The History of Understanding of China in Western Maps for More Than 2000 Years

*Liankang Yang (Ministry of Land and Resources China)*

The relationship between China and the West has evolved over 2000 years. Both accurate and inaccurate perceptions flourished during this period. In terms of historical cartography, early Western maps misrepresented China and Africa, and suggested they were contiguous.'C. Ptolemy, 90-168 A.D, see< Ptolomaeus Cosmographia Ulm 1482 >) In the Middle Ages, many European maps did not include China.(For example, <Die Ebstorfer Weltkarte>, circa 1235 AD.) Some maps depicted a large peninsula, larger than the Indian Peninsula and Indo-China Peninsula, jutting off the coast of southern China.'H. Martellus, Nurenberg, circa 1490 AD and F. Rosselli, Florence, 1492-1493 AD; even after Columbus' discovery, 1506, 1507-1508 AD. etc)'Other maps linked China and N. America. (G. M. Contarini, 1506 and J. Ruysch, 1507-1508; B. Columbus' manuscript 1506. O. Fine, 1534-36) China has been producing maps for >2000 years and has employed a systematic approach for much of that period. Towards the end of the Middle Ages, increased interaction between China and the West resulted in more accurate depictions of China in Western cartography. It is now apparent that since this period aspects of Chinese map making have been incorporated into western cartography. In 1375, A. Cresques' Catalan Atlas contained a map of China, possibly borrowed from Yu Di Tu(Song Dynasty map), created circa 1270. Two other early Western maps that included China - M. Ricci's World Map (1602) and M. Martini's Novus Atlas Sinensis (1655) - were both based on Luo Hongxian's Guang Yu Tu (1555). M. Martini's maps were widely copied in western world maps. Another example, D'Anville's "Nouvelle Atlas de la Chine (1737)", appears to be copied directly from Kangxi Huang Yu Quan Lan Tu (1718). Although these maps were incomplete and sometimes inaccurate in their rendering, subsequent depictions of China in western cartography were far more accurate. 2000 years of history tells us: contacts need maps. And, maps also promote communication, mapping must rely on technology, but we can take the initiative to adopt new technology to create new maps. In the future, exchange of information between east and west may continue to erode inaccuracies in our perception of each other. This could also have benefits for sharing new map making technology. For example ,to unify the main data in World Maps (such as world river's lengths, YangLiankang ,Seoul ,IGU,2000). To create new kinds of maps(such as changing the geographic content of maps according to time to show how continents and oceans have changed each other over

geological periods), and even ,hopefully, ordinary citizens will be able to participate and contribute to the map making process.



## C08.20-05 - Society and Environment: Conceptions and representations of nature(s) in the history of geography 5

*Chair: Bruno Schelhaas, Jacobo García-Álvarez*

### Nature et surnature, Gondwana et Lémurie: une géographie du sacré à Madagascar

*Mialy Ratrimoarivony (Antananarivo University)*

Résultant de l'étude de différents sites sacrés naturels et des populations autochtones à Madagascar, on remarque que la compréhension des relations qui régissent l'espace et le sacré dépasse la simple construction mentale pour être en définitive, le résultat d'une expérience de vie bien ancrée dans une réalité multidimensionnelle. A Madagascar, les esprits de la nature-ancêtres appelés Kalanoro, Zazavavindrano et Vazimba, peuplent et préservent multiples espaces naturels terrestres, forestiers et aquatiques. Leur nature divine et spirituelle définit la sacralité de leur site d'implantation, indépendamment de tout sentiments ou actions humains. Quand une population humaine est présente sur leur territoire, ils se révèlent à elle de diverses manières et lui dictent les règles de vie qui régissent ce territoire. Dans ce cas, la sacralité d'un site naturel lui est intrinsèque. Les échanges humains, rituels et culturels qui s'opèrent au sein du site sacré naturel, dévoilent alors un espace bidimensionnel composé : d'un espace visible qu'est la nature, et d'un espace invisible mais sensible de la surnature, qui sont en connexion permanente. C'est ainsi que nous relierions le continent « Gondwana » des Sciences de la Terre, au continent « Lémurie » des Sciences ésotériques, continents auxquels Madagascar est rattachée. Une autre approche de la géographie du sacré se dessine.

### Poetics of signs: Reading "feng-shui"(geomancy) landscapes in Ryukyu-Okinawa islands

*Naoki Oshiro (Kobe University)*

Poetics of signs: reading feng-shui (??, geomancy) landscapes in Ryukyu-Okinawa islands In Ryukyu-Okinawa region, south-west part of Japan, we can find many strong influences of 'feng-shui' thought as a method of reading landscape or a tool of land assessment like in other regions of East Asia. Reception of 'feng-shui' thought in the Ryukyu kingdom was track back to 1667 when the first foreign student 'Shu Koku Shun' was sent to 'Fuzhou' for learning it systematically. Before the modern era, 'feng-shui' thought was recognized as highly professional knowledge and government administrated it exclusively. Administrators who were called 'Chiri-shi' or 'Funshi-mi' applied this thought to settlement management, river and road improvement, or mountain forest management. This aspect shows very a form of knowledge-power relation. In fact, 'Saion' (1682-1762), a famous administrator who advanced his career to the top of

officialdom (Sanshikan), was a geomancer, and he made the survey of castle, tomb, and mausoleum of the dynasty and gave a favorable blessing of their location in the authentic history, 'Kyuyo(s)'. After the inclusion in 1879, the kingdom of Ryukyu became a prefecture of Japan. But its legal systems had been continued until 1903 for the stage of preserving old customs, and pre-modern ways of life were carried through those ages in Ryukyu-Okinawa islands. Although these conditions were carried on, however, it is important to recognize that modernization had advanced in the aspects of education or police system, and that class system was broken down, then that what was former privileged knowledge or genre de vie had been appropriated into common people during this quarter of century. The knowledge of 'feng-shui' had thus diffused from capital city and privileged class to local villages and ordinary people in late 19th century. But there were some differences between urban area and countryside in modalities of reception more than a little. Still, the vernacular folk knowledge had been strongly-rooted in countryside. There had been also discrepancies between the sophisticated knowledge of 'feng-shui' and vernacular acceptance of it. In this paper, I would present some aspects of articulation of 'feng-shui' knowledge as highly professional knowledge with vernacular folk geographies in Okinawa by investigating 'feng-shui' maps and landscapes.

### The Holy Land in Germany's Cultural Landscape: Religion, Pilgrimage, and Science

*Haim Goren (Tel-Hai College)*

From the time of the Crusades, and even much earlier, a great number and variety of links and relations developed between the German countries and the Holy Land. These ties were initiated by individuals or groups who, for religious, military, commercial, political, missionary, artistic or scientific reasons traveled to the East, and, on their return, either brought with them existing relicts and artifacts of remembrance from their travels, or tried in various ways to reconstruct their voyages and retain their impressions and recollections through various processes of 'memory-building'. Other 'points of memory' originated in the 'religious zeal' which derived from intensive preoccupation with the Bible. Naturally, religious motives played a major part in these cultural connections, but one should also add, depending on the period, scientific, political, geo-political (sometimes even colonial or imperial) and commercial motivations. All of these led to the fact that the map of Germany, the current one which presents the contemporary 'cultural landscape', the landscape shaped by people into a landscape representing 'the combined work of nature and of man', is dotted with numerous 'Topoi' (single: Topos) or manifestations depicting and commemorating the Holy Land, or even more so - the relatively long-lasting and changing German connections to that land on the eastern shores of the Mediterranean. Although always affected by a wide variety of 'outer' and 'inner' processes, by the changing international climate and geo-political interests, by the changing rulers in the Holy Land and their attitudes towards Western Christianity as well as processes within the European Christian churches themselves, these ties between



East and West never seemed to be totally broken. The connections were expressed in various ways, and many of them will be studied in the following paper, demonstrated through existing or vanished relics, of different forms, in today's Germany.

### **Beautiful Plains and Rocky Range. Nature Representation in the Map of the Holy Land.**

*Jutta Faehndrich (Leibniz Institute for Regional Geography)*

In 1858, the Gotha publishing house of Justus Perthes produced a 'Map of the Holy Land'. The author and cartographer of this large-scale topographical map of Palestine was Charles William Meredith van de Velde (1818-1898), former cartographer of the Dutch Royal Navy, landscape painter, and devoted protestant. Van de Velde was a typical representative of 19th century scientific cartography: 'Many of [the existing maps] are filled up with cities and places laid down merely according to fancy', he wrote and claimed to have made a complete, up-to-date, no-nonsense map of the region, based only on reliable, first-hand information. He had even travelled to Palestine himself to survey regions formerly neglected by cartographers and explorers. And indeed, until the advent of the triangulation-based map of the Palestine Exploration Fund in the 1880s, van de Velde's map held as the region's most reliable cartographic representation. Yet a map necessarily reduces our experience of the world - in this case to a two-dimensional, black-and-white set of lines and shades. The result is a discrepancy: between the cartographer's desire to capture the world in its entirety, and the limited ability of his medium. If we have a closer look at the 'Map of the Holy Land', we find a plethora of details that van de Velde used to breach this gap. Perhaps the most charming of these is the inscription 'beautiful plain' in a valley close to the river Jordan - apparently the cartographer found no other means to express his admiration for Palestine's beautiful nature. Others include remarks like 'rocky range' (terrain/ landscape), 'wandering Arabs' (population), 'reeds' (vegetation) or 'quarantine' (information for travellers). The most frequent textual comment though is 'not examined'. So at first glance, these extras seem to be slips of the cartographer's tongue. Yet they really draw our attention to the strengths and weaknesses of the medium. Where pre-modern fancy filled gaps by 'hic sunt leones', the enlightened 19th century cartographer admitted his lack of knowledge. Ultimately, these comments help us understand why for van de Velde, a map was not enough to express his views on the Holy Land. Very much like van de Velde's 'Map of the Holy Land', maps never come as single, detached products. Thus apart from analysing the depiction of nature in the 'Map of the Holy Land', this talk will also argue in favor of reading maps together with the contexts they were published in.

## C08.20-06 - Society and Environment: conceptions and representations of nature(s) in the history of geography 6

*Chair: Bruno Schelhaas, Jacobo García-Álvarez*

### Modern ideas of nature – negotiating nature in the context of the international city of Tangier (Morocco)

*Valerie Viehoff (Universität zu Köln)*

In Harrouda, a novel by the Moroccan author Tahar Ben Jelloun set in Tangier and Fez, one of the narrating voices mocks the glorification of the ‘naturalness’ of Morocco and the Moroccans by the French painter Eugène Delacroix. In his letters written in the 1830s, Delacroix lauded not only the beautiful light and colours of Morocco, but also the simplicity of the inhabitants of Barbary, whom he praised for being so “close to nature in a thousand ways” (Delacroix, 28th April 1831; cited in Ben Jelloun, 1973: 137). His praise for the “simple life of the barbarians” combined ancient prejudices against “barbarians” as those people perceived to be less or un-civilized, with a European fascination for the Orient that developed out of an Enlightenment admiration for the “noble savage” stereotyped as thoroughly good and uncorrupted. The world, in the 19th and early 20th century was a “world of crisis, confusions, and contradictory processes and experiences” (Ogborn, 1998: 2). A world where people were experiencing a maelstrom of rapid change, scientific discoveries, new modes of production, shifting social relationships. A world marked by the struggle of modernity. This paper traces the fundamental changes that occurred in Tangier and Morocco in the later 19th and at the beginning of the 20th century, especially the construction of Tangier’s first “modern” urban water supply system. The key factor was the extension of a colonial, capitalist, economic system under French colonial rule, allowing private ownership of natural resources, such as water, making it possible for a private (French) water company to acquire a contract for distributing and selling water in Tangier. The new water supply system is often lauded as the beginning of modernity in Tangier. The paper discusses the different implications that these developments in engineering had with regards to ideas of nature, its values and its uses.

### Andrew Clark and the interpretation of changing landscapes

*Michael Roche (Massey University)*

Andrew Hill Clark (1911-1976) an influential figure in North American historical geography in the mid 20th century spent 1941-1942 in New Zealand teaching at Canterbury University College and completing the research for his Berkeley PhD, later published under the title of *The Invasion of New Zealand by People Plants and Animals* (1949). This paper considers his writings on New Zealand particularly as they relate to understanding

changing landscapes. This was a subsidiary but not insignificant thread of Clark’s early writing.

### The landscape of Toledo (Spain) from Los Cigarrales: Cultural and symbolic interpretations of a natural site

*Carlos Cornejo (University of Madrid), Juan Vázquez-Navarro (UAM)*

This paper examines the cultural and symbolic interpretations of a natural area facing the old town of Toledo known as Los Cigarrales, and the transformations that have undergone in recent years. Geological and geomorphological features of these open spaces, whose cultural appreciation has constantly been a topic in history, have held a strong attraction throughout the ages. In recent decades, this tradition has been trivialized due to tourism business, whose marketing processes have entailed profound changes that has led this cultural landscape to lose its own identity. The southern natural outskirts of Toledo is home to a mixed space of sixteenth-century cottages (named also cigarrales), gardens and forest area called Los Cigarrales. Here country estates are located on the southern slopes of the gorge of river Tagus. They have historical and cultural origin as recreational and gathering country houses for Renaissance humanists. The value of this area lies in the visual scope towards the ancient downtown, which motivated the location of these cottages in the 16th century. This site with its views contributed to the significance of the cultural heritage of the town itself. During the early twentieth century an intellectual recovery of the historic use of cigarrales was carried out by means of literature and art. Some writers and artists close to the so-called 98 Generation, such as Azorín, Pérez Galdós and Beruete, reinvigorated the cultural tradition of these cottages and its original intention with regards to the oldtown scenery. By focusing on the panoramic view of Toledo they conceptualized a powerful symbolic image of the decadent Spanish reality. Cigarrales cultural landscape has undergone physiognomic and discursive changes throughout its history. Since mid-twentieth century to nowadays, this site has been intensely commercialized, thus losing its geographical and cultural logic, carrying deep changes that have distorted their *raison d’être*. Nonetheless, it has also been the subject of some legal protection and it still remains the main point from which the oldtown is depicted. This is done nowadays through the advertising language of tourism industry to convey this image to the public. In this paper, geographical and territorial features, cultural appraisals, and recent changes of the use of the area will be problematized.



# C08.22

# Islands

## C08.22-01 - Human/Nature-Interaction on small islands – an integrative geography perspective. Co-supported by the IGBP/IHDP core project LOICZ which explores coastal vulnerability and sustainability in the context of global change and human dimensions

*Chair: Beate Ratter, Phil Steinberg*

### The relationship between bio-resources and cultural tradition on Austronesian islands – the cases of Orchid Island and Easter Island

*Flora Sheng-hua Cheng (Chinese Culture University), Yi-Ju Lee (Chinese Culture University)*

A large portion of the Pacific Austronesians live on oceanic islands, which are formed from volcanic eruption on the floor of oceanic tectonic plates. Many of the islands, such as the Hawaiian Islands, were formed from hot spots; others, such as Easter Island, from oceanic ridge; and still others, such as Orchid Island, from island arc effect. Among the three types, the hot spots islands are often arranged as a linear and closer archipelago, while the other two types of island often appear in remote and isolated location. This study will explore the latter two types of isolated islands, focusing on the relationship between their bio-resources and traditional culture. Because of their isolation in the ocean, the living space of those solitary islanders is small and closed. The resources for Islanders' livelihood cannot be separated from the marine resources, especially in exploiting animal protein. There is usually a seasonal or annual cycle of gathering these precious substances, and that developed a material-based unique culture rooted in long-term interaction with the environment. Two islands, Orchid Island and Easter Island, are selected for studying the relationship between their bio-resources and development of culture tradition. They, distant 15,000 km from each other at the two extremes of Pacific Ocean, have both similarities and differences in natural and human geographies. Both are of the Pacific high volcanic island. Both peoples are all Austronesian. (They are called "Tao" on Orchid Island, and "Rapanui" on Easter Island.) And both have about 3,000 residents who have developed their major beliefs and rituals within a span of 200 to 400 years. The differences are also striking. With a tropical climate, Orchid Island in spring and summer each year is supported by the Kuroshio Current which brings in a wealth of fishes. So prominent among the bounty is the flying fish group that the seasonal activities related to its catching (*Cheilopogon* spp.) have developed unique types of cultural ceremonies, tribal fishing organization, related buildings, shipbuilding techniques, and arts and sculptures. Easter Island is in a subtropical maritime climate, visited in each spring by the terns, they breed on offshore islets and provide islanders with egg proteins. The Sooty Tern (*Sterna fuscata*) and the Grey-backed Tern (*Onychoprion lunatus*) are collectively known as manutara. The

manutara has developed the tangata manu ("bird, man") ritual, related buildings, the rules of allocating the bio-resources, as well as the form of stone art. Each of the unique cultural tradition of the two Islands can be traced to its original bio-resource. Keywords : Austronesians, oceanic islands, bio-resource, traditional culture, Orchid Island, Easter Island

### Hurricane Resilience in Grenada from a Complexity Theory Perspective

*Arnd Holdschlag (University of Hamburg)*

In the context of increasing natural or man-made hazards and global environmental change, the study of uncertainty, vulnerability and resilience of social-ecological systems represent core areas of human-environmental geography. Extreme geophysical events coupled with the social construction and production of risks and vulnerabilities, viewed as hazards, raise questions about the limits of knowledge, creating long-term social uncertainty that has to be acknowledged as such. Small islands sharing "isola effects" or "insularity" are exceedingly vulnerable to external shocks and the impacts of the social-ecological interplay. Therefore, the study of islands is extremely insightful in order to analyze and understand hazards as socio-ecological constructions which require human induced resilience capacity. In the Caribbean, tropical storms and hurricanes in particular can lead to abrupt change and disturbance. In 2004 the 344 km<sup>2</sup> small island state of Grenada was hit by category 3 Hurricane Ivan. The effects were responsible for 37 deaths, over 90 % of the country's housing stock was impacted, significant losses of livelihoods took place, especially in rural communities. Valuable ecosystem services were affected, too. In this paper, Grenada is regarded as a complex social-ecological system. I intend to link the weather system of tropical storms and hurricanes with the social system of disaster preparedness and management. The ecological and social vulnerability to such disturbances and disasters is influenced by the buildup or erosion of resilience. Concepts of resilience generally focus on the capacity of the system to absorb shocks whilst still remaining functional, as well as the system's capacity of adaptation, renewal and development when coping with change and crisis. One resilience perspective that has emerged in ecology (C.S. Holling) is embedded in theories of complex adaptive systems. I draw on the heuristic models of the "adaptive renewal cycle" and "panarchy" as approaches for social-ecological system analysis. Hurricane resilience is a local and long-term issue which requires constant institutional learning. Persistent risk communication challenges include the consideration of diverse needs and priorities as well as diverging mental models. In this paper, pre-disaster, disaster and post-disaster management structures, agents and practices in Grenada are examined, taking into account various systems of knowledge generation and communication, forms of organization and networks on different spatio-temporal scales (panarchy). The aim is to understand better the principles of system (or adaptive renewal cycle) dynamics and to find out potentials to enhance hazard resilience. Such lessons can be useful for application to other cases dealing with hazards.

### **Discursive Constructions of Danger, Resilience, Connection, and Difference: Insights from Seas of Islands and Mediterranean Seas**

*Phil Steinberg (University of London)*

Culture is often associated with adaptation, and the Mediterranean is classically labeled a hearth of culture, a region where coastal and island dwellers, reacting to a mix of separation and connection, developed a rich and historically robust set of cultural norms for coping with an environment that, while broadly conducive to human existence and interaction, also posed a number of hazards. One of the less frequently noted aspects of Mediterranean culture, however, is how the idea of a Mediterranean culture - a culture specifically responding to the geographic structure of an inland sea punctuated by fragmented coastal and island communities - has spread to other parts of the world. This paper draws on fieldwork conducted in the Gulf of Mexico/Caribbean and the Arctic to explore how Mediterraneanist tropes are used in these two regions. On the one hand, this paper confirms the general perspective of the Mediterraneanist ideal: appeals to maritime connections and island 'bridges' are used throughout the world to discursively reframe borderlands as spaces of crossing. On the other hand, however, the comparative perspective afforded by this research reveals that the application of Mediterraneanist tropes is much stronger during times of hegemonic expansion (the early 20th century in the Gulf/Mediterranean and the early 21st century in the Arctic). This suggests that the application of the metaphor has a tactical-geopolitical component not often highlighted and that the entire idea of a Mediterranean system of resilience may need to be placed within a more explicitly political context.

of far-reaching colonial intrusion and impacts. Our purpose is to highlight the role of local knowledge in building community resilience, and the role of resistance in the resilience of local knowledge.

### **Local knowledge, resilience and resistance on Pongso no Tau**

*Huei-Min Tsai (Taiwan University), Eric Clark (Lund University)*

There is increasing interest in relating local knowledge and resource management practices to the construction of social and ecological resilience. The aim of this paper is to contribute to this emerging field of research, focusing on how resistance plays into these dynamic relations, and drawing on an empirical case study of a small Pacific island, Pongso no Tau. The Tau people of Pongso no Tau (literally, 'Home of Humans', a small northern outlier of the Batanes Islands southeast of Taiwan) have for centuries exercised highly egalitarian resource management practices, largely in isolation prior to being subjected to two waves of colonial oppression by Japan (1896-1945) and Taiwan (since 1945). Japanese dominance brought police, formal schooling (for 'savage children'), currency and trade. Colonial influence escalated with Taiwanese dispossession of land, establishing farms and labor camp prisons, topocide of traditional villages replaced with low quality housing, imposing Mandarin as primary language, exploitative tourism, extraction of timber and replacement with alien fast-growth species, over-fishing, dumping nuclear waste, and increasing material dependence. This paper analyses social-ecological resilience of Pongso no Tau, primarily from the perspective of reproduction of local knowledge and traditional livelihood. Tau culture has proven itself resilient in the face

## C08.22-02 - Human/Nature-Interaction on small islands – an integrative geography perspective. 2 Co-supported by the IGBP/IHDP core project LOICZ which explores coastal vulnerability and sustainability in the context of global change and human dimensions

*Chair: Beate Ratter, Phil Steinberg*

### Impact of sea-level rise on atoll island states: A bleak future for Tuvalu and the Maldives?

*Roger McLean (University of New South Wales)*

The low-lying atoll states of Tuvalu (central Pacific Ocean) and the Maldives (central Indian Ocean) have been identified as extreme examples of the potential negative impacts of climate change and sea-level rise. Key impacts of the latter include: accelerated coastal erosion; saline intrusion into fresh-water lenses; increased inundation and sea flooding; and, the destruction of settlements and infrastructure from the higher reach of storm surges and king tides. Some authors suggest such impacts will result in the islands becoming uninhabitable. Island abandonment, is increasingly seen as a climate change adaptation option with an exodus of islanders as so-called environmental 'refugees'. Indeed, the long-term viability of these island states is in doubt. What is the basis for such views? How vulnerable are Tuvalu and the Maldives to climate change and sea-level rise in reality? How fragile are atoll islands? What will the likely impacts of climate change be over the next few decades? Is the outlook that bleak? This paper addresses these questions from the perspective of three decades of geomorphic and environmental research undertaken in both archipelagos to assess the linkages between sea-level rise and reef island morphodynamics. Specifically, it has involved reef drilling and island coring; archival map, air photo and satellite-image interpretation; and repeated plan and profile surveying to determine how reefs and islands have responded to: (1) the mid-late Holocene rise in sea level; (2) global sea-level rise during the last 100 years or so; (3) temporarily elevated water-levels associated with recent tsunami and storm surges; and (4) exceptionally high sea levels, deep ocean swells and king tides. Results from these geological and contemporary analogues (of the response of atoll islands to rises in sea levels) suggest that the future situation may be less bleak than some advocates, media, and governments make out. The results also suggest that little modified atoll islands are quite robust in the face of changing external conditions, especially where natural processes of sediment production, erosion and deposition are allowed to proceed with minimal human intervention. Where this is not the case, and where there has been substantial modification and 'development' of reefs, lagoons, shorelines and islands, the future is rather more bleak.

### The Ecological Footprint as a tool for small island sustainability promotion

*Jan Petzold (University of Hamburg)*

For island societies major issues of environmental management result from limitation of space. Depending on island and population size, geographical isolation and consumption patterns, small islands have very different circumstances which intensify their limitation of productive space and make sustainable development more difficult. These differences are even more evident in contrast to continental regions, as e.g. high energy costs and emissions from transportation are often inevitable on small islands. Nonetheless, the land required for imported energy and goods is not evident on the island itself but rather abstract. For this reason a first step to develop sustainable management strategies is the assessment of current land use and consumption patterns. A comprehensive way to achieve this goal is by means of an indicator which offers the opportunity to account for and compare islands' actual land use and quantify their progress towards sustainability. In this paper I intend to present the Ecological Footprint concept with its potentials and opportunities as a sustainability indicator from the perspective of integrative geography, which focuses on human-nature interaction. The 'Ecological Footprint of Islands' project discusses the concept's role for the management of sustainability in the special case of small islands. It assesses whether high food consumption, energy generation, built-up land or rather transportation is the major cause for a high footprint. In this way the impact a society is leaving on the island's ecosystem is reflected in a quantified way: the Ecological Footprint, measured in hectares. This paper, moreover, presents the results of the project and shows how certain consumption and land use patterns influence an island's Ecological Footprint in different ways. Furthermore, an indicator such as the Ecological Footprint is suitable to support a cross-island network for small island sustainability promotion and allows for benchmarking among islands across the globe.

### Human-nature interactions on Soqatra Island (Yemen) in the past and against a background of political uncertainty

*Dana Pietsch (Universität Tübingen), Lisa Banfield (Al Ain Zoo), Miranda Morris (University of St. Andrews), Kay Van Damme (Jinan University), Uwe Zajonz (Senckenberg Research Institute BiK-F)*

Inhabited dry tropical islands are seen principally as vulnerable socio-ecological systems, especially if their inhabitants have limited access to arable land, fresh water and crop seeds. On Soqatra Island/Yemen, well known for its unique biodiversity and therefore declared a World Heritage Site in 2008, the exploitation of natural resources, i.e. those related to provisioning ecosystem services, plays an increasing and important role in the rural economy. Looking at both the terrestrial and the marine resources, the most critical questions are: Which traditional and which modern approaches in the exploitation of natural resources do we find in the Soqatra Archipelago? Which of those practices are sustainable, i.e. are preventing overexploitation, ensuring generation equity and

conserving biodiversity? On the other hand, what kinds of land degradation occur? How does the current political situation in Yemen, with ongoing poverty, and lack of effective central or regional government, affect conservation efforts and resource management, both regarding biodiversity, and natural resources in general? Which priorities could be suggested for the future? After a brief overview of the landscape, economy and people of the main island of the archipelago, this paper will give insight into the use of resources such as rock and soils, fresh water, arable land for pastures for grazing livestock and home-gardening, but also into the importance of medicinal and other plants, terrestrial wildlife, and into the living and non-living marine resources for subsistence and marketing. Based on the long-term-experience of each contributor, suggestions towards a sustainable future for Soqatra will be projected, to serve as a case study for the discussion on human-nature interactions on islands. Sources Cheung, C. and DeVantier, L. (2007): Socotra. A natural history of the islands and their people. Van Damme, K. (Science Editor). Odyssey Books and Guides. Morris, M. and Miller, A. (2004): Ethnoflora of the Soqatra Archipelago. Royal Botanic Garden Edinburgh. Pietsch, D. (2009): Böden der Trockentropen. Prozess- und Strukturindikatoren-gestützte Analyse geschichteter, polygenetischer und degradierter Böden der Insel Soqatra (Jemen). Jemen-Studien Bd. 17. Wiesbaden. Pietsch, D. and Morris, M. (2010): Ancient and modern knowledge of conserving soils on Socotra island Van Damme, K. (2011): Insular biodiversity in a changing world. Nature Middle East. DOI: 10.1038/nmiddleeast.2011.61 Van Damme, K. and Banfield, L. (2011): Past and present human impacts on the biodiversity of Socotra Island (Yemen): implications for future conservation. Zoology Middle East Supplementum 3, 31-88. Zajonz, U., Deodatus, F. & Al-Harrani, G. (2010). Final Synthesis Report. Yemen Strategic Environmental Assessment of Coastal Zone Management. Report to the World Bank and the Environment Protection Authority, Yemen. GOPA and BiK-F.

### **Vulnerabilities and opportunities: There is nothing new in the island realm**

*Stephen Royle (Queen's University)*

The abstract for this session organized by CO 8.22 Islands contains the phrase 'Are small islands in a position to turn their windows of vulnerability into windows of opportunity'? This paper attempts to develop this concept, taking 'vulnerability' to apply to socio-economic and political stresses as well as to climate change and natural hazards, whilst 'opportunities' builds on another phrase from the abstract, the 'resiliences of island societies'. In sum: islands display vulnerability but from this can come opportunity, which may be seized upon by resilient islanders. The 'nothing new in the island realm' phrase from the paper's title points to its identification of such processes in the past as well as the present. The example from the past comes from new research the author is undertaking into Port Hamilton. This was the name given to what is now Geomundo or Komundo, a small archipelago off southern Korea, which was annexed by the British in the late 1880s for potential development as a military base and coaling station. That the island could be taken in this way displayed its vulnerability. The presence of the British

navy however, was an opportunity for the resilient islanders, who whatever resentment they may have felt at their home being invaded by representatives of the 'big queen', soon were profiting from selling land, labour and produce to the foreigners whose barracks and buildings were anyway erected on an islet which they did not occupy. An enterprising man even set up what the archives coyly do not call a brothel; one desperate marine was drowned whilst attempting to swim to it. After two years the British decided that Port Hamilton would be too costly to defend (vulnerability) and left. In the present day one can point to islands such as the Falklands now profiting from tourism to battle sites from the 1982 Conflict, vulnerability developing into opportunity; to island residents working with their small scale and remoteness to market niche products; to perhaps the most profound potential change to take place to a small island in the near future, the building of an airport on St Helena. Here is an island whose economy proved terribly vulnerable to external shock - the demise of its flax industry in the late 1960s was a blow from which it never recovered. In recent years there has been massive emigration and population decline, the one last hope of positive change and opportunity is the plan to build an airport, which has finally been approved. Tourism numbers are estimated to increase from 800 to 50,000 p.a. Let us hope that the islanders are indeed resilient.



### C08.22-03 - Human/Nature-Interaction on small islands – an integrative geography perspective. 3 Co-supported by the IGBP/IHDP core project LOICZ which explores coastal vulnerability and sustainability in the context of global change and human dimensions

*Chair: Beate Ratter, Phil Steinberg*

#### Coastal change of wetland, Taijiang National Park

*Jiun-Chuan Lin (Taiwan University)*

This study is mainly focus on coastal change of Taijiang National Park. Taijiang National Park was designated as the eighth national park of Taiwan in September 2009. As this national park is famous for its wetland, it is necessary to know more about the evolution of coastal change for the purpose of management and sustainable development. This study carried research efforts by analysis of archive maps, field work and analyzing more than 200 references regarding its geographical and cultural landscape, environmental background information, biological resources, historical resources and past management practices. Conservation goals, future research and conservation work are suggested according to the above findings. The results show that it is important to ensure sustainable development and integrity of Taijiang national park's natural, historical, and industrial features, baseline studies, monitoring and conservation work, together with the formation of a systematic database framework are suggested as the major foci at the early phase of Taijiang national park's establishment. According to this study, the vulnerable wetland in south-western Taiwan has changed dramatically due to human activities, dam construction, coastal erosion by typhoon, currents. It is necessary keep monitoring and documentation on this dynamic coast. Keywords: coastal change, long-term monitoring, Taijiang National Park, Taiwan

#### Islands as Refuges of Rare Species

*Tatiana Dikareva (Moscow University)*

In our research we examined the role of marginal (ecoton) ecosystems in the formation of biodiversity of islands or isolated territories which could be considered as "islands". The goal was to evaluate the ecological-coenotic composition of the flora of coastal or marginal vegetation communities and to identify the strategy of flora conservation on the islands. The investigations were made in the Chinese island Hainan and mountain forests of southern Kazakhstan (Karkaralinskie mountains) isolated from other forests by vast territories of steppe zone. Research works were made in 2008-2010 years. For each type of island we identified the sites more favorable as retreats for plants and studied the border communities of the whole island. For Kazakhstan mountain forests we showed

that ecoton communities are more diverse than inner communities as for ecological-coenotic groups and in floristic composition. For coastal communities of Hainan island we showed that floristic composition is poor and flora of coastal communities is composed by pioneer or ruderal plants common for most coastal communities of tropical islands. For all island and "island" communities we showed that certain habitats, such as springs, banks of small brooks, valleys of temporal currents, lakesides, quagmires, bogs, cracks in the mountain blocks, submontane niches are favorable for preservation of rare species. For each type of island we revealed the rare species. For Kazakhstan mountain forests they are such species as *Althaea officinalis*, *Berberis karkaralensis*, *Anemone coerulea*, *Neottia camtschatea*, *Gymnocarpium robertianum*, *Gymnocarpium dryopteris*, *Lonicera pallasii*, *Hypericum perforatum*, *Dracocephalum peregrinum*, *Saxifraga sibirica*, *Nymphaea candida*, *Papaver tennelum*, *Epipogium aphyllum*, *Moneses uniflora*, *Artemisia glabella*, *Coridalis schanginii*, *Dictamnus angustifolius*, *Dactylorhiza fuchsii*. For Hainan island some rare species are *Liquidambar formosana*, *Kleinhovia hospida*, *Spondias pinnata*, *Tillia hainanensis*, *Meyna hainanensis*, *Hopea hainanensis*. Thus, islands can provide habitats for conservation of rare plant species while marginal or ecoton communities can serve as buffer zone between these refuges and surrounding ecosystems. The results of this work can be used for organization of natural reserves on the islands or isolated territories.

#### Facing the crisis from an island perspective. The case of Menorca (Balearic Islands) between recession and opportunity.

*Federica Letizia Cavallo (Università Venice)*

The financial and economic crisis, risen between 2008 and 2011 is lately involving with special seriousness the countries of Mediterranean Europe. Most of these countries (Greece, Italy and Spain) have a well established tradition of seaside insular tourism, involving big islands, such as Sardinia, as well as small (e.g. Menorca) and very small ones like the islands of Greek archipelagos. This situation arises some questions: Does the crisis hit small Mediterranean European islands in specific terms? Which are the major economical, social and environmental effects of the crisis on small islands? Besides, considering that those islands have in seaside tourism their major economic activity, how the insular tourist sector is affected by the crisis? If the crisis of an economic system, including a touristic one, rebounds on the socio-environmental system, this is particularly noticeable within small island, characterized by reduced resources and limited territory. But any crisis implies the need to re-think strategies and goals, as well as to shape a different vision of the future: could this transformed in an opportunity? Are small Mediterranean islands able to face the crisis for good? How the so-called (from a classical development perspective) weaknesses of insularity, could be transformed in chances in a critical juncture? In the last decades the island of Menorca, in spite of being an Unesco Mab Biosphere Reserve from 1993, largely continued to found his tourist development on a Sea, Sun & Sand model, with a particular stress on two kinds of



accommodation: resorts and holiday homes. This tourism model is questioned by the crisis of Europe and Spain: some evident signs can be found in the closing of bars, restaurants and shops, as well as in the 'shrinking' of the tourist season. But the strongest setback lies in holiday homes' trend, with severe consequences on development companies and real estate agencies; that has also to be framed in the national situation, since the crisis in Spain is closely linked to the previous pumping and the subsequent collapsing of construction sector. This all for Menorca means unemployment, insecurity, emigration. The tour operators' managed 'all inclusive' low cost tourism seems to be much less affected by crisis: but its economic fall-out on the island is weak and the competition of other destinations grows. Another sector less affected is ecotourism and agritourism, which is island based and environmentally compatible. Considering this general picture, from the crisis could result a reduction of a tourist strategy based on high land consumption, as well as on high water and energy demand (unreasonable in a small island context). It could also emerge a strengthening of sustainable tourism, characterized by local management and gains, more rooted in island society, based on environmental quality and, therefore, more in line with the purposes of a Biosphere Reserve.

### **Les politiques de développement durable dans les îles de l'océan indien: le cas de la Réunion**

*Ulrich Maillot (Institut de Recherche pour le Développement), Gilbert David (Institut de Recherche pour le Développement)*

La conférence de la Barbade, qui a suivi le sommet de Rio en 1994, était consacrée à la mise en place du développement durable dans les petits Etats et territoires insulaires. L'accent a été mis sur les contraintes qu'impose l'insularité dans ce domaine. Vingt ans après le sommet de Rio, cette communication traite des politiques publiques de développement durable à la Réunion. Quatre acteurs, l'Etat, le Département, la Région Réunion et Réunion Economique, sont à l'origine de ces politiques. La Région Réunion a été la première à se lancer avec la mise en oeuvre en 2002 d'un agenda 21 basé sur l'autonomie énergétique. En matière de gouvernance, il visait à décliner le développement durable à l'échelle du citoyen dans le cadre d'une démarche participative. Cette démarche a été reprise au niveau local par le Département avec la mise en place du Schéma Départemental d'Aménagement et de Développement Durable en 2005. En 2006, constatant que l'agenda 21 n'avait pas le succès escompté, la Région Réunion est revenue à une conception moins participative du développement durable avec pour objectif l'indépendance énergétique de l'île d'ici 2030. A côté de ce volet énergie, des Domaines d'Activités Stratégiques (DAS) ont été identifiés et intégrés à la nouvelle politique de développement durable régionale, le Plan Réunionnais de Développement Durable. La Réunion Economique a aussi proposé sa démarche, Réunion Île Verte 2030. En 2007, à l'issue du Grenelle de l'environnement, l'Etat s'est emparé du développement durable sur l'île en créant un programme ambitieux, Green Energy Revolution Réunion

Island. Il souhaite faire de la Réunion un modèle de développement durable à l'échelle des outre-mer français et des régions ultrapériphériques européennes. En 2009, un groupement d'intérêt public est élaboré et lance enfin le projet sur l'île. Cependant, ce projet élaboré par l'Etat rencontre de difficultés et c'est la mise en place du développement durable sur l'île qui est ralentie. Comment est-on passé d'une volonté régionale à un projet piloté par l'Etat? Quels sont les freins du développement durable de l'île de la Réunion? Que reste-t-il des politiques menées sur le territoire réunionnais?



# C08.23

# Karst

## C08.23-01 - Human impacts and environmental changes in karst

*Chair: Ilona Bárány-Kevei*

### Human impact to the karst of the Franconian Alb, Germany

*Martin Trappe (University Eichstaett), Sebastian Wagner (University Eichstaett)*

The Franconian Alb, located in southeastern Germany, consists of karstified limestones and dolomites of Jurassic Age. It is partly covered by Cretaceous and Miocene deposits and a clayey to loamy overburden. Hydrogeologically, it is separated into a shallow and a deep karst zone. Humans using the different natural framework requirements formed the actual cultural landscape of the area. Depending on the spatial distribution of limestones, dolomites and cover deposits the surface is used by agriculture and forestry. Caused by different percentages of these aspects in the catchment areas karst springs exhibit different chemical compositions with respect to chloride, nitrate, phosphate and other substances. Especially the shallow karst and transitional zone to deep karst show such characteristics. Since a long time the Franconian Alb was affected by exploiting of the natural resources. Mining of iron ore ended twenty years ago in the eastern part of the Franconian Alb. For most of the karst area this human impact has been overcome in the natural scenery and mining remains only as a local touristic aspect. Nowadays the pit and quarry industry exert a large influence to the karst area and locally it is the main branch of the economy. The natural stones were extracted since several hundred years within several quarries to use them for different purposes (e.g. staircases, window sills, wall claddings, building stones). Several parts of the Franconian Alb were declared to natural parks and they are subject to special environmental regulations. Nevertheless the industrial and agricultural use of the landscape persists but it is liable to a number of restrictions. Additionally, different large-scale projects affected the area in the last twenty-five years. The construction of the Rhine-Danube canal, extension of several highways and the construction of high-speed train routes were the main impacts.

### Slovak karst – land cover, exploitation of the karst landscape and its transformation

*Alena Petrvalská (Institute of Geography, Faculty of Natural Sciences), Zdenko Hochmuth (University of Pavol Jozef Šafárik)*

There is the evidence of a human being 15 thousand years ago in the Slovak karst, when they began occupying the area that was mainly forested. What most affected the land was deforestation and exploitation of pastures at the turn of second and first centuries B.C. The largely deforested areas were nearby castles, castle hills to the present time are covered by meadow vegetation. Generally, due to exposition, there were primary

deforested south slopes with formation of karst heathland and xerophyte communities. Forest was preserved only in depressions of deeper dolines and steepest north slopes of valleys. The primary reason for distinct changes in the use of the karst landscape over the last 50 years is establishing the institutionally protected natural area, the national park and biosphere reservation. At the same time, there were considerable changes in social situation of inhabitants (rising average age, emigration?), what resulted into the absence of agriculture in the major area of this region. Nowadays, the transformation of the protected karst area is a very topical and interesting issue, mainly in considering the relationship between nature protection and landscape 'degradation' because of many legislative restrictions (in agriculture, construction activities, commercial forestry, sport activities, hiking etc.). There were following changes established: Artificial afforestation - typical for a period 1970-1975. European black pine (*Pinus nigra*) and South European Flowering Ash (*Fraxinus ornus*) as not original species. Natural succession. When the forest is spreading, the shrub and undergrowth plants are retreating, paralelly with this process the number of species is decreasing in this area, but some new are forming. Slopes of karst plateaus were typical of herbaceous associations, today there are shrubs. This effect is caused by the extinction of pasturing on the ground due to collectivization of agricultural land. But the question 'what means natural' can be raised. Urban, demographic changes and ecological loads - relate with the Roma people who settled in this area and constructed their settlements without any plans, devastation of forests and illegal dumps. These factors have affected the quality of life, water and soil resources, aesthetics of landscape. The worst impact to the karst landscape is the existence of the four huge limestone quarries. When evaluating the positive and negative effects it is necessary to think about vulnerability of the karst landscape. Humans and their activities are changing the whole character of country, character of vegetation, soil situation and microclimate. By the soil erosion an originated karren were destroyed, in cave humans left damaged decoration, inscriptions and objects. It is difficult to say, if all these processes are either positive or negative, but from the long-time view, it slowly comes to reversibility of derivative processes.

### Implication for Karst Rocky Desertification by $\delta^{13}\text{C}$ in New Carbonates from Caves

*Ziqi Liu (Southwest University)*

In order to study the implications for karst rocky desertification by new carbonate from caves, cave deposits in central-western Guizhou Province of China were sampled for analyzing their  $\delta^{13}\text{C}$ . Vegetations and soils on the top of the caves were also sampled for analyzing the organic  $\delta^{13}\text{C}$ . It was found that  $\delta^{13}\text{C}$  average value of new carbonate of Shijiangjun Cave (SJJ) in Anshun > Zhijin Cave (ZJD) in Zhijin > Houzi Cave (HZ) in Shuicheng > Jiangjun Cave (JJ) in Qinzhen. It can be seen that  $\delta^{13}\text{C}$  of cave deposits can be used to reflect the vegetation situations of the time; from the old time till now, the vegetation is in a trend of decreasing. The average organic  $\delta^{13}\text{C}_{\text{VPDB}}$  in the vegetation



and soils of HZ is  $-32.75$  and that of SJJ is  $-24.33$ . For the  $^{13}\text{CVPDB}$  in new carbonate, it is  $-5.21$  and  $-0.87$  respectively in HZ and SJJ. It means that C3 plants predominate in HZ while C4 plants predominate in SJJ. Through the comparative analysis of different grades of rocky desertification surface with the  $^{13}\text{C}$  of cave deposits, it was found that the more severe the rocky desertification is, the heavier the  $^{13}\text{C}$  of cave deposits will be. Therefore, although factors affecting  $^{13}\text{C}$  of cave deposits are very complicated, it basically reflects the changes of vegetation on the surface and organic  $^{13}\text{C}$  of soils; vegetation coverage rate and vegetation types are significant factors affecting  $^{13}\text{C}$  of cave deposits; the average  $^{13}\text{C}$  also varies with the different grades of rocky desertification on the surface. Thus,  $^{13}\text{C}$  recorded in cave deposits can be used to study rocky desertification evolution processes.

## C08.23-02 - Management and conservation of karst landscapes 1

*Chair: Elena Trofimova*

### The significance of landscape ecological research in the 21st century

*Ilona Bárány-Kevei (University of Szeged)*

The assessment of the environmental stress and strong anthropogenic impact on karsts came to prominence in international research in the 1990-ies. First, the "Study Group on Man and Impact in Karst" IGU Commission (Paris 1984), and the "Conservation and Environmental Changes in Karst Areas" (1989) IGU Commission was formed. Karst ecological research has started from that time (Gams 1987; Jakucs 1987; Bárány-Kevei 1987, 1996; Dreybrodt 1988; Gillieson - Smith 1989; Pfeffer 1990; Williams 1993; Uruishibara Yoshino 1995; Day 1996; Urich 2002; Urich - Day - Lynagh 2001; Simon 2007). Karst ecosystems are vulnerable to anthropogenic impacts like land use and climate change. Climate change in space and time determines the movement of karst water, but also affects soil and vegetation. Understanding the ecological consequences of such changes and the prediction of the adverse effects is one of the most important issues of karst research today. It is very important for both ecosystem protection and management. The proper understanding of the hot spots and hot times of ecosystem functions and the recognition of the factors of the system's driving forces are very important issues for the future. One of the most common forms of land use on karsts is forest management. Sustainable forest management manages forest products as well as protective and recreational functions in such a way that their continued existence is ensured for a long time (Tanács - Samu - Bárány-Kevei, I. 2007). The agricultural use of land for grazing may also cause damage (erosion by trampling) to slope steppes, and the presence of livestock affects the chemistry of the soil and the infiltrating waters. Accelerated eutrophication processes (Samu, A., Bárány-Kevei, I., 2010) in the karst lakes also lead to changes in the karst system. Urbanization and the management of the urban environment puts a significant pressure on the karsts, through the acidifying effect of the infiltrating contaminated water. Quarried rock material causes a shortage of material, which indirectly has a landscape deforming effect, the same as waste disposal. Karst water pollution is increasing, and often water abstraction is damaging to the system. The task of karst landscape ecological research is to examine landscape changes due to land use. In order to work out future landscape management the current state should be assessed and different use proposed if needed. The proposal should include possible methods for the sustainable development and conservation of karsts. Plans should be drawn for both landscape use and management. This requires the knowledge of the mechanisms that characterize the functioning of the karst ecosystem. The presentation gives some international examples of current changes in land management.

### Proposed Criteria for Karst Ecosystem Detirioration of Indonesian Karst

*Eko Haryono (Gadjah Mada University)*

Indonesia in 2009 enacted revised act on Environment Protection and Management (Act number 32). The act stipulates that Environment Ministry must provide criteria and guideline for ecosystem deterioration of which one of the guideline is for karst ecosystem. The guideline is already drafted with three principles, i.e. simple and objective, easy to apply, and data availability. The guideline is divided in two criteria. The first criteria are for karst region and the second are for specific object in karst region. For the karst region, the criteria are percentage of vegetation coverage and outcrops/bare land. Spesific object in karst area which is included in the guideline are cave, spring, doline pond, karst hills. Parameters for karst deterioration are speleothem condition, cave sediment condition, and the existence of bats. Parameters for spring deterioration are water quality and discharge fluctuation. Parameters for doline pond deterioration are the period of inundation. Parameters for karst hills deterioration are percentage of vegetation coverage, outcrop coverage, and volume of quarried limestone. Keywords: Karst Management, Karst Environment Deterioration

### A micromorphological approach to deterioration of speleothem of show cave

*Jie Zhang (Nanjing University)*

With spectacular speleothems, karst caves often become tourist destination in China. Yaolin Cave is one of them, which was developed as a show cave in 1980s and once had become one of hotspot of tourist destination in China those years. However, as soon as a cave opened to public activities, the cave environment has been largely changed, and causes artificial deterioration and changes of surface color of speleothems on the one hand, and also changes of original condition of calcite precipitation on surface of speleothem. In this paper, a micro morphological approach to surface processes and types of micromorphology of weathering or deterioration, especially the biodeterioration is carried on with observation and statistics of characteristics under both OPM (optical microscope) and SEM (Scanning electronic microscope). In situ observation and sample collection include choosing typical comparable geomorphic or illuminative position as sample collection sites, recording related hydrologic condition and hand sample description. Lab observation and statistics include Optical microscope (OPM) observation and Scanning Electronic Microscope Observation. A series of criterion of micromorphology were developed for the statistics with systematic observation on surface features of samples, occurrence frequency of the characteristic features on surface were quantified in percent of area coverage. The surface erosional features can be classified under OPM into three types of the crystal-based type of surface erosional features, i.e., round fresh solusional features with patch, roughly solutinal feature with micro pinacles, and polished round solutinal surface with densely calcite crystal. Types of micromorphology of speleothems under SEM can be classified into several groups of

criterion as follows: unweathered Original features with 3 subtypes, Physical weathering features with 4 subtypes, Chemical corrosional features with two subtypes, Biokarst erosional features, with 4 subtypes, Biomats and Primary precipitation features with 3 subtypes. Our observation with statistics according to such focused on subjects as follows: Surface features and mechanism of corrosion of speleothems, Precipitation on speleothems, Show cave environment and related bioeffects, Deterioration of speleothem and the possible mechanism, Micro morphology of speleothems. It is concluded that cave deterioration of speleothems might be reflected and observed in terms of micromorphology with a series of characteristic features as indices, to depict . In this case sample cave, i.e., Yaolin, China, there is certain deterioration of speleothem as the cave opened to public tourist with artificial illumination and subordinate growing of algae, which calls for a better management of cave tourism.

### **Cold karst of Natural Park “Lena Pillars” (Yakutiya, Russia)**

*Elena Trofimova (RAS)*

Natural Park 'Lena Pillars' is located in the latitudinal part of the valley of great Siberian River Lena. Orographically region explored belongs to Prilensko'e Plateau raised at 300-600 m a.s.l., dissected by the valleys of Lena and Boutama Rivers. Climate of the territory is Sub-arctic extreme continental and dry: average annual temperature of the air is '9,8°C at the annual temperature amplitudes to 98°C. Average annual precipitations doesn't exceed 249 mm. There is the area of continuous permafrost up to 300 - 500 m thickness, the thickness of active layer is 2,12-2,36 cm. Lower Cambrian limestones and dolomites with a thickness 400-500 m outcrop represent the karst rocks. In spite of the insignificant quantity of the precipitations falling on the territory of NP Lena Pillars, karst processes are widespread here. One the one hand, the additional receipt of the water is supplied by the processes of condensation, occurred both from the air, and in consequence of the condensation water on the lower part of active layer: because of the big gradients between earth temperature and lower situated perennially cryotic rocks. On the other hand, according to L. Jakucs, the solubility of CO<sub>2</sub> in the water decreases with the increase of temperature of the solution: at temperature 0°C the coefficient of absorbing of CO<sub>2</sub> is 1,713 and at temperature 30°C - only 0,665. Thus, cold waters of permafrost's regions, saturated by CO<sub>2</sub>, are characterized by the considerable aggressivity in respect to karstifying rocks. Additionally, the infiltration of summer precipitations along the deep fissures of carbonate rocks, the condensation, as well as the considerable snow accumulation, have the warming impact on the cryolithozone and condition the formation of supra- and intra-permafrost taliks. Three main morphogenetic types of the karst are developed on the Prilensko'e Plateau: naked, covered and soddy one. Karst sinkholes, ponors, dry channels, disappearances of the rivers, karstholes, karren, etc. represent the classic superficial and underground karst. Solutional denudation rates for the territory researched were estimated by three methods and showed the following figures: 9,43mm/ ka by J. Corbel, 11,7 - by M. Pulina and 12,9 mm/

ka by F. Gombert (maximum potential dissolution of the limestones). Whimsical and picturesque karst pillars - Lena Pillars are the emblems of Natural Park. On-going development of the pillars is controlled considerably by the following geomorphologic processes: frosty and cryohydration weathering, karst, gravitational-slope and fluvial processes. Cold karst of Natural Park 'Lena Pillars' is being of outstanding value internationally and nationally.

## C08.23-03 - Management and conservation of karst landscapes 2

*Chair: Elena Trofimova*

### Stable isotope analyses of freshwater tufa sites and karst springs in the Mecsek Mountains (Southern Hungary)

*Gabriella Koltai (University of Szeged), Sándor Kele (Hungarian Academy of Sciences), Ilona Bárány-Kevei (University of Szeged)*

Annually laminated freshwater carbonates are of particular importance in paleoenvironmental studies since they are considered to be suitable for high-resolution analyses. The present study focuses on freshwater tufa sites located in the Mecsek Mts (Southern Hungary) as possible sources for paleoclimatic research. Water samples have been collected for  $^{18}\text{O}$  and  $^2\text{D}$  analysis on a regular basis and basic physicochemical parameters such as water temperature, pH and conductivity have been measured monthly in situ since September 2011. Stable-isotope analyses of the investigated karst springs revealed unambiguous differences between the Eastern and Western Mecsek. The possible cause of this difference could be the so-called 'altitude effect', which is stronger concerning the higher Eastern Mecsek, than the lower Western Mecsek. At some springs (e.g. Anyák-kútja) monthly differences can be observed in the isotope composition of the karst water, reflecting seasonal changes in precipitation. The  $^2\text{D}$  and  $^{18}\text{O}$  data of the investigated springs from the Mecsek Mts fit to the Global Meteoric Water Line, indicating their meteoric origin. Recently deposited riverine tufa samples were also collected for  $^{18}\text{O}$  and  $^{13}\text{C}$  measurements; furthermore core drillings were carried out at four tufa sites for future investigations. Comparing our stable isotope data with the database established by Andrews et al. (1997), the samples from Mecsek Mountains are similar to the tufas collected in Poland and in the Dinaric Karst concerning  $^{18}\text{O}$  values, reflecting the effect of continentality compared to the tufas collected from Western-Europe (Andrews 2006). The  $^{13}\text{C}$  values of our tufa samples are isotopically light and fluctuate between  $-9.0$  - (VPDB) and  $-11.6$  - with a mean value of  $-10.3$  ‰, suggesting strong soil-zone  $\text{CO}_2$  contribution. References: Craig, H. (1961): Isotopic variations in meteoric waters. *Science* 133, pp. 1833-1834 Andrews, J.E., Riding, R., Dennis, P.F. (1997): The stable isotope record of environmental and climatic signals in modern terrestrial microbial carbonates from Europe. - *Palaeogeography, Palaeoclimatology, Palaeoecology*, 129, pp. 171-189. Andrews, J.E. (2006): Paleoclimatic records from stable isotopes in riverine tufas: Synthesis and review. - *Earth-Science Reviews* 75, pp. 85-104.

### An investigation of land cover patterns in Hungarian karst areas between 1990 and 2010 with special regard to forests

*Eszter Tanács (University of Szeged), Ilona Bárány-Kevei (University of Szeged)*

The most important forms of economic activity in karst areas are usually agriculture, forestry, water management, limestone extraction, and tourism (Watson et al. 1997). Agriculture, forestry and to a lesser extent quarrying strongly affect the karstic landscape and thereby tourism; they also influence both the quality and quantity of the water supplies. Their major changes are well reflected in the land cover making it possible to retrace changes over time. The aim of the present research was to investigate land cover patterns in Hungarian karst areas after the democratic transformation in 1989 with special regard to forests. First, CORINE land cover maps from all available dates (1990, 2000 and 2006) were used in order to investigate tendencies of change at the landscape level in the land cover. A time series of vegetation indices (NDVI, NDMI) calculated from LANDSAT TM and ETM+ imagery were used for local change detection in the forest cover in two of these areas, Aggtelek Karst in North-Hungary and Mecsek Mts. in Southwest-Hungary. Temperate deciduous forests indeed play an important role in Hungarian karstic landscapes; the studied areas all have at least 75% forest cover. Thus forestry policy, wood prices and demand may have a fast and direct effect on our karst areas, also leading to regional differences. Between 1990 and 2000 the total land cover change in the karst areas was ~7%, most of which consisted of reforestation following the abandonment of former agricultural areas and the conversion of arable land to meadows. Between 2000 and 2006 changes were even less significant, only 2.8% of the total area, mostly related to the cycles of traditional forest management operating with clear-cuts. However the forestry law of 1996 limited the maximum area of clear-cuts in mountainous areas to 5 hectares, so while locally they still influence the karstic environment, they would not often appear on large-scale land cover maps. The welcome shift in paradigm towards continuous forest cover may result in an apparent lack of change in the land cover at the landscape level while hiding important dynamics at the local level. The two highlighted areas are very differently affected by forest management; the interests of conservation are much better observed if not challenged by short-term economic interests. References Watson, J., Hamilton-Smith, E., Gillieson, D. and Kiernan, K. (Eds). 1997: Guidelines for cave and karst protection (IUCN Protected Area Programme Series). IUCN, Gland, Switzerland and Cambridge, UK pp63

### Investigation of soils on the slopes of sinkholes in nature reserves

*Maria Smirnova (Moscow University), Alexander Gennadiyev (Moscow University)*

Karst landscapes are widely spread all over the world and some of them are negatively impacted by human activities such as agriculture, mining, industry and so on. For successful management, conservation of karst landscapes and estimation of human

impact on such fragile ecosystem it is important to study components of these landscapes in nature reserves. The problem addressed in our work is related to the research of soil catenas on the slopes of subsidence sinkholes in natural reserves. It is based on field research of 24 soil catenas in the north and south of taiga zone, broad-leaved forest and steppe zone in European Russia. Our work is devoted to the comprehensive analyzes of soil formation on the slopes, changes in morphological, physical and chemical soil properties from top to bottom of sinkholes and the assessment of contrast among soils within soil catenas. We studied soil erosion within the slopes of sinkholes beneath the forest and steppe vegetation by the method of magnetic tracer. The main feature of soil cover in karst landscapes is a considerable variety of soils within relatively small areas and their high complexity. Soil development in these landscapes is affected by an ancient and modern denudation processes. Current research showed that the thickness of humus horizon increases and the content of organic matter decreases from top to bottom of sinkhole slope. Textural metamorphic and calcic horizons lose their morphological properties such as structure and texture from top to bottom of sinkhole slope. Soils from the bottom of the slopes have more in common rather than soils from the top of the slopes regardless of landscape and morphological properties of sinkholes. Soils in sandy soil catenas are more contrast among each other than soils in loamy and clay soil catenas. Water-filled sinkholes bottoms lead to the increased soil contrast within soil catena in comparison with other sinkholes.





# C08.24

## Land Degradation and Desertification

## C08.24-02 - Land Degradation and Desertification in the context of Global Environmental Change: Management, Vulnerability, and Policy 2

*Chair: Guðrún Gísladóttir, Paul F. Hudson*

### Global Environmental Change, economic globalization and increasing social vulnerability of local communities in Atacama Desert

*Hugo Romero (Universidad de Chile), Magaly Mendonca (Universidade de Santa Catarina), Pamela Smith (Universidad de Chile), Manuel Méndez (Universidad de Chile)*

Global climate change and economic globalization are both together threatening rural and indigenous people local communities living in Atacama Desert Andean highlands, i.e. Chilean mountains and plateaus located between 18 and 27°S and above 3.000 heights. Global Circulation Models predict important reductions in precipitation and increments in temperatures, especially in some specific and meaningful water source areas such as freshwater and salty lakes, lagoons and groundwater bodies. Desertification trends should be added to large interannual precipitation variability that are, in turn, a complex and dynamic result of spatial interactions among South American Monsoon, El Niño-Southern Oscillation, the Pacific Decadal Oscillation and the Antarctic Oscillation. It is expected a crisis of water availability and an increasing hard competence between mining, agriculture, nature conservation and urban uses. Public policies and integrated watershed management practices are being urgently required in these landscapes. Global economy, on the other hand, is meaning the investment of more than 80.000 million US dollars in export oriented copper, gold, lithium and other mineral ores only at the current decade. Water requirements of such mining installations are meaning outstanding decisions in terms of social vulnerability of local communities. Mining companies are particularly interested in a water re-allocation process that based on an accentuation of privatization and commodification of water rights; finally replace domestic farming and grasslands for more economic efficient uses. For the government and national and foreign mining companies decertification of natural conservation areas is another important goal to ensure water availability. In spite of critical situation of water resources in Atacama Desert there are not explicit public policies nor did management instruments that could control social vulnerability and avoid natural and social collapses that can be anticipate everywhere.

### The significance of land use on ecosystem health and soil organic carbon in Iceland

*Guðrún Gísladóttir (University of Iceland), Egill Erlendsson (University of Iceland), Rattan Lal (University of Iceland and Ohio University)*

The Icelandic natural environment is highly dynamic, and the climate has been the principal control of ecosystem variability prior to the Norse colonisation around AD 874. During the post-settlement era, drastic change in Iceland's ecosystem has been influenced primarily by human activities. Healthy ecosystem, soil and vegetation, is not only an important resource to meet human demands but also a prominent sink of atmospheric CO<sub>2</sub>. In contrast, soil erosion and land degradation are major sources of atmospheric CO<sub>2</sub>. This paper discusses the impact of climate change and human activities on vegetation, soil erosion, and soil organic carbon (SOC) in some soils of Iceland. Analyses conducted include pollen in Histosols and lake sediments, soil properties, soil accumulation, SOC in Histosols and Andosols, and terrestrially-derived SOC in lake sediments. The pre-settlement landscape was not entirely stable, and relatively small differences in climate may have caused subtle changes to the terrestrial environment. However, the Norse colonists and subsequent occupants caused drastic alternations in the environment and exacerbated environmental deterioration, and the magnitude of alteration was spatially variable. The farmed lowlands were largely deforested during the early Norse colonisation, which reduced an important habitat for fragile biota and caused degradation of soils. The late-Medieval climatic change put further stress on the terrestrial environments, to beyond the threshold of ecosystem resilience. The vegetation denudation accelerated soil erosion, with attendant redistribution of soil over the landscape, and decline in its quality. Vegetated areas became important sinks for wind-transported soils, as evidenced by increase in deposition and bulk density, increase in susceptibility to soil erosion, and decline in SOC content. Despite decrease in SOC content, the high sedimentation rate and elevated bulk weight resulted in higher SOC sequestration at these sites, even though soil quality declined. The potential soil C sequestration in adjacent sparsely or devegetated soils were highly impaired and along with soil mass losses these areas became important sources of anthropogenic CO<sub>2</sub>. The analyses of lake sediment show an increase in C fluxes during the periods of major landscape instability in the post-settlement era. These trends indicate that the surrounding organic soil was being eroded and transported into the lake. Barren sites lost soil cover and SOC pool, resulting in net loss of soil resource and SOC reserves.

### Understanding the Endogenous Dynamics of Environmental Degradation in Northern Togo

*Bernhard Martin (University Halle-Wittenberg)*

Since three decades in northern Togo various processes of environmental degradation could be observed, in particular the sharp decline in tree vegetation and soil degradation. The reasons for that are complex: Successful attempts of agricultural modernisation led to the introduction of ox-plowing, cotton and hybrid maize and to an increased use of chemical fertilisers. The new techniques led to the give up of former, ecologically more sound farming practices and to deforestation. The lucrative growing of cotton created new consumer needs. The cultivation of maize led to new food habits. However, these changes were heavily disputed between younger and elder people. Thus the agricultural modernisation involved also local conflicts regarding modernity and concepts of life. In addition new consumer needs of rural young people, urban energy needs and profit interests of local traders caused the expansion of firefuel and charcoal production. These contribution wants to sensibilise to the social backgrounds of the processes of environmental degradation in peripheral rural African areas.

### The use of soil chrono-sequences in studies of ecological succession under changing climatic conditions

*Aaron Yair (University of Jerusalem)*

Chronosequences of soil characteristics represent an important tool in the reconstruction of past climatic changes over millennial time-scales. They are sometimes used for studying temporal dynamics of plant communities under changing climate and soil conditions. The northern Negev desert offers unique conditions for the study of the environmental effects of loess deposition, during a wet climatic phase. The loess mantle was deposited directly on rocky hillslopes devoid of soil cover. The loess mantle buried a preexisting well developed drainage network. A comparative study of the environmental characteristics of a dry rocky area with a wetter loess covered area, allow us to describe and analyze the environmental effects of loess deposition. Average annual rainfall in the rocky area is ~ 90 mm; while in the loess covered area it is ~175 mm. Pedological, botanical and zoological data clearly indicate that the loess covered, wetter, area is more arid than the drier rocky area. The explanation proposed for the desertification effect of the loess deposition, during a wet climatic phase is as follows. Most rainstorms in the study area are characterized by their low rain intensity and very short duration of most rain-showers. Under such conditions the loess mantle; rich in fine grained particles, is able to absorb all rainwater at most rainstorms. The high water absorption of the loess results in shallow water penetration. Infiltrated waters are afterwards lost by the high evaporation losses during the lengthy intervals between successive rainstorms. An opposite effect is characteristic of rocky areas. The quick hydrological response to rainfall of rocky hillslopes results in the concentration of runoff water from extensive contributing

rocky areas into a limited adjoining collecting soil-covered area the process of water concentration leads to deeper water penetration and water preservation, beyond that allowed by direct rainfall, limiting thus evaporation losses.

## C08.24-01 - Land Degradation and Desertification in the context of Global Environmental Change: Management, Vulnerability, and Policy 1

*Chair: Guðrún Gísladóttir, Paul F. Hudson*

### Principles of spatio-temporal evaluation and the cause-and-effect relations of desertification in Republic of Armenia (RA)

*Ashot Khoetsyan (Yerevan University), Susanna Khachatryan (Yerevan University)*

The cause-and-effect relations of global climate change, decreasing biodiversity and the enlargement of the desertification habitat have been central issues in geographical studies from the second half of the XX century. Desertification can be attributed to a number of local and global natural and socioeconomic factors. Especially intensive desertification can be observed in tropical and subtropical regions of the planet, where the arid mountainous territory of Armenia is located. Main natural and socioeconomic factors resulting in environmental degradation and desertification in the territory of RA have been explored in the present study. Analysis has identified the following findings: The Republic of Armenia is geographically located in a high desertification risk zone. This is underpinned by contemporary socioeconomic conditions and the faulty system of nature management. Desertification is especially intensive in the arid and sub-arid landscapes of RA, located between 400-1500 m. Given the vertical (mountainous) nature of the landscape, environmental degradation freely progresses from one zone to another. While modeling the desertification processes in RA, numerous natural and socioeconomic factors have been identified. Nonetheless, a few dominant factors are responsible for the environmental vulnerability: aridity coefficient, atmospheric moistening coefficient, draught frequency, number of rainless decades, nature management culture, public awareness, etc. Main factors of the spatio-temporal dynamics of main desertification factors have been identified utilizing contemporary objective graphical-analytical methods (correlations, regressions, dynamic aridity spectrums, probability calculations, modeling, chronoisopleths, hydroclimatological analysis of the formation of surface water drains, evolutionary analysis of landscape formation, development of synthetic and assessment draught maps, desertification risk, etc.). The effect of contemporary socioeconomic and political situation in the country on the desertification process has been assessed (hasty privatization of land, the level of ecological degradation of land, imperfections in nature management legislation, military action, transportation blockade, strong migration trends, etc.). Not only technical, but humanitarian sciences have to take part in the fight against one of the central issues of sustainable human development, desertification. This ultimately requires higher nature management culture, stronger 'bottom-up' public motivation in the fight against desertification. Recommendations are provided for most

efficient forms and technologies of decreasing the vulnerability of the territory of RA against desertification. Those can serve as a basis for a state anti-desertification program.

### Land Degradation in Semi-arid Region: Assessing Wasteland Distribution and Reclamation in Dhaulpur District, Rajasthan, India

*Rama Prasad (University of Rajasthan), Rani Singh (Kanoria PG Mahavidyalaya)*

Land degradation will remain an important global issue for the 21st century because of its adverse impact on agronomic productivity, the environment and its effect on food security and the quality of life, which ultimately has resulted in wastelands. Land on India suffers from varying degrees and types of degradation, stemming mainly from unstable use and inappropriate management practice. It manifest chiefly in the form of water erosion followed by wind erosion, bio-physical and chemical deterioration. In India vast tracks of lands (20.17% of total geographical area) exists as wastelands. In Thar Desert of region of Rajasthan, in India land degradation is occurring at an increasing rate. The region contains more than 2lacs sq. kms of arid land has a fast growing human population and increasing livestock number, all of which accelerate damage to fragile arid landscape. The present study juxtaposes the view of land degradation with the increase in wasteland in eastern most part of Rajasthan where whole economy is dependent on agriculture. Here, land degradation is a dominant problem. Over 40% area is affected by various categories of wasteland. Gully and ravine erosion is severe problem along the river Chambal (only perennial river in state), which has a calamitous effect on the agro-economical activities of the area. Overgrazing and salinity are other problems causing degradation of land. Prevailing of semi -arid climate, the area is renowned for its badland topography. Objectives are to evaluate the Tehsilwise distribution, trend and characteristics of 10 years interval, to identify the various environmental and anthropogenic factors responsible for land degradation,

### Estimate of the structural stability using the pedotransfert functions: Application to Cheliff soils (Algeria)

*Hamel Zineb (Hassiba Ben Bouali University)*

The physical properties of soil have been the objective of many studies in recent decades. These properties are difficult to measure because of the requirements in terms of date of sampling, sample storage, heaviness of the protocols and the cost of measurement. Early studies have been designed to establish relationships to estimate the structural stability of soils from the characteristics of the soil more easily accessible. These relationships, or pedotransfer functions (PTF) as they are called in recent years are in fact a heterogeneous soil properties that tell us about the behavior of soils under rain or irrigation. These pedotransfer functions were determined on groups of soils from different stratifications. The PTF selected by various stratifications are applied to land in the Lower

Cheliff (Algeria). The results show that the soils in Cheliff (Algeria) are very diverse they belong to the group of stable, unstable soil. Their behavior towards the action of water is clearly different.

### **Estimation of water resources in the high-mountainous regions of Georgia on the background of the climatic change**

*Besik Kalandadze (Iv. Javachischvili Tbilisi Universitaet), Vazha Trapaidze (University Georgia)*

Georgia is a high-mountainous country, with 54% of its territory (approximately 37.000 km<sup>2</sup>) located over 1000 m hypsometrical altitude above the sea level. The mountainous type of the territory of the country and abundant atmospheric precipitations result in the height of flow layer of 757 mm per square kilometer. With this indicator, Georgia ranks first in the world. The high mountainous region of Georgia is rich in underground waters and their reserve amounts to 15 km<sup>3</sup>. There are about 1000 mineral sources with the daily output of over 100 mln. l. registered on the territory. There are 30.000 mln. m<sup>3</sup> ice accumulated in the glaciers of the high-mountainous regions, with 5% of the given mass contributing to the feeding the rivers. Numerous rivers of the regions are typical high-mountainous rivers well characterized by the factor most important for high power potential - great fall per length unit. If considering that the strength of the river water current is proportional to the product of the river fall and water discharge, the great resources of the high-mountainous rivers of Georgia are clear. Due to the climatic change in recent twenty years, the flow of the rivers and intensity of the glaciers melting will have different reactions and therefore, their hydrological regimes have changed evidenced by sharp variation of the peaks of maximum and minimum levels and water discharge in different seasons. Large-scale evaluation of the water resources and elements of the regime of flow of the rivers in the high-mountainous region of Georgia is of a great importance to ensure the sustainable development of the eco-systems in the mountainous regions.

## C08.24-03 - Land Degradation and Geomorphology: Monitoring, Assessment, and Theory Development 1

*Chair: Guðrún Gísladóttir, Paul F. Hudson*

### Concepts of soil erosion by shallow flowing water – deconstructing the models

*Manuel Seeger (Trier University), Stefan Wirtz (Trier University), Mazhar Ali (Wageningen University)*

Physically or process based soil erosion models describe sediment detachment and transport by flowing water as the interaction of the soils' resistivity to be eroded, the force of the water to entrain particles and its capacity to transport them in suspension. This has led to concepts in which hydraulic parameters as flow velocity and composite parameters such as shear stress, stream power etc. are set into a direct relation. Soils' resistivity to erosion is in general represented as a threshold problem, in which a critical value is trespassed and the following increase of erosion is considered a soil constant. Despite considerable efforts, the process based model concepts have not been able to produce more reliable and accurate reproduction and forecast of soil erosion than 'simple' empirical models such as the USLE and its derivatives. Therefore, there still remain some unanswered fundamental questions about soil erosion modelling: 1) What are the main parameters of soils and flowing water influencing soil erosion?, 2) What relationship do these parameters have with the intensity and different types of soil erosion?, 3) Are the present concepts suitable to describe and quantify soil erosion accurately? To elucidate the influence of basic parameters as grain size, slope, discharge and flow velocity on sediment transport by shallow flowing water laboratory experiments were performed in a flume. Variable flow was applied under different slopes on mobile beds of non-coherent substrates. Field experiments were designed to quantify the hydraulic and erosive effects of small rills in the field. Here, small existing rills were flushed with defined flows, and flow velocity as well as transported sediments was quantified. The laboratory flume experiments clearly show a strong influence of flow velocity on sediment transport, depending this at the same time on the size of the transported grains, and the sediment concentration. It is also shown that hydraulic parameters are not able to predict the combination of sediment detachment and transport. Moreover, the relationship between flowing water and sediment transport is shown to be complex, depending on the morphological evolution of the bed. The field experiments confirm these results, and also show that under variable conditions higher transport rates than those predicted by different model concepts are possible. Soil erosion by flowing water is much more complex than reflected in model concepts: they neither reflect the process variability nor the interaction between the different dynamic parameters of flow and soils. We conclude that mechanistic concepts, in which simple or composite predictors define the dynamics of soil erosion, can not succeed in soil erosion modelling.

### Prioritization of sub-watersheds using extracted Cartosat-1 DEM derived morphometric and natural parameters by AHP

*Akanksha Balha (TERI University)*

Soil erosion is a kind of land degradation process. Categorizing a watershed on the basis of its soil erosion response and prioritizing it correspondingly at the level of sub-watershed helps the decision makers and planners to decide and implement their plans accordingly. Catchment area of proposed Bhugad Reservoir in Damanganga Basin, Maharashtra state, India, covering an area of 710 sq km and having an elevation range of 38m to 866m is chosen as the study area. Physiographically, the study area has a rugged and hilly terrain. Twelve ground control points and twenty seven tie points have been taken on four stereo-pairs of Cartosat-1 satellite to extract a Cartosat-1 DEM at 10m resolution using high resolution Carto-DEM and orthoimages at an RMSE of 0.32 pixels. The extracted Cartosat-1 DEM has been used for hydrological analysis to delineate eleven sub-watersheds with area varying from 42 sq km to 96 sq km. The origin of all hydrological and geomorphological phenomenon is a watershed, hence it has been considered as the basic unit for the study. To study the behavior and the hydrological processes within a watershed, morphometric analysis of the basin has been done. Various morphometric parameters of the watershed are calculated, analyzed and all the eleven sub-watersheds are prioritized on the basis of their soil erosion response towards morphometric parameters using AHP. AHP is a decision making method which quantifies the comparative priorities for a given set of parameters on a ratio scale and puts stress on the significance of judgement and knowledge of decision makers. Another methodology of prioritizing sub-watersheds on the basis of their soil erosion response towards natural factors like vegetation, soil characteristics, slope and etc using AHP has been done. Then a comparison between the two methodologies has been made and respective interpretations are made. The study would help in taking up suitable soil conservation measures resulting in suitable planning and sustainable watershed management.

### Gully Erosion and Land Degradation in Semi-arid Environments – Monitoring, Quantification and Assessment

*Johannes Ries (Trier University), Irene Marzolf (Johann Wolfgang Goethe Universität), Manuel Seeger (Trier University)*

Gully erosion is considered one of the most important soil erosion processes, but its contribution to the total soil loss needs to be discussed. If gullies, and not interrill and rill erosion processes are the most effective source for the siltation problems in reservoirs in semiarid landscapes, strategies to combat land degradation need to be changed significantly. Despite the efforts made to understand the occurrence and development of gullies, there is still a lack of knowledge in spatio-temporal dynamics, on the range of headcut and sidewall retreat, on the factors leading to gully formation and growth as well

as on the influence of human activity, causing misinterpretation of volume rates. This paper presents results of several research projects on gully monitoring between 1995 and 2011 which employed large-scale aerial photography taken from remote controlled platforms. The resulting high-resolution images (pixel sizes < 10 cm) are used for photogrammetric and GIS analysis in order to quantify gully development with linear, areal and volumetric measurements at various sites in small to medium-scale catchments in semi-arid landscapes of Spain and Morocco. The monitoring results from high-resolution aerial photography are combined with the characterisation of the gully catchments (mapping of soil surface types and geomorphology) and the analysis of the relationship between runoff patterns and infiltration behaviour (rainfall simulations). Natural rainfall characteristics and catchment sizes are included. Additionally this study investigates how medium-term gully-development data (7-13 y) differ from short-term (1-2 y) and long-term data (20-50 y). The results show an extremely high spatial and temporal variability of gully development in an order of more than two magnitudes, being almost independent from the size of the contributing catchment and rainfall characteristics. Gully area loss varies by a factor of 25 and gully volume loss by a factor of 200. For these, sidewall erosion may play a considerable part. The short-term gully volume changes observed at the individual gullies show very high variability: on average (median of all gullies), the maximum headcut change observed in 7-13 years was 14.3 times larger than the minimum change, but the degree of fluctuation varies strongly between the gullies. The varying negative and positive influence of land use and human activities - especially on connectivity of surface flow to the headcut - appears to play a dominant role, both for short-term variability and medium-term difference in gully development. The study proves the value of capturing spatially continuous, high-resolution 3D data using small-format aerial photography for detailed gully monitoring. In particular, human activity on varying time scales and its positive or negative effects on runoff production and connectivity need to be considered as an important factor for gully-erosion variability.

### Terrestrial laser scanning for detailed topographic analysis of slopes affected by large tsunamis

*Takashi Oguchi (University of Tokyo), Yuichi S. Hayakawa (University of Tokyo), Hitoshi Saito (University of Tokyo), Akitoshi Kobayashi (University of Tokyo)*

A massive earthquake of  $M = 9.0$  occurred on Friday 11 March, 2011, off the Pacific coast of northeastern Honshu, Japan. This has been the largest earthquake ever recorded in Japan. The earthquake triggered destructive tsunami waves that struck the Pacific side of Japan, traveling up to 10 km inland. The total number of dead and missing people due to this disaster is about 19,000, and more than 125,000 buildings were damaged or destroyed. The damage caused by the tsunami waves was much greater than that by ground motion due to the large earthquake. We investigated the impact of the huge tsunami on landforms in the coastal area. The tsunami waves destructed numerous buildings and other artificial objects, and they contained sandy and muddy

grains transported from the sea bed. However, erosion and deposition on flat lowlands and valley bottoms were unexpectedly limited. In contrast, side-slopes of valleys along a ria-type coast often underwent erosion including the removal of vegetation, soil, and regolith, and even bedrock may also have been modified due to strong wave action. To understand the characteristics of landforms affected by such erosion, we conducted field surveys in some valleys and collected high-resolution 3D topographic data using a terrestrial laser scanner (TLS). The targets of scanning include both relatively broad valley-side slopes and specific landslides caused by tsunami waves. One of them is the valley of Aneyoshi, where the maximum tsunami run-up height was measured (38.9 m). The results indicate some differences of the surveyed slopes from usual slopes. For example, nearly vertical segments often occur at lower slopes although they are almost free from erosion by normal coastal waves and rivers. Historical and sedimentological records indicate that the study area experienced multiple large tsunamis in the late Holocene. Erosion by the repeated tsunamis seems to be responsible for the observed unique slope shapes. In other words, topographic characteristics of slopes may be used to identify areas with high risk of large tsunamis.

## C08.24-04 - Land Degradation and Geomorphology: Monitoring, Assessment, and Theory Development 2

*Chair: Guðrún Gísladóttir, Paul F. Hudson*

### Soil development within late Holocene glacial chronosequence of Skaftafellsjökull glacier, SE-Iceland

*Guðrún Gísladóttir (University of Iceland), Olga Vilmundardóttir (University of Iceland), Rattan Lal (University of Iceland and Ohio University)*

Worldwide glaciers are melting due to a warmer climate, exposing surfaces where weathering and new soil formation commences. Since the end of the Little Ice-Age, Icelandic glaciers have been retreating after reaching their maximum extent in 1890, leaving behind deposits of glacial till of basaltic rock fragments mixed with tephra. The presence of end moraines mark the location of the glaciers' terminus, and a chronosequence can be established along proglacial areas. In a chronosequence, it is hypothesized, that except time, all other soil forming factors (climate, parent material, biota, and topography) remain unchanged. Thus, it is possible to assess the role of time on the rate of pedologic processes. As soils develop, organic carbon accumulates in the soil. In fact soils encompass the largest terrestrial carbon pool containing ~1500 Pg of organic carbon in the upper 100 cm. Sequestering carbon in soil is an option of mitigating climate change. Thus, the aim of this research was to investigate how the soil develops over time, determine the rate at which carbon is sequestered in the soil under natural circumstances, and to study the relationship among soil properties, landscape and vegetation. The research was conducted at Skaftafellsjökull glacier, SE-Iceland. Soils in different stages of development were sampled along three moraines representing surfaces of ~ 8, 65 and 120 years. Several parameters were analysed to investigate early stage soil formation and its relation with time; formation of A-horizon, bulk density, organic matter, organic carbon and nitrogen, soil reaction (pH), and clay content. To compare the properties under a mature ecosystem, which may develop on the glacial moraines in the future, soils were also sampled in the birch forest on the Skaftafellsheiði heathland adjacent to the glacial moraines. The data indicate that after 120 years of development, the proglacial soils are still young compared with the older soil under the birch forest. Bulk density decreased with time as did the soil pH, and these changes were more evident in the 0-10 cm than 10-20 cm depth. The formation of A-horizon and the proportion of organic matter and soil organic carbon increased over time. After 120 years, the A-horizon was 8 cm thick and the soil contained 19.6 Kg C m<sup>-3</sup> of organic carbon. When compared to the organic carbon of 29.7 Kg C m<sup>-3</sup> under the forest soil, it was apparent that the soil had not yet reached its climax carbon sequestering capacity. Further, the young soils contained a substantial amount of secondary clay minerals characteristic of soils of volcanic origin, but the increase in the concentration with age was not clear. The research is funded by the University of Iceland doctoral fund, the

Landsvirkjun's Energy Research Fund, and Targeted Investment in Excellence, Climate, Water and Carbon Project, C-MASC, OSU, Columbus, OH, USA.

### Complexity and local-scale variability in floodplain geomorphology along a heavily managed fluvial system: A lowlands perspective from the Nederrijn-Lek River (Rhine), Netherlands

*Paul F. Hudson (University of Texas/ University of Amsterdam)*

Flood management alters fundamental fluvial processes that have consequences to rivers and floodplains. This paper examines overbank sedimentary deposits and floodplain morphology of the Lek-Nederrijn River, the second largest tributary of the modern Rhine delta. Historic and modern geomorphic, hydrologic, and sedimentary data from field and archival activities are examined in relation to different types of historic floodplain uses and management approaches. In view of the modern system representing a mosaic of different human impacts superimposed upon a dynamic system, this study addresses the degree to which the modern system is disrupted. Specifically, the study quantifies the magnitude of disruption of sedimentary deposits from natural or theoretical patterns. The sediment size channel banks displays considerable spatial variability, but lacks an overall downstream fining trend. Although lateral fining trends are observed, they vary from typical natural levee patterns because of the influence of engineering works. Despite having ample time for natural levees to form, the morphologic expression largely lacks the pattern observed in natural systems. The results have implications to floodplain rehabilitation, which should consider the sedimentary and morphologic framework in which floodplain restoration occurs.

### Influence of landform and land use on soil properties of the Sikkimese Himalayan piedmont in India

*Pawel Prokop (Polish Academy of Sciences), Dominik Ploskonka (Polish Academy of Sciences)*

Quaternary piedmont deposits of Sikkimese Himalaya built a system of fans decreasing in elevation from 200 m a.s.l. at the mountain front to about 100 m a.s.l. within a distance of 10 km. The alluvial surface is dissected by the braided mountain rivers and forms several extensive terraces. The higher elevated terraces are stable landforms, while lowest ones are frequently flooded in effect of heavy monsoon rains reaching 4000-6000 mm annually. The piedmont zone was under natural forest up to the second half of the 19th century when the foundation of tea plantations and laborers migration caused rapid deforestation. As a result, higher elevated terraces were taken under cultivation of tea, while active floodplains were converted to paddy rice fields. Fifteen soil profiles representing main landforms and dominant land use - forest as reference sites, tea plantations and paddy rice cultivation were elaborated within an area of 170 km<sup>2</sup> in piedmont zone. The morphological and physico-chemical characteristics of soils from



higher terraces and active floodplains revealed two distinct stages of pedogenic development: A-(Bw)-C and A-C with soil classified as Inceptisols (Dystrudepts) and Entisols (Fluvaquents) respectively. Old, stable landforms, good drainage conditions of Inceptisols result in rapid leaching and enhancement of the weathering process, giving rise to thick humus horizon, thereby lowering the pH (4-5) and development structural Cambic horizon. However, maintained tea garden soils are characterized by thinner A horizon and lower organic matter content in comparison to forest soils. Entisols of active floodplains, imperfectly drained, without any diagnostic horizon except ochric epipedon, show little alteration of the original deposits and higher pH (5-6), because they receive new sediments faster than the assimilation of previous material into the genetic horizons. Textural stratifications are the effect of fluvial genesis. Along with the increase of the distance from river bed, and continuous soil tillage operations on paddy rice fields they result in organic matter depletion in comparison to forest soils. Topography of the land along with the time factor and nature of parent material played a main role in the genesis of piedmont soils. About 130 years of monoculture cultivation of tea and rice significantly modified morphological and physico-chemical soil properties within different landforms.

#### **Complex Urban System and its Impact on Wetland Bio-Diversity in Guwahati City, Assam, India**

*Rinku Manta (Guwahati University)*

Complex Urban System and its Impact on Wetland Bio-Diversity in Guwahati City, Assam, India

## C08.24-05 - Land Degradation and Geomorphology: Monitoring, Assessment, and Theory Development 3

*Chair: Guðrún Gísladóttir, Paul F. Hudson*

### **Environmental and socioeconomic consequences of gully erosion in agricultural areas (Lublin Upland, East Poland)**

*Wojciech Zglobicki (Sklodowska University), Bogusława Baran-Zglobicka (Sklodowska University), Leszek Gawrysiak (Sklodowska University)*

The Lublin Upland is an important agricultural region in eastern Poland owing to the occurrence of Luvisols and Cambisols. At the same time, the natural conditions and long-lasting agricultural activity have led to the formation of a dense network of permanent gullies. In some places, their density exceeds 11 km/km<sup>2</sup>. The total length of gully forms in individual gully systems can exceed 15 km. The largest gullies are 20-25 m deep; their width is similar. The formation of gullies entails several environmental and socio-economic consequences. Most of the socioeconomic consequences are unfavourable from the human perspective. Gully erosion processes can thus be regarded as a land degradation factor. Gullies reduce the size of land that can be used for agricultural purposes, impact the conditions of agricultural production (changes in hydrologic conditions, difficult access to the fields), and increase the frequency of local floods. This study investigated 43 rural districts in loess-covered areas in the Lublin Upland. The permanent gullies in the study area cover a total of 61 km<sup>2</sup>. An attempt was made to assess the correlation of the selected indicators reflecting the state of the environment and the socio-economic development of the rural districts with the size of the area covered by the gullies within the territory under study. The indicators analysed included: forest cover, area of arable land, size of agricultural holdings, revenues of the districts, population density, and balance of migration etc. The project has been financed by Narodowe Centrum Nauki - the National Science Centre (project no. NN305 262840).

### **The effects of gully erosion and land use changes on environment and socio-economic status of Lower Chambal Valley India**

*Padmini Pani (Jawaharlal Nehru Univesity)*

The natural environment of an area has always a certain degree of influence on society. Land degradation due to gully erosion is one of the key environmental challenges which affect the sustainability of the ecosystem. In the present paper an attempt has been made to study the effects of gully erosion and land use changes on the environment and its impact on the socio-economic status of Lower Chambal Valley of India. The lower Chambal Valley of India is considered as an ecologically fragile region over the years due to the vast ravenous tracts along the river Chambal. The selected study area is a part of

Morena district of Lower Chambal Basin India. The striking feature of the area is the ravines in the form of dissected landscape which are difficult to cross and unsuitable for cultivation. The formation gullies in the area causes not only the loss of fertile soils but also shifting of agricultural lands due to the advancement of gullies. The mechanism and rate of gully development has been studied in the region for several years. Areal extent of gully erosion was measured using Indian Remote Sensing satellite images. The land use changes due to gully erosion have severe impact not only on the agricultural productivity but also on the poverty. The decade-long history of land use change has been recorded from the time-series digital satellite images. The study comprises in two steps. Firstly the land use changes have been estimated along with the intensity of the ravines and secondly the affects of these changes on socio-economic status have been investigated. The relationship between gully erosion and land use change has also been considered and its effect on society has been discussed. One of the major indicators of the impact on society is the development of the villages. The villages found within the ravenous zone are comparatively less developed than the villages out side the ravines. It is inferred that the local people are also aware of the processes of land degradation. Loss of agricultural land due to spreading of the ravines along the marginal lands has long been considered as a major threat to the local farmers. It was found that people surviving mainly on the agricultural resources of this area have developed a range of coping strategies to cope up with the impacts of land degradation. These strategies ranged from collective action at the community level to micro-level coping strategies at the level of the households or the individual. The pattern of gullies has also an impact on the development of marginal lands which ultimately effects the agriculture production. The results reported in the study suggest that natural environment certainly play a key role in the development of the society. Key Words : gully erosion, land degradation, ravines, marginal lands

### **Pyrogenic polycyclic aromatic hydrocarbons in soils**

*Anna Tsibart (Moscow University), Alexander Gennadiyev (Moscow University)*

Polycyclic aromatic hydrocarbons (PAHs) are priority organic pollutants composed of fused benzene rings. Natural and anthropogenic processes generate PAHs during the incomplete combustion of all types of organic matter. But the connection between combustion conditions (temperature, oxygen amount and scattering of combustion products), type of burning material and PAHs accumulation in soils is not covered in literature. One of the most important combustion properties is scattering of combustion products. Intense scattering of combustion products takes place during wildfires. The PAHs accumulation in soils was studied in three different Russian natural reserves (Norskii, Khakasskii, Polistovskii natural reserves) affected by forest, steppe and peat fires. Conditions of limited scattering of combustion products appear during domestic wood combustion. For studying PAHs accumulation under these conditions we chose a site with stove heating (village Verchnie Dachi, Moscow Region). Weak scattering of combustion products is observed during processes of coal dump combustion. We

investigated burning gangue dumps of Kuznetskii coal field (Kemerovo Region). Soil samples were analyzed for 12 compounds: fluorene, naphthalene, phenanthrene, chrysene, pyrene, anthracene, benz(a)anthracene, benz(a)pyrene, benz(ghi)perylene, retene, coronene, benz(e)pyrene. Identification and quantification was carried out by high resolution Shpol'skii spectrofluorometry. Under conditions of intense scattering of combustion products during wildfires PAHs accumulation in soils was low. The difference of PAHs concentrations in affected and background soils did not exceed 10 times. Type of burnt vegetation had an effect on pollutants amount in soils. Wildfires in coniferous forests and peat bogs tended to give higher absolute PAHs concentrations in soils (to 100-150 ng/g) than steppe wildfires (to 30-40 ng/g). PAHs distribution in fire-affected soils also depended on soil type. Mineral soils had maximum of concentration in surface horizon and in peat soils the highest concentrations of pollutants were detected at depths of 5-10 and 10-20 cm. Limited scattering of combustion products during wood heating favoured intense PAH accumulation in upper soil horizons (to 1000 ng/g). Under conditions of weak scattering of combustion products derived from coal dumps PAHs accumulated across the soil profile (to 500 ng/g). Soils subjected to forest fires contained higher concentrations of chrysene, benz(a)anthracene, retene, phenanthrene, benz(ghi)perylene. Peat-fire affected soils showed prevalence of pyrene, naphthalene, benz(a)anthracene, phenanthrene, chrysene, benz(a)pyrene. Grass combustion during fires favoured the accumulation of low weight PAHs (fluorene, naphthalene) in soils. Combustion of coal particles in gangue dumps gave naphthalene, phenanthrene, retene, fluorene.

### Ep-seated landslides and accretionary prism with reference to Kii Mountains, Japan

*Hiroshi Suwa (University of Tokyo)*

Typhoon Talas in 2011 brought about heavy rainfall of more than 1000 mm in a few days at many gauging stations in Kii Peninsula, Japan. The rainstorm triggered many deep-seated landslides. The landslide closed river flows at more than 18 places to form landslide-dam reservoir. Then water level was artificially reduced to avoid secondary hazards from breach of landslide dam at 4 unsteady dams. The same area in Kii Mountains had experienced a severe landslide hazards also in 1889 which was triggered by heavy rainstorm of a typhoon whose trajectory was almost same as that of typhoon Talas. The 1889 hazard formed 53 landslide dams, most of which breached in less than a few days and brought about secondary dam-breach flood hazards to the villages along the rivers below the dams. The local government of Uchi-Yoshinogun County published a survey report of the hazard consisting of 11 volumes in 1891. The report records and explains the features in detail concerning the rainfalls, landslides, flash floods, loss of peoples, loss of properties, evacuation of local peoples, rescue activities, emigration of local peoples to a northern island: Hokkaido after the disaster during the 1889 winter and so on. Discussion combining the study of the 1891 report and field studies of the 1889

landslides and other 5 recent hazards including the 2011 typhoon Talas rainstorm hazard indicates the major incipient causes for deep-seated landslides at geologic belts of accretionary prism as follows. (1) Slopes consist of dip slope. The dip slope originates from a structure of accretionary prism. Otherwise it faces syncline axis. (2) The slope has break line on its mid position. The upper slopes including break lines are candidates for a next slide. This occurs due to large uplift rate due to a tectonically active movement of accretionary prism. (3) The slopes on outer side of winding. They are kept unstable by successive undercutting. (4) Both geomorphic indexes: drainage density and slope angle are large. This condition is equivalent to high frequency in steep and long slopes. (5) High infiltration capacity of the slope, which contributes slope instability under rain storm.

## C08.24-06 - Land Degradation and Geomorphology: Monitoring, Assessment, and Theory Development 4

*Chair: Guðrún Gísladóttir, Paul F. Hudson*

### Land Classification Based on Sediment Yield Production (Case Study: Eyvanakey Watershed- Iran)

*Mohammad Hassanzadeh Nafooti (Azad University), Moslem Chabok Boldaje*

Sedimentation due to erosion in watersheds is regarded as environmental pollution which always incurs considerable damage to hydroelectric facility and rivers' recreational value. By land classification based on sediment yield production it is possible to provide priority in order to correctional action and sedimentation control. Thus Eyvanakey watershed which is consisted of marl deposits sensitive to erosion is selected. Marl deposits have higher sediment production due to structural nature such as destructive particles (silt and clay) and chemicals (calcium carbonate' Gypsum' Anhydrite and salt). In this research, a portable rainfall simulator was used in order to measure sedimentation in marl units. Then sedimentation level of each unit is analyzed by SAS software. Groups' difference was significant in levels 1 and 5%. marl units were divided into four main groups by Duncan's average comparison method : A (including OLs unit), B (including M3 unit), C (including M1 , M2 units) and D (including O-M, OLg units) in terms of sediment yield production where this susceptibility decreases from A to D.

### Assessment of Land Degradation in Al-Bathina Region, Oman

*Ali Al-Buloshi (Sultan Qaboos University), Yassine Charabi (Sultan Qaboos University)*

The Batinah region is situated along the sea of Oman. This coastal plain is approximately 25km wide and lies at the foot of the Western Hajar Mountains. After Muscat the capital of Oman, it is the most densely inhabited area in Oman. The problem of salinity in this region started in the mid 1990 due to the extensive agriculture activities, coupled with increasing population, through the use of lands for farming and overdraws of fresh groundwater to a degree of causing seawater intrusion. This region is also characterized by low amount of annual rainfall (less than 100mm) and high evaporation ration. These factors contributed in increasing the area of salinity and causing abandoning of productive farms. For the assessment of the land degradation in this region during the last decade a GIS database was designed and compiled with different spatial attributes (salinity, crop. Built-up area, ground water etc). The fuzzy logic and multi-criteria analysis into GIS environment was used to classify the land suitability index. The unsuitable lands represent 40% and 48% of the total Land of the region in 2005 and 2010 respectively.

This paper shows that the land suitability index is a good index to retrieve the spatio-temporal dynamic of the land degradation.

### Land Evaluation for its Optimum Use in the Kendujhar District, Orissa

*Punyatoya Patra (Aditi Mahavidyalaya)*

Endowed with rich natural resources such as different types of forest and high-grade minerals, the Kendujhar District contributes a major share in state's economy. The rich forest as well as fertile agricultural land is sacrificed for extraction of minerals and development of various types of industries. The rich farmers who have very big and fertile agricultural land are unable to take care of it, grow valuable sal and teak which needs little care and gives high return in long run. On the other hand landless tribal people grow crops on the marginal uneven/ sloppy land for their basic needs. So there is drastic change in land use pattern, which is not sustainable in long run. Keeping all these problems in view the purpose of the study is of three-folds: (i) evaluation and classification of land of the Kendujhar District for its optimum use; (ii) deviation of actual land use from its optimum use and the reasons behind it; and (iii) suggestion for possible land use changes for sustainable development. To obtain the results, the secondary data on land and soil variables have been collected from Survey of India toposheet on 1:50,000 scale; National Bureau of Soil Survey and Land Use Planning, Nagpur; and Orissa Space Application Centre. The land and soil variables are: slope, texture, pH class, depth, drainage, soil erosion, stoniness, groundwater condition etc. These variables have been evaluated one by one and land of the study area has been classified for its optimum use following USDA land capability classification keeping local conditions in view. Then the deviation of actual land use from its optimum use has been found by overlying the map prepared for optimum use and the map showing existing land use pattern. All these data have been processed by using GIS software (ARC/VIEW 3.2 version). The primary data in sample locations have also been collected in the field by interviewing local villagers, forest and revenue department staffs to suggest possibilities of changes in existing land use pattern wherever required. Eight types of land for optimum utilization have been delineated. They are: Type I- suitable for double crops; Type II- suitable for single crop; Type III- suitable for plantation; Type IV- suitable for pasture; Type V- suitable for mixed farming; Type VI- suitable for forest; Type VII- suitable for sanctuary; Type VIII- suitable for other. In 35 percent area, the actual land use deviates from optimum land use. Most of the type IV, V and VI lands are used for agricultural purpose. In many places type I and II lands are used for plantation purpose. Lastly it was found that in many places there is possibilities of land use change for sustainable development which need cooperation among government officials, social workers and local people.

## Forest fires in the southern Russia steppe forests

*Maria Martynova (Southern University)*

Southern Russia forests are extrazonal, the forested area is very small. It varies from 0.01% in deserts up to 20% or more in Caucasus foothills. The especially low humidity, intensive rainfalls, droughts (relative humidity is below 30%), sharp winter temperature fluctuations (from +10°C to -40°C), extremely hot summers (up to +40°C), dried eastern winds, dust storms, etc restrict the development of woody vegetation. In Rostov region (forested area - 2.5%) one may see a big variety of steppes. Mainly, the natural vegetation is converted to agricultural landscapes. Southern Russia forests are both natural (valley-glens, floodplains, sand) and anthropogenic (more than 50% of the area). Mainly, mono-breed arrays of *Pinus sylvestris*, *Quercus robur* L. and *Robinia pseudoacacia*, large areas of *Ulmaceae*, are represented, especially along gullies and floodplains. Young trees and middle-grades ages dominate. The forest geosystems are not viable in the arid steppe. Now, the forest plantations start growing old. The bad sanitary conditions cause the death of forest landscapes due to pests, diseases and fires. The predominance of the 2nd and 3rd class forest fires risks is the result of dry steppe soils, dense road network and "wild" tourism. During the fire risk season both lower and crowning fires are possible. In this sense, the large arrays consisting of *Pinus sylvestris* and planted in 1950-1970 are the most risky. The frequent dry winds and poor sanitation conditions lead to incensement of the number of fires. However, a downward trend in the forest fires events, as well as one of the covered areas is observed during the last 2 decades. The peak-years are 1994 (4269 ha burned), 1995 (5876), 1998 (2321), 2001 (4685 ha) when the middle-age forests playing the most important ecological role have been lost. Recently, the big fires have been observed in 2002, 2004, 2007 and 2010. The local fires become more frequent. Our group has been observing the forest fires during the last 5 years. The investigations include area surveys and profiling of the damaged areas. The landscape maps and vertical profiles have been constructed and succession series have been described. Usually, the fires in the southern region are line, distributed along the roads, rivers and edges of fields. The forest fire region activity zonation has been carried out. One can see seven distinct areas, where the species and age of trees, sanitary status, forest fires frequency during past 15 years, the crowning fires proportion, fire areas and burned wood volumes have been studied. The high proportion of crowning fires (more than 40%) is very dangerous since the traditionally grown steppe arboreal species are hardly fire adapted and regeneration of natural steppe forests is almost impossible. The lower steppe forest fires are also destructive; they lead to the abrupt change of region landscapes.



# C08.25

## Land Use and Land Cover Change

## C08.25-01 - Session on Land Use and Land Cover Change – Global Change 1

*Chair: Ivan Bicik*

### Land Use/Cover Change: Global challenges – local solutions

*Elena Milanova (Moscow University)*

Climate change and biodiversity degradation are very vital contemporary issues of global concern. Between the natural factors that shape the land cover and biodiversity in Russia, climate is the most important one. The five different Global Circulation Models (GCMs) were used for three pre-set time periods: 2020s, 2050s, and 2080s. Land use/cover change (LUCC) is a complex process, driven by both natural and anthropogenic factors. LUCC transformations under human activities are threatened to the sustainability of environment and people life-support systems. One of the important issues is how to balance land cover capability and land use practice with anthropogenic stress. Russia is distinguished by a graphic share of such problems, and one of them is the elaboration of sustainable land use policy that is especially important during current land use restructuring connected with many geopolitical, economic and social problems. The territory of Russia has huge landscape diversity of main land biomes. At the same time, the country's economy developed under the conditions of strong centralization, lack of the normal market and isolation from the most of the global system. Agriculture is one of the major driver of land cover and biodiversity change in Russia where more than 220 mln ha (13 % of the total country territory) are designated for agricultural use. Integrated approach on the base of landscape methodology was used to map and to assess land use/cover change. Present-day landscape was chosen as the core unit of LUCC classification, because it comprises various aspects of natural and socio-economic environment. The landscapes' applications and mapping were done at global, country and regional scales using remote sensing data. This methodology helped to provide understandable presentation of geographical distribution of areas with different LUCC trends and degree of land cover transformation; to identify territories with similar land cover status in order to replicate more advanced environmental management experience and to reveal the territorial extent of areas with the most heavily transformed lands that may need prompt rehabilitation actions. The ecologically sound land use systems should help to reconcile human activity needs with the requirements of the environment and to avoid the unfavorable consequences of land and biodiversity degradation. The agrolandscapes' applications were done at macroregional, regional and local scales on the base of cartographic, remote in-field data. The ecologically sound agriculture development should help to reconcile social needs with the requirements of the environment and to avoid the unfavorable consequences of land degradation.

### Land use systems in the Brazilian Amazon

*Gilvan Guedes (Vale do Rio Doce University), Alisson Barbieri (University of Minas Gerais), Eduardo Brondizio (Indiana University), Bernardo Queiroz (University of Minas Gerais)*

This paper aims to analyze the impact of household and lot life cycles, as well as integration into markets on smallholders' land use systems from a mixed-method perspective. Research on land use/land cover change in agricultural frontiers worldwide usually applies traditional LULC classes to define agropastoral strategies among smallholders (Caldas et al. 2007; Perz 2002; VanWey et al. 2007), yielding mixed evidence about how the demographic and temporal dimensions of frontier occupation impact the landscape (VanWey et al. 2007; Perz 2002; Walker et al. 2002). Based on the conceptual framework developed by the Food and Agricultural Organization (FAO 2003), other studies applied cluster and fuzzy methodologies in order to incorporate smallholders' joint decisions when choosing a specific land use system (Brandtberg 2002; Walker et al. 2002). This work builds on the participatory spatial research perspective (D'Antona et al. 2008), and advances the study of land use systems by combining a fuzzy method (Grade of Membership) with qualitative spatial instruments (participatory sketch maps) to create multidimensional profiles of land use systems. These previous techniques combined with in-depth interviews and multivariate regressions were applied to a representative longitudinal dataset of 402 smallholders along the TransAmazon Highway, in the Brazilian Amazon. In-depth interviews with landowners from each type of the four land use systems found (pasture with cattle, pasture and annuals, perennials and pasture, perennials) help to better understand the relation between demographics, place-specific capital, market stimulæ and land use choice. We found that proximity to markets and life cycles have significant effects on system choice, but in a non-linear fashion: landowners adjust their land use systems based on market stimulus (e.g., increasing perennials when cocoa price increases), constrained by the viability of the type of soil. At the same time, labor constraint is overcome by informal exchange of days of labor. These findings probe universalistic approaches that explain how local actors interact with their immediate environment. The increasing time on the frontier expand smallholders' ability to process exogenous sources of information, such as price changes in national and international markets, yielding efficient choices under labor and biophysical constraints. While the latter is harder to overcome, the former is mediated by informal labor arrangements. As smallholders respond rationally to change in market stimulæ, government intervention might focus on ecobalanced reduction in transportation costs (expanding existing road networks) coupled with fiscal incentives on sustainable crops. These actions promote both social and ecological benefits, by reducing pressure on the remaining standing forest, as well as improving smallholders' livelihoods.

## Global Cropland and Agricultural Systems AD1000 - AD2000

*Mats Widgren (Stockholm University)*

Climate change models can be improved by incorporating past human landscape transformations. Accurate maps of global agricultural history are critical in this regard. The existing datasets, widely used and quoted, are all based on backcasting from 20th century land cover data using historical population estimates. This method tends to overemphasise European and colonial agriculture and reflect to a large degree Eurocentric and environmentally deterministic assumptions rather than historical, archaeological and palaeoecological evidence. The paper presented here reports on a collaborative project based in US and Sweden and carried out by economic historians and historical geographers with the aim to present in global maps the most recent knowledge of the agricultural systems of the world for AD 1000, AD 1500, and AD 1800 with discussion of 19th and 20th century agricultural developments. Changes during the past millennium occurred suddenly, in great leaps, not in a slow and continuous manner. Qualitative changes within existing agricultural systems -- intensification -- were as important as quantitative changes -- expansion -- of previously established patterns of land use. Moreover, abandonment and collapse was part of the development, especially in the Americas. The maps presented provide input to an alternative dataset of land cover change during the last millennium. The paper is coauthored with William E. Doolittle, University of Texas-Austin, Ulf Jonsson, Stockholm University, Janken Myrdal, Swedish University of Agricultural Sciences, William I. Woods, University of Kansas.

## Assessment of Geosystems Transformation Using Time of Succession Processes

*Vladimir Karakin (Pacific Geographical Institute)*

One of the basic processes which are studied by geography is anthropogenic transformation of natural environment considered in various borders (geosystems, ecosystems, landscapes, or administrative and historical units). The main problem here is to find proper metrics of assessment of the object's transformation degree. There were developed many scales, in verbal or scorecard shapes, to assess a degree of transformation of the object by its contemporary state (from badlands and urban landscapes, then to agricultural landscapes and to weakly transformed forest and wetland objects). Most of the used methods assess the contemporary state of the geographical object but not the process of its transformation from initial state to the contemporary one. From our point of view, the transformation process is more informative since the different processes can lead to the similar results. For instance, the modern intensive agro-landscape with high share of arable lands can appear in result of transformation of initial forests, steppe areas, and wetlands that demands for methods of assessment of its transformation. We developed and apply the method of the geosystems transformation assessment according to duration of time needed for

hypothetical recovering of the existing type of anthropogenic landscape to the initial state. This method focuses on duration of recovery process, and a degree of transformation is measured by objective time units (years, centuries). These measures characterizing separate sites (field, forest area, etc.) can be 'weighted' and used to characterize areas of any larger dimension (landscape, country, etc.) then. The method was approbated through scale systematization of accumulated regional data according to duration of succession processes under various base conditions.



## C08.25-02 - Session on Land Use and Land Cover Change – Global Change 2

*Chair: Ivan Bicik*

### Results and Comparison between CORINE and SIOSE in the Land of València (Spain)

*Joan Carles Membrado (Universitat de València), Emilio Iranzo Garcia (Universitat de València)*

The land of València (officially Comunitat Valenciana) is a 23.000 km<sup>2</sup> territory in eastern Spain inhabited by five million people, traditionally known abroad because of the oranges it produces, and nowadays as a remarkable tourist destination as well. The author of this paper was the person in charge of photointerpretation for the CORINE (2000 and 2006) and SIOSE (2005-2006) projects in the land of València, being then a member of the Institut Cartogràfic Valencià (Cartographic Institute of València). As regards CORINE, we can see that artificial surfaces almost double between 1990 and 2006, and the class that grows the most in those years is Discontinuous Urban Fabric. In 2008, the collapse of the Spanish property bubble put an end to this huge growth of artificial surfaces, as the next CORINE will no doubt show. As for SIOSE, this is a Spanish acronym standing for Sistema de Información de Ocupación del Suelo en España (Spain's Land Cover Information System), a GIS promoted and coordinated by the Spanish Instituto Geográfico Nacional. It is the most detailed geographic information system ever created in Spain on land cover and land use. For example, whereas photointerpretation allowed CORINE to identify 8.541 different polygons in València, SIOSE identified more than 157.000 polygons for the same territory. The reason for such a wide gap between the two systems' figures is that CORINE has a minimum mapping unit of 25 hectares, whereas SIOSE's minimum is 2 hectares (in forests and agricultural land), 1 hectare (in urban land) or even ½ hectare (in humid and water-covered areas). Thanks to this, a huge quantity of researches can be derived from SIOSE, especially on a local level, since SIOSE's information is very detailed and precise. Nonetheless, on a regional or a national level, it is better to use CORINE land cover, since SIOSE's detail would be excessive in this case, as it would make it impossible to compare the differences and coincidences between Spanish or European regions. In this paper we will compare CORINE and SIOSE in order to identify the main technical differences between them, and also the differences regarding their València land cover results, which are remarkable because of the different photointerpretation mapping units employed in each case.

### Tracking dynamic land use change using Spatial-Markov model based on spatial analysis techniques

*Xiyong Hou (Chinese Academy of Sciences), Li Wu (Nanjing University), Xianghong Di (Chinese Academy of Sciences)*

Land use change has become one of the main research subjects of global environmental change and sustainable development. It's fundamental works to develop modeling techniques in order to understand land use change precisely and imagine future land use scenarios visually. In the past few years, scientists have developed lots of models of land use/cover change (LUCC). In this paper, Spatial-Markov model, a model based on the theory of Markov chain process and spatial analysis techniques was presented and evaluated by comparing it with Logistic-CA'Markov model. The spatial-Markov model was applied in Jiaodong peninsular, China to simulate the spatio-temporal process of land use change from 2005 to 2010 at 500m spatial resolution. The error matrix and kappa index were used to evaluate the simulation results, and the disagreement due to location and disagreement due to quantity were also analyzed in order to get more information about how to improve the model. The results show that: (1) The overall accuracy of Spatial-Markov model was higher than that of Spatial-Markov model by 1.2 percent, and the Kappa index of the former was also higher than the latter by 1.91 percent. (2). The disagreement due to location of the Spatial-Markov model is lower than that of the Logistic-CA'Markov model, whereas the disagreement due to quantity was higher than that of the Logistic-CA model slightly. That is to say, the Spatial-Markov model outperformed the Logistic-CA'Markov model in the aspect of location, but underperformed it in the aspect of quantity.

### Global long term energy and CO<sup>2</sup> emissions scenarios under land use constraints

*Francois Cattier (EDF R&D), Prabodh Pourouchottamin (EDF R&D), Jean-David Sta (EDF R&D), Jerome Wirth (EDF R&D)*

ContextCurrent trends are leading us to an unsustainable world: between now and 2050, energy needs and associated CO<sub>2</sub> emissions are expected to double [IEA, 2010] - Food demand would increase by 70% [EC-SCAR, 2011]. At the same time fossil fuel resources scarcity will increase, especially for oil since conventional oil resources have already reached their production peak [IEA, 2011]. These driving forces will drastically increase the pressure on land use in order to: - Respond to the food challenge - Develop bioenergy and biofuels in order to compensate at least partly the expected decline of oil resources - Preserve some areas for CO<sub>2</sub> sequestration or for biodiversity - Support urbanization and development in emerging countries This raises several questions on the availability of land and on the interactions between the different demands. Land use is a central concern with multi dimensions which are rarely taken into account in long-term energy studies. ObjectivesThe objectives of this paper are to: - provide a global picture of

the energy world in 2050 - evaluate the potential for bioenergy, taking into account land use constraints - estimate the impacts on CO<sub>2</sub> emissions. In this paper we have compared the results of different scenarios combining food and energy trends. We have assessed their implications on land use, CO<sub>2</sub> emissions and provided some insights on possible resulting tensions. The scenarios and variants in this paper are based on the 'Mescalito' Model [Cattier, Wirth, 2010] which simulates global long-term energy supply and demand trends. Developed by EDF R&D, Mescalito is based on the estimation of possible supply on one hand and desired demand on the other hand, taking into account fossil and fissile fuel resources availability, political, economical or industrial constraints. Mescalito also estimates CO<sub>2</sub> concentration in the atmosphere with a simple carbon-cycle model. The model has been enhanced in order to: - Take into account land potential for different uses - Explore their interactions especially between food and energy - Make a first evaluation of CO<sub>2</sub> implications of land use changes. References: International Energy Agency (2010), Energy Technology Perspectives 2010, OECD/IEA, Paris. European Commission - Standing Committee on Agricultural Research (2011), Sustainable food consumption and production in a resource constrained world, <http://ec.europa.eu/research/agriculture/scar/>. International Energy Agency (2011), World Energy Outlook 2011, OECD/IEA, Paris. Cattier, F. and Wirth J. (2010), A long term scenario on global resources availability, IAEE 2010 Conference, Vilnius.

### **The carbon sequestration and dynamics of soil respiration in post-agrogenic ecosystems of Russia**

*Dmitry Lyuri (Russian Academy of Sciences), Sergey Goryachkin (Russian Academy of Sciences), Dmitry Karelin (Moscow University)*

The goal of this research is to reveal tendencies and factors of the abandonment of agricultural lands in Russia in XX century and to describe the role of fallows in the processes induced the carbon balance. The major objectives of the work are: - to analyze the long-term dynamics of agricultural areas in Russian regions in the 20th century; - to calculate the area of abandoned agricultural lands and fallows in different Russian ecoregions; - to study the sequestration of carbon in soil and plant covers in the course of postagrogenic successions in different ecoregions of Russia. - to investigate the dynamics of soil respiration in process of post-agrogenic self-restoration of ecosystems. Abandoning of agricultural lands began in some regions of Russia since the end of the 19th century. Our calculation shows, that the total area of abandoned lands since that time (1897-2007 yrs.) in Russia is approximately 71 mln ha. And almost at 65 mln ha of them (fallows) the process of the self-restoration of natural post-agrogenic ecosystems is very active. The largest part of Russian fallows locates in southern taiga (23.1 mln. ha), steppe (13.9) and forest-steppe (7.3) zones. The old (>50 years old) and medium-aged (50-20 yrs.) pre-crisis fallow lands occupy a significant part of the southern taiga and forest-steppe zones. On the other hand, the fallows of steppe zone are the young fallows (<20 yrs.), forming during the last Russian crises (1991-2000). The accumulation of

carbon in them (soil + vegetation) increases from north to south, reaches the maximum value in the zone of hardwood forests, and decreases again to a minimum level in the semidesert zone. The fallows presently accumulate about 64 million tons carbon annually (first of all in south taiga - 34 mln tons), which is more than 25% of the total current industrial emission of carbon in Russia. The processes of carbon sequestration are different in forest and steppe zones. Post-agrogenic ecosystems in forest zones, which having been manured while in use, in first 20-25 years of succession emit carbon, and only after this period begin to sequester it. Post-agrogenic ecosystems in steppe and forest-steppe zones haven't this emission period. Measurements of soil respiration at different stages of post-agrogenic succession in southern taiga confirm the existence of this emission period. The initial stages of succession (5-20 years) have the most intensive emission. Then the soil respiration decrease and increase only in final (spruce forest) stages of succession, first of all, because of litter soil horizon. So, post-agrogenic ecosystems actively sequester carbon, especially in forest ecoregions, and they play a very important role in carbon balance.

## C08.25-03 - Session on Land Use and Land Cover Change – Global Change 3

*Chair: Ivan Bicik*

### Opportunities and Threats of Artificial Reforestation in Steppe Zone of Eurasia

*Oxana Klimanova (Moscow University)*

The steppe zone of Eurasia includes several types of landscapes with different degree of transformation by anthropogenic impact. In various part of steppe zone there are well preserved natural areas, pastures of extensive use, great farmlands, mining areas and also big cities and rural settlements. Russian steppes are the most changed landscape zone in the country. 80 per cent of steppes in European part of Russia are arable lands. In others countries such type of ecosystems plays also the most important role in food security. The absence of natural vegetation, strongly dissected relief, high wind activity are the main factors of wind erosion which is the most dangerous process of degradation of the steppe landscapes changed by human impact. There were intensive deflation, increase in frequency of dusty storms, decrease in soil fertility and transformation of the big areas of arable lands into badlands among its consequences. Reforestation in peripheral parts of arable lands was one of means of struggle against intensive erosion in steppe zone during about one and a half centuries that contributes to improvement of water balance in soil, microclimate stabilization and decrease of erosion. That way of ecological rehabilitation of arable lands was an extended measure on areas under intensive agricultural use. The economic changes, which have mentioned in agriculture of Russia, Kazakhstan and Mongolia last two decades of twentieth century, have led to change of character of land tenure in steppe zone, for example, to area compression of non-irrigated lands in arid areas (Mongolia, Kazakhstan, Siberia) till ecologically and economically optimum sizes, and also to decrease in intensity of actions for the device of forest shelter belts. At the same time, other tendency was also outlined. So, in steppe zone of Russia several regional programs directed to increase amount of forest of regions are accepted. Their basic direction is creation of forest plantations on the former agricultural lands. The cultivation of «Kyoto forests», which is provided on the lands never occupied earlier with wood, can also become the possible mechanism of increase of forest. At the same time, artificial reforestation without taking in account local features of climate and applied tree species can cause negative effects, e.g. fire danger strengthening, reduction of biodiversity of steppe ecosystems because of reforestation of territories served refuge for native steppe kinds of plants and animals. In that case, increase of forest can turn back destruction of remained steppe and other grassy and shrubby ecosystems.

### CA Markov modeling of dynamics of land use land cover and sensitivity analysis to identify sensitive parameter(s)

*M. Surabuddin Mondal (Indian Institute of Technology, Roorkee), Nayan Sharma (Indian Institute of Technology), Martin Kappas (University of Goettingen), P k Garg (Indian Institute of Technology, Roorkee)*

An attempt has been made to explore and evaluate the Cellular Automata (CA) Markov chain modeling to monitor and predict the future land use land cover pattern scenario in a part of Brahmaputra River Basin, India, using land use land cover map derived from multi-temporal satellite images. CA Markov is a combined Cellular Automata / Markov Chain / Multi-Criteria / Multi-Objective Land Allocation (MOLA) land use land cover prediction procedure that adds an element of spatial contiguity as well as knowledge of the likely spatial distribution of transitions to Markov chain analysis. In this study, evidence likelihood map were used for as knowledge of the likely spatial procedure in CA MARKOV model. This study also establishes the validity of the CA Markov process for projecting future land use and cover changes in the study area. The validation calculates various Kappa Indices of Agreement (KIA or Kstandard) which indicate how well the comparison map agrees and disagrees with the reference map. The validation shows Kstandard is 0.7928. Sensitivity analysis has been also carried out to identify the LULC parameter(s), which have the highest, lowest or intermediate influence on predicted results. The results shows that the land with or without scrub appeared to be most sensitive parameter as it has highest influences on predicted results of LULC of 2007. The second most sensitive parameter was lakes / reservoirs / ponds to predict LULC of 2007, followed by river, agricultural crop land, plantation, open land, marshy / swampy, sandy area, aquatic vegetation, built up land, dense forest, degraded forest, waterlogged area and agricultural fallow land. The least sensitive parameter is agricultural fallow land, which has minimum influence on predicted results of LULC of 2007.

### The Methods for Extracting Changing Information of Coastal

*Yan Gu (Nanjing University), Ying Zhang (Nanjing University), Zhengjun Wang (Nanjing University)*

The offshore tidal current forces attribute to the changes of Coastal. These changes occur frequently especially in the region of the silty mud coasts. So the study of the methods how to extract the information of estuary accretion erosion changes from satellite images is of great importance for the coast and tide flat development and the ecological environment protection. In this paper, the Wang gang River in Yan cheng, Jiangsu Province is chosen as the study area, and the satellite images with the spatial resolution of 10m and 2.5m of 2006, 2008, and 2009 as the data source. It is purposed to study the method how to extract the artificial seawall, the average high tide line and the average low tide line from the satellite images and this will be taken to analyze the evolving characteristics of tidal flat on both sides of Wang gang River. Research has revealed that: Firstly, compared with



traditional remote sensing images, high resolution images can be extracted more subtle features, so it can extract the average high tide line by the characteristics of surface features which are left on sea and land boundaries after high tide; Secondly, on the basis of the extracted average high tide line and water edge and through the tide date of the image for the day, the average low tide line can be worked out in accordance with the linear relationship among the average high tide line, instantaneous water edges and average low tide line; Thirdly, the average high tide line is in deposition, and deposition every year, and the rate is increasing after 2006, The average low-water line of the region is in homeostasis. The average low-water line in 2008 to 2009 has eroded 840 m, and change is very obvious.

## C08.25-04 - Session on Land Use and Land Cover Change – Risk and Conflicts 1

*Chair: Ivan Bicik*

### Land use/land cover changes along the Romanian Danube Valley in the postcommunist period

*Dan Balteanu (Romanian Academy), Monica Dumitrascu (Romanian Academy), Ana Popovici (Romanian Academy)*

Land use/land cover changes along the Romanian Danube Valley in the post-communist period After crossing the Carpathians, the Danube Valley runs along around 1,000 km on Romanian territory over a fertile plain area which, together with a large floodplain, are used mostly as arable land. The paper presents land-use dynamics in the post-communist period, based on Corine Land Cover data-base (1990, 2000, 2006), Agricultural Farm Survey (2005), General Agricultural Census (2002, 2010) and many additional data obtained from field surveys. Structural changes in land use are discussed, with highlight on the transition from excessive concentration of terrains into collective farms and state farms to marked fragmentation of land into small individual farms. Following Romania's EU membership status in 2007, terrains tended to be amassed into large and medium-sized farms, with some abandoned lands from the Danube floodplain and terraces being integrated into agricultural production. The occurrence of ever severer droughts and desertification phenomena, as well as intervals of low Danube levels or overflows and the destruction of irrigation systems and dykes with direct impact on land use are being analysed within the context of global environmental change.

### Natural and human impact on land use change of the Eastern Himalayan piedmont, India

*Pawel Prokop (Polish Academy of Sciences), Subir Sarkar (University of North Bengal)*

The piedmont of the Eastern Himalaya in India, receiving 4000-6000 mm rainfall annually, forms a system of fans dissected by dense river network. The overloaded rivers carrying heavy bed load are liable to shift their braided courses and cause the land use changes. Such natural land use changes often overlaps with the accelerated human activities along the tea plantations and human migration to the piedmont zone at the end of the 19th century. As a result, extensive forest areas were replaced by tea gardens and floodplains were taken under crop cultivation. Simultaneously, a number of large blocks of natural forest became protected and forestry stayed an important contributor to the economy of the piedmont. A hydrologic and geomorphic approach was employed to delineate three key areas (about 300 km<sup>2</sup>) along river courses on alluvial fans stretching 10 km from the

mountain front. The changes in land use were derived from topographic maps supported by detailed tea garden plan, satellite images from Corona project and Google Earth for the year 1930, 1970 and 2010. Six land use categories were defined: forest, grassland, tea plantation, crop cultivation, built up area and river. Logical rules in GIS were used for determination where areas has the same land use class in each time period (stable), locations where there had been one point of change (stepped), areas where frequent change has occurred between two categories (cycle) and a high turnover between many different classes (dynamic). The major processes of land use change between 1930 and 2010 are deforestation (10-17% of each key area) and expansion of the tea plantation (4-12% of each key area). The changes of grassland and cultivated land, situated within floodplain does not show clear tendency because their area depends on flood events. The stable land, consists of large blocks of reserved forest, tea garden and settlement, covers more than 50% of each studied key area. About 30% of land in each key area undergone stepped changes. These are conversion of forest and grassland to tea bushes and natural shifting of river courses or widening river beds as result of extreme floods. Cyclic changes occur only in places within floodplains of the larger rivers. Land undergoing dynamic changes is scattered within river beds where sand bars are frequently degraded and built up by flowing water. A result of anthropogenic impact is the gradual increase of the land use stability through the increase of areas with monoculture cultivation of tea and rice. The rivers are still the most dynamic factor of land use changes.

### Catchment hydrologic response to changing land system in Kashmir Himalayas

*Shakil Romshoo (University of Kashmir)*

Hydrological response is an integrated indicator of catchment conditions and significant changes in the land system may affect the overall health and function of a catchment, as it modifies and alters many other inter-related processes. It has been observed that the changes in the land cover types in a catchment substantially affect the hydrological response including surface runoff. Such changes in runoff patterns in turn result in severe environmental implications like increased erosion, sedimentation and nutrient loadings of the water bodies particularly fresh water ecosystems and disrupt their ecological stability and functioning. The current study was carried out in the Dal Lake Catchment, Kashmir Himalayas to assess the impacts of the changing land cover from 1992-2005 on the hydrology and nutrient loadings. In order to accomplish the study, the Generalized Watershed Loading Function (GWLF) Model, considered to be a combined distributed/lumped parameter watershed model was used. The GWLF model simulates surface runoff using the SCS-CN approach with daily weather (temperature and precipitation) inputs. Erosion and sediment yield are estimated using monthly erosion calculations based on the USLE algorithm (with monthly rainfall-runoff coefficients) and a monthly composite of KLSCP values for each source area. The datasets used include

multi-date satellite data, digital elevation model, soil, stream, catchment, weather and field data. The LU/LC information was generated through the digital image analysis of Landsat ETM (Sept. 1992) & IRS LISS III (Sept. 2005) satellite data using supervised Maximum Likelihood Classifier (MLC). Images were classified into 17 LU/LC types viz, built up, agriculture, fallow, horticulture, coniferous forest, deciduous forest, sparse forest, grasslands, scrubland, plantation, aquatic vegetation, bare land, bare exposed rocks, water bodies, water channel area, snow and golf course/turf. The results of change detection showed that significant changes in the LU/LC of the catchment have taken place from 1992 to 2005. The vegetation cover in the catchment has declined, with coniferous forests decreasing by 5.67 km<sup>2</sup>, deciduous forest by 1.8 km<sup>2</sup>, grasslands by 7.89 km<sup>2</sup>, and plantation by 12.9 km<sup>2</sup>. During the same time period, impervious surfaces like the built up increased by 12.8 Km<sup>2</sup>, bare land by 4.44 km<sup>2</sup> and scrubland by 11.97 km<sup>2</sup>. The model simulations showed that the average annual runoff increased from 329.07 mm/yr to 341.34 mm/yr under the changed LU/LC conditions with impervious surfaces contributing the maximum to it. Strong correlations were observed between the increased runoff rates and the erosion and sediment loadings which increased respectively by 651.37 and 122.2 tons under the altered land system conditions. The results confirmed that the altered land system is one of the main reasons for the increased surface runoff, erosion and sediment loadings from the catchment into the Dal Lake.

### **The role of courts in open space conservation**

*Tseira Maruani (Bar-Ilan University)*

Under conditions of proceeding urbanization and expanding development the issue of open space conservation is becoming more complex and controversial. This is manifested, among others, by the growing body of research dedicated to various aspects of the issue and the factors that affect it. However, research so far has quite neglected one of these factors, namely, the significant role that courts may play in monitoring planning decisions relating to conservation. The present paper wishes to draw attention to this role of courts and to the constraints that frame their potential impact on the consequent spatial layout of open spaces. The paper provides evidence from a recent study of Israeli court rulings that were concerned with issues of conservation and planning decisions, and offers practical suggestions for immediate implementation as well as directions for further research. Among others, it reveals the important part that environmental non-governmental organizations play in this arena.

## C08.25-05 - Session on Land Use and Land Cover Change – Risk and Conflicts 2

Chair: Ivan Bicik

### Spatial Analysis of Farmers Attitude in Defending Agricultural Land within Land Conversion at Sleman Regency-Indonesia

*Rika Harini (Gadjah Mada University)*

Increasing number of people will directly impact on land resources to meet the necessities of life. As resources are limited and cannot be updated in terms of quantity then the existence of land need more attention, especially agricultural land. Conversion of agricultural land due to the increase in population cannot be avoided. If it is allowed to be continued, this problem will lead to uncontrolled land conversion. The impact threatens food security in addition to other possibilities is the occurrence of environmental damage. The attitude of farmers to maintain agricultural land is an interesting study to be assessed. Considering the incessant development outside the agricultural sector, it shifts the agricultural activities, especially in areas close to centers of economic growth. The research was done in Sleman which will be divided into three zones namely zone 1, which are regions with high conversion, the conversion zone 2, which are areas with moderate and low conversion which are named zone 3 area. Survey method conducted in this study through interviews with owners of agricultural land of farmers. Descriptive analysis and statistical tests with binary logistic models and Seemingly Unrelated Regression (SUR) is displayed in the form of tables and maps. The results showed variation in the area of "land conversion in Sleman Regency. Internally the location of land and land prices significantly affects the conversion of land in all zones, which are zone 1, 2 and 3. Externally the population and prevention of land conversion regulations significantly affects the level of land conversion of all regions in Sleman Regency. The test results in the attitude of farmers to maintain agricultural land shows that the variables age and educational level did not significantly affect the attitudes of farmers to maintain agricultural land. Based on SUR test results, the variation in attitudes of farmers to maintain agricultural land happened in wetland, dry land, or yard. Key words: Spatial Analysis, Farmers Attitudes, Defending Agricultural Land

### Assessment of soil erosion changes in the small arable catchment of Kursk region based on different-age tracers methods

*Evgenia Shamshurina (Moscow University), Andrey Zhidkin (Moscow University), Valentin Golosov (Moscow University), Aleksandr Gennadiev (Moscow University)*

To assess the rate of soil erosion'accumulation processes during different time intervals was used the method of different-age tracers, based on simultaneously use of spheric magnetic particles (SMPs) and technogenic radionuclide  $^{137}\text{Cs}$  as tracers of the soil erosion. The analysis of the radioactive isotope distribution in the sloped soils allows characterize rates of the soil loss and accumulation during the last 25-year-long period from the Chernobyl fallout in 1986 to the moment of the soil sampling.  $^{137}\text{Cs}$  is used as a tracer of erosion because of its ability of being rapidly and strongly sorbed by soil particles and transferred with them. The magnetic tracer method can provide data on the mean rates of the soil erosion and accumulation during the period since the beginning of the exploitation of steam locomotives on the nearest railroads (the last 130-150 years). SMPs have the same weight and size (10-50\*10-3 m) as the soil particles and are very stable in soil material. Within local areas, SMPs relatively uniformly arrive from the atmosphere into the soil; therefore, the changes in their concentrations in the soil cover result from their redistribution due to the erosion'accumulation of soil material. The assessment of the erosion or accumulation processes is studied on proportional calibration model based on the direct relationship between the changes in the tracers reserves in the sloped soils against the initial (reference) values on geomorphologically stable plots, where there is almost no removal of soil material or input of sediments from the adjacent areas. Small catchment in Kursk region with total area 1.98 km<sup>2</sup> was chosen for detailed study. The catchment occupies area with typical and leached chernozem soils formed mostly on loess deposits. Catchment topography is characterized by gradually rolling interfluvial areas and predominance of convex slopes with maximum gradients up to 5-10°. Most of the catchment area has been cultivated (71 % of total area - 141 ha) in 1986 (before the Chernobyl accident). For our research has been selected three transects on the slope of southern and northern exposition, as well as additional transect on the slope with soil conservation practices of western exposition. The low rates of soil erosion (<4 t/ha per year) observed on the northern exposition slope during the studied period (since 1869 and 1986). The high rates of soil erosion (>10 t/ha per year) were obtained on the southern exposition slope using SMP tracers. The rates of soil erosion have decreased by 5 times since 1986. Probably, the rate of soil erosion declined because of reduced agricultural loads. The situation is similar to the western exposition slope - the soil erosion rate since 1986 significantly decreased. Using the method of different-age tracers revealed to study the reduction of the soil erosion rate since 1986 compared to the average rate since 1869 in small catchment in Kursk region.

## Major societal driving forces of agricultural development in Czechia and LUCC 1845–1948: From differential rent I to differential rent II

*Leos Jelecek (University Prague)*

The paper gives general characteristics of major SDFs (economic, technological, political, geopolitical, social, etc.) and events in the history of Czechia, which basically influenced the development of capitalism in agriculture and consequently of LUCC. The different influences of the Industrial Revolution, and the agricultural revolution, followed at the end of 19th century by the technological-scientific revolution in agriculture etc. on LUCC are characterized and analyzed. Their periodization, phase shifts, and definitions of those basic SDF, not only technological historical innovations, are provided. Some of these processes led to both extensive and intensive modes of productions in agriculture and LUCC. The impact of chief milestones in political history defining new geopolitical and geoeconomic positions for Czechia and fundamentally influencing LUCC is also documented and evaluated. The explanation of the different influence of capitalism's developmental phases and modes of production in agriculture on LUCC is based on analysis of LUCC documented by a number of tables and cartograms. Cartograms show LUCC on the entire territory of Czechia divided into about 9,000 territorial units comparable in time and area. The paper provides clear evidence that in the 2nd half of the 19th century the necessary increase in agricultural production caused by the Industrial Revolution was made possible to secure by LU extensive changes predominantly influenced by differential rent I generation (i.e. mainly by the large increase of arable land area). Within the last two decades of the 19th century the transition to DR II is documented by small changes in LU. Then during the 1st half of the 20th century further necessary increase of agricultural production was enabled by LU changes resulting from the impact of the differential rent in its intensive form, notably DR II, i.e. by intensification of production by investing capital in more fertile plots of land with relatively better position to market.

## Accuracy Assessment of Multi-source data sets in Landcover Analyses in Southwestern Nigeria

*Adebayo Ojo (African Regional Centre for Space Science &Tech. Education)*

Remote sensing has moved beyond its traditional role of mapping natural resources, environment, and infrastructure and hazard zonation, to making geo-spatial data infrastructure and services one important pillar supporting the information society. The study aimed to assess the relative accuracy of feature definitions on the imageries; and examines the potentials and constraints of data seaming for complimentary usage of spatial data. The study revealed that significant and positive correlated occurred within the visible bands in NigeriaSat- 1 ( $r=0.95$ ;  $p < 0.05$ ) and SPOT ( $r= 0.98$ ;  $p < 0.05$ ) while it was lower in Landsat TM imagery ( $r =0.3$ ;  $p < 0.05$ ) on the other hand the objects in the Near Infrared (NIR) correlated significantly with the red band (visible band) only in SPOT

( $r= 0.98$ ;  $p < 0.05$ ) Landsat TM imageries ( $r = 0.98$ ;  $p < 0.05$ ). In addition, the percentage accuracy of the classified area was highest in NigeriaSat-1 for built- up area (97.3%) and lowest in SPOT imagery (81.98%). On the other hands, while bare rocks (89%) were classified with the highest accuracy in SPOT, other land uses such as farmland (88.1%), secondary forest regrowth (78.3 %) were more accurately classified in NigeriaSat-1 ( $k = 0.97$ ;  $p < 0.05$ ). waterbody was however most accurately classified in SPOT imageries (85.5%;  $k = 1.0$ ;  $p < 0.05$ ). Furthermore, the results of the accuracy assessment of the seamed set of the imageries showed that a merge of SPOT + NigeriaSat -1 correlation was however yielded higher 81.2% ( $k = 0.98$ ) than other combination (i.e. Landsat TM + NigeriaSat-1 seamed was however yielded higher level accuracy for built up area (>96%) and were more defined than other landuse classes. The study showed that both SPOT and NigeriaSat-1 imageries are likely to be useful within acceptable accuracy for land use/ land cover in urban area in southwestern Nigeria. The study concluded that integrating more than one medium resolution imageries could provide better accuracy than a singular image for land use/ land cover study in the southern Nigeria.



## C08.25-06 - Session on Land Use and Land Cover Change - Society and Environment 1

*Chair: Ivan Bicik*

### **Fifty years of land use change in the Swartland, Western Cape, South Africa**

*Michael Meadows (University of Cape Town), Gator Halpern (Pomona College)*

The Swartland is a largely agricultural region situated to the north of the greater Cape Town Metropolitan Area in the Western Cape, South Africa, and is known to have been subject to significant land use changes over many decades. This fertile land lies within the winter rainfall region of the Western Cape and has been used intensively for agriculture since European colonial occupation from mid-17th century onwards. Historically, the most prominent land use in the region has been grain, typically winter wheat and, while this remains the case, throughout the past half-century, however, there has been a substantial shift among many commercial farms in the region towards wine grapes. There are, nevertheless, relatively few quantitative assessments of the nature and extent of such changes, their underlying causal factors or, indeed, their environmental and economic impacts. This study presents an extension and re-evaluation of previous work in the region that considered land use change and its environmental implications (Meadows et al. 2006) with the aim of providing a more detailed description of land use change in the Swartland during the period 1960 to 2010 and to explore the possible causes and implications of the observed changes. The methodology involves the analysis of five comparable sets of sequential aerial photographs for the Philadelphia area that may be considered representative of the broader Swartland landscape. The resultant series of land use maps is analyzed employing GIS and statistical techniques. The results show a marked recent shift from grain to grape, as well as a general increase in urbanization. The underlying structural causes of such trends are discussed and their possible environmental consequences explored.

### **The growth of traffic areas in Slovenia in the last 200 years**

*Matej Gabrovec (ZRC SAZU), David Bole (ZRC SAZU)*

In the past investigations on the land use and land cover changes in Slovenia the emphasis was laid on the changes in farming areas. Among Slovenian investigators the interest for lands below built structures was much lesser, and they were mainly discussed in relation to the building up of farming lands. In spite of the fact that among the lands below built structures traffic areas occupy the largest portion, nobody has analysed the changes in these areas in Slovenia yet. The lands used by traffic have not aroused interest so far, not even among transport geographers. The ever greater mobility of the population also exerts intense impact on land use. Due to the increase in motorized forms of transport, traffic land use is increasing, in suburbanized areas in particular where the

daily mobility of workers and school-children is the most intense. We believe that the growth of transport infrastructure is directly related to certain social groups; therefore, the growth of traffic land use is more rapid in newer suburbanized settlements while the growth of transport infrastructure in traditional environs is closer to sustainable models. The first part of the research analyzes the size of traffic areas in the time of traditional agrarian society in the first half of the 19th century. Next, the paper presents the degree of growth of traffic areas in different types of settlements in the following 200 years. However, not only the degree of growth of traffic areas is important, but also the changing relation between traffic areas and other built-up areas, or the relation between traffic areas and the number of inhabitants. On the basis of the performed analyses of changes in traffic areas we will be able to assess how far individual settling patterns in Slovenia meet the standards of sustainable development.

### **Great Disasters and Land Use/Cover Changes – Some Lessons of Great East Japan Disaster**

*Yukio Himiyama (Hokkaido University)*

Land use/cover change was highlighted as an important theme of global change research in 1996, when LUCC (Land Use and Land Cover Change Programme) was jointly established by IGBP and IHDP, and IGU-LUCC (IGU Commission on Land Use/Cover Change) was launched in order to support it. Despite their wide-ranging research activities, LUCC and its successor GLP (Global Land Project), as well as IGU-LUCC, have not addressed great disasters as their priority research theme. However, the increase of great disasters in the recent years is becoming a major threat to sustainable land use world-wide, and there are enough reasons for GLP/IGU-LUCC to include it in their research mission. The presentation discusses these reasons and the related research issues that should be given high priority based on the case study related with Great East Japan Disaster of 2011.

### **Specific methods applied in investigation of the long term land use development in Czechia**

*Ivan Bicik (University Prague)*

Bicik, I., Janousek, Z., Stych, P: Specific methods applied in investigation of the long term land use development in Czechia. In the beginning of 21st century was finished special database of land use development in Czechia based on cadastral units and 8 903 comparable basic territorial units= BTU (1845 - 2010). We derived some special methods applied on evaluation of this database. There are: coefficient of concentration and triangle graphs. Coefficient of concentration gives information about extent of the Czech republic territory in which was observed directly half (also quarters) evaluated category (arable, grasslands, forest areas etc.). Basic territorial units (BTU) must be ordered from point of view of biggest share of observed category (arable, grasslands, forest etc.) in the BTU



and then summarized. When sum of ordered BTU will rich just half of size this category in Czechia we will rich more concentrated half. These results are given on the cartograms from different time horizons and evaluated. Differentiation of compared cartograms from two time horizons gives information about changes of observed category concentration in the observed territory (of all Czechia). Second method is based on possibility to show structure composed from three parts by point(s) in triangle graph, development between two time horizons by vector(s). For this method we can use simplified structure showing only three categories: agricultural land, forest areas and the rest (inland water bodies + built up + other areas). We could compare results using different specific geographical units in different order (regions, microregions and BTU). Results are clear. Using smaller geographical units their differentiation (shown as a location in triangle graphs) is wider and wider. Triangle graphs show also specific types of development in land use structure in observed units.

## C08.25-07 - Session on Land Use and Land Cover Change – Society and Environment 2

*Chair: Ivan Bicik*

### Multi-temporal analysis of land use transition considering lifetime

*Chiaki Mizutani (University of Tsukuba)*

The monitoring of the latest status of land use and the analysis of transition trends is increasing in importance. It is important to analyze continuity of land use attributes by high temporal resolution data sets. However, many time series land use data sets have five timestamps in five years or more temporal resolution in maximum. Enrichment of the temporal resolution of land use has accumulated many issues (e.g., data development and up-dating budget, methodological consistency of data development). For this reason, many land use studies have emphasized the spatial aspect of land use transition processes (e.g., increase and decrease of total number of different of land uses, distribution pattern of land uses) rather than the temporal aspect of land use transition. This indicates the lack of understanding of temporal aspect of land use transition. This study aims to understanding temporal and spatial aspects of land use transition processes through multi-temporal analysis of land use transition processes. The study area that was selected to apply multi-temporal analysis is a central part of Tsukuba City, Ibaraki, Japan. The study period covered a total of 3565 days from February 25, 2000, to November 29, 2009, with eleven timestamps. Firstly, spatial distribution of land use changed area was mapped to analyze adjacency of polygons. Secondly, survival time analysis was conducted. As results show, polygons, adjacent to those that have frequently changed have also changed the land use type frequently. Conversely, the surroundings of polygons with a low frequency of land use changes have not experienced land use change at all or have changed once to twice at maximum. This indicates the existence of local variability in land use. Survival analysis executed on both the number of polygons and the area of each lifetime clarified the differences of variability for each land-use type. Focusing on lifetime, the analysis highlighted the turning point of the transition by comparison in both the number of polygons and the area. Generally, the input data of survival analysis, such as the statements of patients and products are assumed to exist individually and independently. On the other hand, land use has spatially interactive relationships between each polygon (e.g., neighborhood effect, spatial adjoints). Considering the spatial relationship, future analysis requires the application of a semi-non-parametric model or parametric model considering spatial attributes in survival analysis. However, it is a step forward to deepen spatiotemporal analysis with representation of the continuity of land use by lifetime and survival probability.

### Dynamics of Landuse/Landcover Change in a Sub-catchment of Pohru Catchment using Remote Sensing and GIS

*Syed Mohd. Rashid (Jamia Millia University), Pervez Ahmed (University of Kashmir)*

The Landuse/Landcover change is a global phenomenon and intensity and the magnitude varies from one part of the globe to other. This change has wider ramifications in our part of the world as in majority of the cases it is unplanned and primarily governed by personal interests. This change in ecologically fragile mountainous areas has future consequences, which can prove to be quite disastrous. The present study reveals that in the study area, the Landuse/Landcover change is discernible and importantly, the drivers of this change are physical and economic factors. The change is unplanned and can be detrimental to the health of the soil. The study used multi temporal remote sensing data for two time periods viz-a viz 1974-75 and 2008. The change detection was performed in GIS environment followed by subsequent analysis for examining the factors responsible for change.

### Classification and landscape mapping of the Russian part of Amur River basin

*Kirill Ganzei (Pacific Geographical Institute), Ermoshin Victor (Pacific Institute of Geography)*

In connection with great attention to geopolitical and to environmental problems of Amur River basin the number of the works devoted to research of questions of economic development, the decision of water-environmental problems, estimations of ground resources, tendencies of economic interaction between Far East of Russia and North-East of China. The further researches and development of this region demand not only more detailed, but also more homogeneous information about natural components. In the Information-Cartographical Center of Pacific Geographical Institute FEB RAS within the limits of performance of works under the project of the International Scientific and Technical Center «Environmental Criteria and Restrictions in the Programs for Sustainable Nature Management in the Amur River Basin» are begun works on landscape mapping of the Russian part of Amur River basin in scale 1:2500000. The main goal of the present project is definition of the priority, possible and forbidden types of wildlife management for planning land use activity in Amur River basin. The landscape analysis of territory will allow to classify landscapes on sensitivity degree to anthropogenous influences within various areas. This data is correlated with existing and potential ecological risks. Works on electronic map «Landscape structure of Amur River basin» are conducted on the basis of synthesis thematic information layers. The structural-genetic classification is put in a basis of landscape classification. Now are defined taxones of following levels: classes of landscapes (horizontal and mountain), subclasses (peculiarities of geomorphologic structure), types (39 classes of vegetative formations and 45 types of soils), a sort (relief

genesis and a lithology of superficial adjournment - 10 generalized types). At present the classification matrix includes 171 sorts of landscapes. On the basis of the developed variant of landscapes classification landscape mapping of the Russian part of an AmurRiver basin are carried out. During the work gathering of remote sensing dates Landsat TM is carried out, construction of digital models of a relief is executed. With using of software package ArcMap overlays-operations with the branch thematic maps translated in an electronic kind also are made. The electron layer of landscape in which have found reflection about 5500 polygons is generated. According to methodology of GIS-technologies for a layer the attribute table in which for everyone polygon characteristics of vegetation, relief, soils, and geology are resulted is constructed. The layer of landscapes will form information base for zoning territory on types of economic use with consideration of ecological risks and prospects of social and economic development of the South of the Far East of Russia. Work was carried out under the support of ISTC Project 4008.

### **Spatio-temporal Land Use/Land Cover Dynamics and its Environmental Implications in the Highlands of Ethiopia: The Case Study of Lake Alemaya Watershed**

*Berhan Gessesse Awoke (University of Erlangen- Nürnberg)*

The study of LU/LC changes and its implications on the environment is an essential strategy for sound policy decisions to enhance natural resource conservation and management options. In this paper, long term LU/LC dynamics (between 1965 and 2007) analysis was carried out. The objectives of this study are intended to examine the magnitude, rate and patterns of spatio-temporal LU/LC dynamics processes and analyze its implications on soil and water degradation. Remotely sensed datasets (Panchromatic aerial photographs and SPOT image) and topographic maps were the principal data sources of this study and post-classification comparison change detection algorithm was employed using the integrated techniques of geo-information technologies. Eventually, a serious and rapid LU/LC changes were observed in the study watershed during the past 42 years. Specifically, aquatic vegetation cover, urban land use and intensively cultivated lands have considerably expanded. Conversely, forest cover, grassland, open water (mainly Lake Alemaya) and shrub land covers deceased in size. Based on the 1965 aerial photograph interpretation, about 925 rural dwellings are identified and a total gully length of 93.88 kms measured. Moreover, in the year 1996 the number of rural dwellings was reached at 1390 and the size of gully length advanced to 109.52kms. On the other hand, 154.38 kms gully length is measured and the size of rural dwellings along with intensively cultivated lands extremely surpassing in the year 2007. The expansion of cultivated land increases along steep slope areas whereas the areal coverage of forest, grass and shrub lands decreased along steep gradient. On top of this, the size of gully density is expanded from time to time in the entire watershed mainly along with the intensively cultivated land areas and steep slope site. These settings had implication on land

degradation in the form of soil erosion, siltation, water quality as well as quantity which intern the complete drying-up of Lake Alemaya (since 2003) in the study watershed. To ameliorate these problems, sound land-use plan development and implementation as well as soil and water conservation methods is needed in the studied watershed. Keywords: Change detection; GIS; Gully developments; Lake Alemaya Watershed; Ethiopia

## C08.25-08 - Session on Land Use and Land Cover Change – Society and Environment 3

*Chair: Ivan Bicik*

### Spatio-Temporal analysis of Land Use Land Cover in the Muni-Pomadzi Ramsar site, Ghana

*Gerald Atampugre (University of Cape Coast)*

Land Use Land Cover (LULC) dynamics in wetland catchments is poorly understood Ghana albeit its importance as an indicator of wetlands' ecological integrity. The study aimed at detecting and quantifying LULC changes at the Muni-Pomadze Ramsar site in Ghana. The objective was to produce LULC maps for the area, assess the LULC dynamics during a ten year period, and establish statistical relationship between the major LULC changes and biophysical factors that influence human decisions. Using image processing techniques, an aerial photograph of January 2005, Landsat Thematic Mapper (TM) and Enhanced Thematic Mapper (ETM) data of December 1990 and February 2000 respectively were analysed to produce LULC maps for the Muni-Pomadze wetland catchment. The image analysis produced an overall accuracy of 85% and a kappa coefficient of 81%. The post classification technique involving overlay operation was applied to produce LULC change map and matrix which aided the analysis of LULC dynamics in the area. Two LULC maps were produced with LULC units such as farm fields, rangeland, built-up, barren-land closed forest, open forest, and water. The dynamics of LULC within the Muni-Pomadzi could be said to be complex since counter transfers were detected. Using logistic regression in SYSTAT, it was established that altitude, distance to roads, rivers, and settlement were significant in explaining deforestation and afforestation which culminated in the reduction of the physical extent of the wetland.

### The impact of land use and land cover change on stream discharge and suspended sediment loading on Mt. Elgon

*Yazidhi Bamutaze (Makerere University), Bob Nakileza, Gorret Kitutu, Paul Mukwaya*

Although land use and land cover changes are believed to be taking place on Mt. Elgon, their patterns as well as impacts on water resources are not well understood. In this paper, we present preliminary results on trajectories (1960-2010) of land use and land cover change and associated fluxes in stream water flow and suspended sediment loading on from key rivers on Mt. Elgon in Eastern Uganda, namely Manafwa, Simu, Sipi and Namatala. Trajectories of land use and land cover were assessed using Aerial Photo Interpretation (API) for the period prior to 1970. For 1970 to 2010, landsat satellite images

of 30 meter resolution were interpreted and classified using supervised classification techniques in IDRISI Taiga software and subsequently ground-truthed in the field. Historical and current data on discharge and Total Suspended Solids (TSS) were obtained from the Directorate of Water Resources Management of Uganda, which has gauging stations along the target streams. Preliminary results indicate that land use and land cover changes on Mt. Elgon have entailed largely conversion of forestland (from 52.4% in 1960 to 7.7% in 2003) to arable land thus increasing the magnitude and severity of environmental degradation. Significantly, woodlands and forests have given way to annual and perennial cropping. Discharge patterns were varied among the studied streams ranging from 2m<sup>3</sup> s<sup>-1</sup> to 24m<sup>3</sup> s<sup>-1</sup> between 1960 to 2010. Critically, the streams depict a changing trend in discharge in 2007 with Namatala and Simu showing a declining trend, while Sipi shows an increasing trend. Results also indicate changing spatial and temporal stream loading dynamics, with river Manafwa currently heavily laden with silt to the magnitude of 43.7 mg/l and transporting over 35 tons/day. A preliminary analysis strongly implicates land use change although anecdotal evidence also links the increasing intensity of footpaths and roads on Mt. Elgon to changes in stream discharge and sediment loading. Further analysis and modelling are being undertaken to quantify the land use impacts as well as other key parameters including climatic factors.

### Short-interval Monitoring of Land Cover Change Using RADARSAT-2 Polarimetric SAR Imagery

*Zhixin Qi (University of Hong Kong), Anthony Yeh*

Many illegal land development schemes are emerging in some of China's rapidly developing regions. Some illegal land development projects have caused irreversible environmental problems. Short-interval monitoring of land cover changes is important for preventing and controlling illegal land development at an early stage. Remote sensing data obtained from different optical sensors have been commonly used to characterize and quantify land cover information. However, conventional optical remote sensing is limited by weather conditions. Difficulties are encountered in collecting timely land cover information in tropical regions that are characterized by frequent cloud cover. Radar remote sensing, which is not affected by clouds, is therefore an effective tool for extracting timely land cover information. The objective of this study is to implement short-interval monitoring of land cover change by using RADARSAT-2 PolSAR imagery. Since the repeat cycle of RADARSAT-2 is 24 days, monthly land cover change information can be extracted by using RADARSAT-2 imagery. In this study, land cover change detection was conducted based on the comparison of two repeat-pass RADARSAT-2 images. Change Vector Analysis (CVA) was used to extract land cover change areas. The image channels used in CVA were selected using decision tree algorithms based on training samples. The change types were determined based on the post-classification of the RADARSAT-2 images. A novel algorithm that integrates polarimetric decomposition, PolSAR interferometry, object-oriented image analysis, decision tree algorithms, and

support vector machines (SVMs) was used to implement the classification. Polarimetric decomposition and PolSAR interferometry can be used to extract polarimetric and interferometric information to support the classification of PolSAR data. The main purposes of object-oriented image analysis are delineating image objects, as well as extracting various textural and spatial features from image objects to improve classification accuracy. Decision tree algorithm and SVMs provide an efficient way to select features and implement classification. The results of this study show that RADARSAT-2 PolSAR imagery can achieve very satisfactory accuracy for identifying land cover changes from vegetation to barren land and barren land to urban/built-up areas. This type of land cover change is mainly related to construction activities and therefore can provide important information for identifying illegal land development schemes. The results indicate that RADARSAT-2 PolSAR imagery are very promising for short-interval monitoring of illegal land development and can provide accurate and timely information to prevent and control illegal land development.

#### **Agricultural land use change in the Jaman North District of Ghana: Implications for land tenure, women's rights and food security**

*Simon Mariwah (University of Cape Coast)*

The recent agricultural land use change from the production of food crops to the growing of cashew in Ghana raises a number of concerns. The study therefore sought to explore the causes and implications of such a change. Employing an exploratory design, the study used interviews and FGDs to collect data from purposively selected opinion leaders in a randomly selected village in the Jaman North District. The study found that the major causes of the change are decreasing food crops yields, resulting from decreased soil fertility, infrequent rainfall (climate change), and the increasing demand for cashew nuts. It was also found that the change has altered the land tenure regime, reduced women's access to land, and has the potential to threaten food security in the village within a short time. It is recommended that the Jaman North District Assembly should engage in diversified sensitization programme to avert the already threatened food security in the district.

## C08.25-09 - Session on Land Use and Land Cover Change – Urbanisation and Demographic Change 1

*Chair: Ivan Bicik*

### Changes of artificial surfaces in Slovakia 2000-2006

*Jan Feranec (Slovak Academy of Sciences), Monika Kopecka (Slovak Academy of Sciences), Jan Otahel (Slovak Academy of Sciences), Jozef Novacek (Slovak Academy of Sciences)*

Landscape changes resulting from human activities are associated with building of infrastructure (dwellings, production, sports, etc.) and communications (roads, railways, parking lots, etc.). As these processes are systemic and they irreversibly cover the areas of agricultural and forest landscape, their effects (degradation) on land, soil especially, are analysed and assessed by multiple approaches. Among them, the most frequently used, are the identification and assessment of soil sealing. Aerial and satellite images or data derived from them (e.g. CORINE land cover - CLC data) but also data obtained by the conventional national statistics (statistics of plots using) are important data sources. The aim of the paper is to demonstrate on example of Slovakia: - Possibilities of the use of CLC data for observation of the building process with stress on the analysis of CLC classes 11 (urban fabric), 12 (industrial, commercial and transport units), 13 (mine, dump and construction sites) and 14 (artificial, non-agricultural vegetation areas); - Possibilities of the use of national statistic data for observation of the building process; - Results of comparison of the conventional national statistical data concerning the building process in Slovakia (the area of building was 219,340 ha and 227,092 ha in 2000 and in 2006 respectively; enlargement amounted to 7,752 ha) with CLC data (areas of classes CLC 11 and 12 were 256,040 and 257,895 ha in 2000 and 2006 respectively; enlargement amounted to 1,855 ha) and their map presentation; - Identification and analysis of differences along with assessment of causes and spatial aspects characterizing enlargement of artificial surfaces.

### Contact zones of the Amur River basin: Anthropogenic influence, Land cover and Landscape structure

*Ermoshin Victor (Pacific Institute of Geography)*

An emergence of new natural-anthropogenic and anthropogenic boundary systems - contact geozones (tension geozones) with different spatial scales - with the specific features, structures and stabilities is the object of wide speculation. The contact tension geozones are transitional, boundary spaces between different natural systems, between natural and anthropogenic systems. Their occurrence is huge and roles are quite substantial. A considerable increase in the areas of boundary contact formations related

to diverse anthropogenic activities is noted. The contact structures are characterized by the increased intensity in exchange of matter and energy. At that, a fast development of destructive processes, negative effects and local environmental conflicts and crises is characteristic of them. Our study is concerned with the contact territories - transitional zones from plains to mountain areas in the Amur River basin within the range of elevations of about 250-500 meters. The plain territories are most developed and more than 90% of populated localities and industrial centers, about 80% of agricultural lands and more than 70% of road network are concentrated there. These areas have their impact on the adjoining contact territories which extend it on the mountain regions. From that matter, the contact territories realize, in a greater degree, the buffer function. The environmental health of the mountain territories will depend on their response to the anthropogenic impact and transfer and transformation by them of this impact. The landscape mapping of the Amur River basin territory carried out earlier has served as the information base for analyzing the landscape structure, identifying the contact (tension) zones themselves and making their functional zoning. The functional zoning assumed a preparation of the special electronic map with identification of major groups of landscapes exercising different functions. The landscapes of reserves and wetland ones fulfill the environment-oriented function with maximum restriction of the economic activities. The landscapes of waterlogged larch and Korean pine-broad-leaved forests in the hill countries and low-hill terrains perform the protective function with the limited economic exploitation. The most part of the forest landscapes of different types was assigned to the regulated use. For the specific post-fire landscapes of bushes and thin forests, the recovery function is recommended. The agricultural zone was also identified. Further, it is supposed to correct the boundaries of identified zones and to redefine the landscape functions in accordance with additional environmental restrictions and balance ecologic-economic model. The works performed provide the information base for planning of the nature management within the transboundary basin. The work was carried out with financial support by the ISTC Project 4008.

### Land use changes in the peri-urban agriculture of the Belgrade region during the transition period

*Mikica Sibinović (Belgrade University), Mirko Grcic (Belgrade University)*

LAND USE CHANGES IN THE PERI-URBAN AGRICULTURE OF THE BELGRADE REGION DURING THE TRANSITION PERIOD The Belgrade region is comprised of 17 municipalities with a total of 166 settlements and with about 1.6 million inhabitants. Peri-urban agricultural production is organized to meet the needs of the population. Over time the agricultural system in the rural areas of the Belgrade has transformed from traditional agriculture to the agricultural production for the market. Standardization, vertical integration, and globalization have resulted in land use changes in the agricultural system. In pri-urban areas these changes are most pronounced because of the pressure of urbanization and rural-urban conflicts. The development, distribution and structure of

agricultural production depends on environmental and social conditions. Social factors are strongly reflected by the agricultural population, agricultural structure, the achieved level of agricultural technology, access to markets and the industrialization of agriculture. The needs of Belgrade influences agricultural production and land use changes in the peri-urban areas. This research investigates the nature and intensity of this relationship in terms of the functional aspects of agricultural production, rural-urban conflicts, and future trajectories of agriculture. Results suggest possible directions for the sustainable development of agriculture and optimization of land use in the Belgrade region. Keywords: Belgrade, peri-urban agriculture, land use changes, rural-urban conflicts

### **Suburbanization as a driving force of land cover change in Prague metropolitan area**

*Lucie Kupkova (University Prague), Ivan Bicik (University Prague), Martin Ourednicek (University Prague)*

Before the "Velvet Revolution" in 1989, cities in the Czech Republic expanded to the surrounding land in a very limited extent, due to many factors that characterized the socialist system. As there was no market economy, a market for land and private property did not exist; efforts to reduce regional differences were high and laws for land preservation were strict. Since the beginning of the economic transition after the fall of communist regime in the Czech Republic in the early 1990s a new stage of urban development of Prague metropolitan area has become. The rapid suburban area development is reflected in extensive changes of selected types of land cover categories. Based on aerial photos and QuickBird imagery an analysis of land cover changes in Prague suburban area in the period 1990 - 2007 using modified CORINE legend and manual vectorization was carried out. The results proved an extreme increase of typical suburban land cover types, especially of areas of commercial and residential buildings, impervious areas, bare areas (construction sites), road network and gardens. We were able to distinguish areas of typical residential suburbanization - for example relative change of residential urban fabric in Kvetnice municipality was 368% while the count of family houses increased from 82 to 447 in this period. Commercial suburbanization caused an extreme increase of impervious areas in many municipalities situated around the main roads. Impervious surfaces have spread over 5% (41 ha) of the Jirny municipality total area. It is serious problem because often the most fertile soils are exploited for the purpose of these constructions. Spatial planning failed in the Prague suburban area, urban sprawl is very serious problem and our research outputs are important indicators that will be used at the level of the Ministry of the Environment for the further control and prevention. Acknowledgement: The research is carried out thanks to the support of the Czech Science Foundation project no. 205/09/0995 Regional differentiation and possible risks of land use as a reflection of functional changes of landscape in Czechia 1990-2010 and to the support of the Ministry of the Environment of the Czech Republic project no. SP/4i5/212/07 Suburban Development, Suburbanisation

and Urban Sprawl in the Czech Republic: Tackling the Negative Impacts on the Environment



## C08.25-10 - Session on Land Use and Land Cover Change – Urbanisation and Demographic Change 2

*Chair: Ivan Bicik*

### Land use and land cover changes in the Oresund region

*Mariola Ferenc (Polish Academy of Sciences)*

The Oresund Region is a cross-border area located in Denmark and Sweden on both sides of the strait of Sund. With 3,7 million inhabitants, it is the most densely populated region in the Nordic countries. Changes in land use and land cover in the Oresund Region are the results of both demographic and economic factors, as well as local and regional law. Based on the Corine Land Cover 2000 and 2006, observations and interviews conducted in the region during the implementation of case studies, the EU-LUPA program (European Land Use Patterns) drew conclusions about the dynamics and scope of change. Changes in land use extend on multiple levels: both between sectors, as well as within administrative boundaries. One example might be the impact of construction of the Oresund Bridge, which created the conditions for development, especially settlement, on both sides of the strait. In 2010 more than 20 000 people crossed the bridge every day. The Oresund region is very interesting in the aspect of land use and land cover typologies because of the increasing importance of multifunctionality in this area. Denmark and southern Sweden, was for many years characterized by intensive, trademark agricultural. But nowadays farming has become more organic and focused on producing good quality food. Two additional functions that have appeared in the rural areas in recent years are recreation and the production of bioenergy. More and more farms are offering accommodation and entertainment, for example horse riding or fishing. Farmers produce biomass, which unfortunately contributes to the devastation of the landscape by vast fields of energy crops. Tourists also interfere with wind farms, which increasingly appear in the landscape of the coast. To prevent the devastation of the landscape and inconvenient noise, producers move farms to the sea. Changes in land use structure is influenced in majority not only by the agricultural situation, but also by strong pressure of new investments of agglomeration development, especially new settlements. Additionally, knowledge industries and research activities are moving to rural or coastal areas, because people prefer to work in nice landscape and clean conditions. The most important result is that the functional changes of land use in rural areas are far stronger than changes in land cover structure. Also we should say, that the changes are greater in semiurban areas than in cities and in rural areas.

### The assessment of urban sprawl effect with emphasis for land use change using multi-temporal satellite imagery (Case study Urmia city 1984-2011)

*Mina Farokhi (Zanjan University), Shahrivar Rostaei (Zanjan University), Mohsen Ahadnejad Reveshty (Zanjan University)*

This paper assessment of characteristics, causes and effects of urban sprawl development pattern with emphasis on land use changes. The sprawl is external growth without control and imbalance at around of urban area that caused of destruction green space, increase traffic, loss of agricultural land and changes it's to built-up area. Sprawl use more land in comparing with compact development and it's a global phenomenon that is not only developing countries but developed countries also were involved by this phenomenon. This study was investigated to urban sprawl assessment and land use change in Urmia city and it's around with use of Landsat TM5 images for 27-year period. In order to detect and evaluate land use changes, image differencing, principal component analyses and Fuzzy ARTMAP classification method were applied. The result of this study shows that economic, social and environmental effects of sprawl caused that change in agriculture land to built-up area, density and transportation system in Urmia city in 1984-2011 during. In this research after detection of land use changes in case study area with use of other countries experimental and attention to case study area conditions the strategies in order to smart growth were developed that could improve Status quo and prevent further sprawl in the future.

### Object-based LULC classification of urban and peri-urban areas

*Luka Valozic (University of Zagreb)*

During the last decade significant attention has been paid to object-based image analysis (or object-oriented image analysis) methods as the means for the land cover and land use classification of data acquired by remote sensing. This paper will present object-based LULC classification performed on multispectral remote sensing imagery of urban and peri-urban areas. Emphasis in the classification process will be placed on the mapping of the impervious surfaces as opposed to vegetation, soil, and water surfaces because that land cover class is made out of the most noticeable features of urban spaces: buildings and transportation network. Impervious surfaces, or more specifically their quantity and spatial pattern, are the ones that define the human settlements' morphology and structure most clearly and have undeniable influence on the water and energy flux in the environment. Remote sensing data used for this research will be RapidEye satellite imagery that comes in 5 spectral bands (red, green, blue, Red Edge, NIR) with the spatial resolution of 5 m and with the 16-bit radiometric resolution. Error matrix will be produced by comparison of the classification results and very high spatial resolution remote sensing imagery (available through services such as GoogleEarth) that will serve as the ground truth data. Software used for the object based image analysis and most of the other tasks will be Trimble eCognition Developer 8 and ESRI ArcGIS Desktop 9.3.1 (ArcInfo).



## Modelling Spatio-Temporal Urban Land Cover Growth Dynamics: A Case Study of Khulna City, Bangladesh

*Bayes Ahmed*

The primary objective of this paper is to predict and analyze the future urban growth of Khulna City using the Landsat satellite images of 1989, 1999 and 2009. Khulna City Corporation (KCC) and its surrounding impact areas have been selected as the study area. At the beginning, a fisher supervised classification method has been applied to prepare the base maps with five broad land cover classes. In the next stage, three different models have been implemented to simulate the land cover map of Khulna City of 2009. These are named as 'Stochastic Markov (St\_Markov)' model, 'Cellular Automata Markov (CA\_Markov)' model and 'Multi Layer Perceptron Markov (MLP\_Markov)' model. Then the best-fitted model has been selected based on various Kappa statistics values. This is how the 'Multi Layer Perceptron Markov (MLP\_Markov)' model has been qualified as the most suitable model for this research. Later, using the MLP\_Markov model, the land cover map of 2019 has been predicted. The MLP\_Markov model shows that 33.33% of the total study area will be converted into builtup area cover type in 2019.

## C08.25-11 - Session on Land Use and Land Cover Change – Urbanisation and Demographic Change 3

*Chair: Ivan Bicik*

### **Ivan Bicik et al.: Results and conclusions of the long – term land use development studies in Czechia (1845 - 1896 - 1948 - 1990 - 2010).**

*Ivan Bicik (University Prague)*

Ivan Bicik et al.: Results and conclusions of the long - term land use development studies in Czechia (1845 - 1896 - 1948 - 1990 - 2010). One of the most progressive investigation not only in geography in the last two or three decades is landscape change. Faculty of Science at Charles university has some experience in this type of topics, as from geoecological as from social points of view. The second one was realized using statistical data from archives as data up to date on the base of cadastral units. All territory of Czechia covered 8 903 basic territorial units (= BTU - comparable as in time as from point of view of land use structure in 8 observed categories) and created database is fully located on the website ([www.lucc.ic.cz](http://www.lucc.ic.cz)). This database gave us possibility to study size of observed 8 categories and also to study land use structure and its development in different periods in specific natural and social economic conditions. Main results: bigger typological regions of similar land use structure were created step by step. Their inner structure is similar looking on land use structure of BTU, but there are big differences in comparison among created typological regions (metropolitan, suburban, lowlands with intensive agriculture, afforested mountain areas, second homes and recreational areas etc.). The same specific characteristics we can observed in long term development of land use in these specific regions. Completely different development of land use structure in four observed periods was defined. We will show specific methods suitable for similar databases in other countries (index of change, coefficient of anthropogenic influence, typology of macrostructural development of land use, main landscape processes etc.). This topic will be presented with many specific charts and tables explaining main results of this specific investigation. We can also compare rich results based on the statistical data and results obtained by overlaying detailed maps created for specific time horizons.

### **Investigation of urbanization in relation to accessibility of urban green space in Kunming, China**

*Jialing Wang (University of Pennsylvania)*

Urban green space is an important component of urban ecosystem and contributes to the quality of life. This project takes Kunming of China as a case study and uses GIS and remote sensing techniques to analyze the linkage between rapid urbanization and the accessibility of urban green space. Situated on the northern shore of Lake Dian,

surrounded by mountains to the north, west, and east, Kunming is the capital city of Yunnan Province in southwestern China and is well known as 'Spring City'. During the last three decades, Kunming has experienced rapid urban growth that has led to tremendous landscape changes in the city and its surrounding area. This research is designed to include three major parts: (1) to map land use and cover, particularly, to map built-up land and urban green space of Kunming in different periods, based on Landsat images acquired between 1976 and 2010; (2) to measure the accessibility of urban green space in different years; and (3) to analyze the factors in the urbanization process of Kunming that have effects on the accessibility of urban green space. This study will add our understanding of urbanization as a major force driving the urban ecosystem changes and the research outcomes will be beneficial to make Kunming a modern eco-city in the near future.

### **Change detection of green cover areas, Greater Cairo, Egypt**

*Ahmed Abdelhalim Hassan (Münster University)*

KEY WORDS: Greater Cairo; green cover; horizontal and vertical classifications; change detection analysis. ABSTRACT: The fertile land in Greater Cairo Metropolis is suffering from loss and misuse, since urban encroachment, high population growth rate, and poverty lead to exert pressure on fertile land. Therefore, this paper examines the transformation of green cover in the Greater Cairo; further evaluate the impact of rapid development on agricultural landscape and urban green areas. Multi temporal and multi resolution remotely sensed data (Landsat and Spot images) and field observations were used to apply horizontal and vertical conceptual classification and analysis to reveal green cover patterns and changes. Both positive and negative changes were detected and analysed in different levels and scales. Thus the green cover was decreased dramatically in the contact zone between the agriculture fields and settlements (hot spots) and increased in new metro areas. This approach could be contributed to the sustainability of fertile land in the future spatial planning in Greater Cairo.



# C08.26

# Local Development

## C08.26-01 - Regional Development: Planning and Disparities

*Chair: Michael Sofer*

### Problems of Local Development: Impact of Population Distribution and Urban Agglomerations in Sabah, Malaysia

*Shuang-Yann Wong (National Institute of Education)*

In the early stage of local development, geographical asymmetries have often resulted in unequal development that tends to benefit the strategically located places in a country. The locational advantages of strategic regions are further reinforced with the extension of internationally connected and world standard transport and communication systems. Space economies are interdependent and agglomeration in one region may reduce the occurrence of agglomeration in another, especially when there are limited resources for development. Biased policies may worsen existing regional disparities. Using Sabah as a case study, this paper aims to show that the presence of too many sparsely distributed small urban centres and the absence of a strong urban agglomeration may retard the development of a remotely located region like Sabah in Malaysia. The assertion is that without the economies of scale and scope, the region will continue to function as a resource frontier, deepening its dependence on the more developed regions and precluding any opportunity of potential constructive local development. The spatial pattern of the region's population growth and distribution, the evolution of the urban landscape and related development problems and constraints over the last forty years including the social and political issues will be reviewed and analysed to provide the empirical evidence for the explanation of the suppositions made.

### An Introduction to Regional Planning and Regional Policies in China with a Special Attention to the Main Functional Zoning

*Weidong Liu (CAS), Hui Liu (CAS)*

China is widely applauded for its rapid economic growth in the last three decades. However, along with such rapid growth, the Chinese society has witnessed a high cost in natural environment and social justice. Regional disparity and environmental degradation are two major issues faced by the Chinese government for achieving sustainable development. To alleviate the social and natural tensions, since 2000, the Chinese government has announced and implemented a number of major regional policies and made specific planning of major regions. One of the new measures in recent years is the Main Functional Zoning (MFZ), which has been included in the Twelfth Five-Year-Planning. The paper will introduce why and how to make the MFZ against the general

political and institutional background of China and analyze the role of the MFZ in achieving balanced regional development in China.

### Potential of industrial heritage for regional development – case study of Brno city

*Libor Lnenicka (Masaryk Universität)*

The Brno city, centre of South Moravia region and also of the whole Moravia passed in terms of economic activities and their spatial localization after 1989 significant change. The industrial city became a post-industrial city with dominant administrative function. Location of areas intended for the production underwent a complete change in localization patterns, structure of employment and also other factors impacting economics of locality and whole South Moravian region changed (e.g. FDI inflows, innovation, businesses networks or R & D, etc.). The aim of this paper is to outline the current post-industrial development of the Brno city, with emphasis on the largest industrial zones - one along the Svitava River, the second zone on 'ernovice terrace'. The article also tries to analyze new trends in manufacturing location, industry structure and industrial heritage (brownfields).

## C08.26-02 - Local Development in the Rural Space 1

*Chair: Anthony Sorensen*

### **The Regional Council as a Local development Agent: An Israeli Case Study**

*Michael Sofer (Bar-Ilan University), Levia Applebaum (Bar-Ilan University)*

During the last three decades the rural space in Israel has gone through a process of economic, social and visual restructuring - from a productive farming space to a multifunctional space. This paper is concerned with one aspect of this process - the growing role of the regional councils, the local government bodies of the rural sector, as the leading actors in the transformation and development of the rural space. In addition to their statutory roles as administrators of the regions under their jurisdiction and representation of their residents vis-à-vis the national authorities, the councils have assumed responsibility for the physical, demographic, economic and social development of their regions. There are, however, considerable differences among the regional councils regarding their development priorities on the one hand and their organizational and economic capacity to implement their development plans on the other hand. The focus of this paper is upon the regional councils' ability to adjust to the changing conditions at the national, regional and local levels and to cope with the development challenges and their residents' expectations, in view of the available resources, the array of local opportunities, the options of institutional support, and the pressures of competing local and external interests. The underlying assumptions of the research are first, that some of the regional councils lack the professional capacity to make use of supporting programs and resources offered by national authorities, and second, that some of the support programs do not take into account the differences in the needs and priorities of regional councils. The result is a mismatch between the needs and possible solutions. The research is based on three inter-related components: analysis of policy papers; interviews with chairmen and officials of regional councils; and analysis of development plans submitted by the regional councils to the Ministry of Agriculture and Rural Development.

### **Local Development and Demographic Change – How the Region “Der Selfkant” (North Rhine-Westphalia, Germany) Meets the Challenge of Ensuring the Local Quality of Life**

*Sandra Opitz (RWTH Aachen)*

Demographic change is one of the major challenges many developed nations are facing today. This is also the case in Germany where the population is expected to decline and age in the coming decades. These changes not only affect all aspects of society, but also all levels of administration. While there is a necessity for national and federal state governments to adapt legislation in order to manage this new situation, it is up to the

local authorities in the communities to deal with its effects by implementing federal state and national laws. In the light of this it becomes even more challenging for sparsely populated rural areas, which are already facing difficulties today, to provide an adequate level of public services and infrastructure in order to sustain the local quality of life. Research on this particular topic has up to now mainly been focusing on former East Germany where most rural areas are already dealing with or are going to have to cope with a shrinking as well as ageing population. Comparatively little is known however on the challenges awaiting West German rural areas. One of these rural areas with an ageing, if not yet shrinking population, is the region 'Der Selfkant' located in the district of Heinsberg in the West of North Rhine-Westphalia. With the financial support of the European Agricultural Fund for Rural Development (EAFRD) a group of local stakeholders and members from the communities' administrations in the region started to work out a long-term strategy to enhance and ensure the local quality of life. This strategy aims at making life in the region easier and more comfortable for an ageing population. It also strives to prevent the possibility of a large number of people moving to urban centers in the future. In a first step the most significant factors that contribute and affect the quality of life in the communities were determined. Realizing that future local development has to take greater account of the people's needs, the second step was to find out how the quality of life in the region is perceived by the local population. For this purpose, a large-scale citizen survey was carried out in 2009 by the Cultural Geography work group of RWTH Aachen University. It resulted in 1,600 residents aged 35 and older providing information and data. Selected findings of this survey will be presented in this talk and discussed keeping the question in mind as to how the local quality of life can be sustained and enhanced in view of an ageing population and tight municipal budgets.

### **The Role of Migration Networks on Rural Development in Iran**

*Seyed Ali Badri (University of Tehran), Hassan Izady (Shiraz University), Seyed Abbas Rajaei*

Remittance has become a crucial source of income for households in rural areas of developing countries and migrants' networks have a significant role in the path it to the development projects in some societies. Using a cross-sectional dataset from two rural districts in Iran along with techniques of questionnaire and interview, the paper tests the relative significance of organized remittance and the other determinants of remittance behavior. The use of an improved statistical methodology enables corrections for potential NGOs in existing studies of remittance motives. The empirical results suggest that remittance appears to be driven by NGOs interested motives for provenance and hometown development. Interest and bias toward the hometown development is the effective factor that shape migration networks and NGOs in some Iranian metropolis same as Tehran lead to increase benefits of migration as well social capital. Keywords: Migration; Rural-Urban migration; Social capital; Migration networks, Rural areas of Iran.



## **Landscape at a rural-urban fringe**

*Milada Šastná (Mendel University in Brno), Iva Kenovská (University in Brno)*

Local studies are mainly carried out at the outer part of the urban fringe; however this paper will present an overview of a research that is emphasizing the specific character of changing landscape at the rural-urban fringe in the South Moravia Region. This Region is distinguished by its diverse location, natural, economic and social potential for a further development. Growing emphasis will stay on the quality of the environment, a small and large scale landscape and an environmental conservation. Such a trend may lead not only to the improvement of the community life, but also disproportions in a regional development. Growing amount of leisure time of economically active people and pensioners in particular will play an important role in forming the landscape to satisfy their activities. The potential of the countryside at the rural-urban fringe as a place for a quality relaxation and recreation will come into consideration.

## C08.26-03 - Local Development in the Rural Space 2

*Chair: Jurek Banski*

### Cultivating a Culture of Business Innovation: Sustaining Rural Communities in Outback Australia

*Anthony Sorensen (University of New England), Bernice Kotey (University of New England)*

Australia's large number of small and remotely located rural service centres often struggle for survival under the weight of new technologies, rising agricultural efficiency, demographic restructuring, constantly shifting patterns of accessibility, and skeletal regional development strategies. We start by sketching the implications of this dynamic and sometimes lethal operating environment for the survival of local small businesses in country towns. Secondly we consider alternative antidotes to the stresses faced by small business, focusing especially on their need to acquire a culture of constant and rapid innovation. This is not an easy goal for either individual enterprises, as revealed by our recent work for Australia's Cotton Catchment Communities Cooperative Research Centre, or for communities as a whole observed during our current piece of action research. Our task in the latter research was to help develop strategies and institutions enabling enduring culture of innovation and entrepreneurship in the two small rural communities of Moree (in Northern New south Wales) and St. George (across the state border in Southern Queensland). We document the problems and successes we encountered along the way in our two chosen service centres and draw out themes of potential relevance to public policy and community action.

### Spatial analysis of models of knowledge transfer in agriculture – first results

*Konrad Czapiewski (Polish Academy of Sciences)*

In the article will be presented the first results of the four-year project entitled 'Models of knowledge transfer in agriculture and its influence on agricultural productivity - spatial analysis' financed by the Polish National Science Centre. In view of the spatial differentiation occurring in Poland, it can be asserted that the issues concerning the overall level of education in a society are strictly related to the old-established two-dimensional division of the country (east-west, centres-peripheries). Also it is believed to be an indubitable truth that the magnitude of knowledge resources (differently quantified) has an immense effect on productivity, on economic results of the entire economy as well as on particular areas and firms. However, there are no in-depth analyses examining spatial differentiation from a perspective of people employed in agriculture that could allow for modelling of processes of knowledge transfer into agriculture. It should be stated that the available analyses concerning the effect of level of education, as well as of knowledge resources, on productivity and on other results of agricultural activity are not

sufficient enough to program the growth of that production factor. The whole project has a theoretical, cognitive and applicative character. A theoretical goal is related primarily to description and carrying out a spatial typology of agricultural farms, taking into consideration the dominant model of knowledge transfer. The cognitive task is going to be encapsulated at every stage of the project. In addition, along with development of models the conditions of their effectiveness will be established. The basic task of the project is to develop models of knowledge transfer in agriculture in a spatial dimension. Three particular goals that can facilitate achieving the main goal are: Analysis of significance of and accessibility to various knowledge sources that are available to farmers (secondary schools and higher education institutions, agricultural consultancy services, manufacturers of materials and equipment used in agriculture, information-communication technology, governmental agencies and private firms, EU projects and others). Analysis of changes in spatial diversity of the level of farmers' education (directional and general) in the years 1988-2010. Determining the effect of various forms of knowledge and education on economic results obtained in different types of farms.

### Policies for local development in sparsely populated areas: Comparative analysis of three rural Spanish regions

*Carmen Vazquez (University of Castilla-La Mancha), José M. Martinez (University of Castilla-La Mancha)*

In the Green Paper on Territorial cohesion published by the European Commission in 2008, the "Sparsely Populated Areas" have been identified as "Regions with specific geographical qualities", which should be given particular attention within the EU cohesion policy. These are not only identified by criteria of population density, but also by the extent of the potential population (calculated for the resident population from a point and specific perimeter) in order to emphasize the relationship between the phenomena of scarcity and dispersal of population and the potential socio-economic consequences. The green paper identifies 18 sparsely populated areas in the EU, three of which are located at Spain (the provinces of Cuenca, Soria and Teruel articulated on the same mountain ridge, the Sistema Ibérico). The main challenge for these regions according to the green paper is "low density, peripheral situation and structural weakness, as well as dependence on the primary sector, which represents a substantial barrier to development". The LEADER European initiative has been consolidated in their different calls as a laboratory of socio-political experimentation which has enabled the financing of rural development programmes in most of Spain's regions and the renewal of the working methods of territorial actors in this field, becoming a useful tool for the acquisition of operational skills both for local action groups and public administrations. We insight the overlap and interaction between European, regional and local policies and criteria has led to processes and dynamics differentiated in each of the three provinces analyzed, fact that we will try to demonstrate in the development of our contribution. In order to address the development of this contribution we will begin presenting the structure and



characteristics of the three territories selected, characterised by remarkably similar ecological structures, based on statistical data and mapping which allow us to analyse diachronically the regressive evolution thereof. We will analyse the peculiarities of the territorial organization of development in each province through local action groups which have been developed its work since the 90s of last century to the present day to immediately pass to scrutinize the programs and projects managed and financed as well as their impact on local-rural development. Finally, we will study the policies and actions of regional and/or local initiative and its interaction with the regional policies of territorial cohesion animated from the European Union.

### **Development of Handicraft Industry for Rural Industrialisation: Case study of Sheetalpati (Reed-mat) in Cooch Behar District, India**

*Suman Sao (University of North Bengal)*

Handicrafts are mostly defined as items made by hand, often with the use of simple tools, and are generally artistic and/or traditional in nature. They are also objects of utility and objects of decoration. The handicraft Industry stands a unique place among all other industries in India. It represents the rich culture, tradition and heritage of India. However, handicraft Industry has the status of cottage industry and it is one of the most important segments of decentralized sector in India. Most of the part of industry operates in rural and semi urban areas throughout the country but it has shown promising growth and has evolved as one of the major revenue generator over the years. It has shown continuous growth at the rate of 15-20% over the years and has large potential in Indian & International market. Handicraft Industry includes wide range of products because of country's diversified culture, traditions and heritage and provides ample opportunities for employment to people belonging to backward and weaker classes of society. Although the development of the rural economy in India will still be largely determined by the development of the rural-agricultural sector, however, the development of the non-agricultural sector, particularly handicraft industries is of equally crucial importance in leading towards a more effective and significantly integrated rural development. Handicraft Industry may be expected to absorb part of the underemployed rural population and to divert the rural work-force away from the overcrowded agricultural sector. Thus, rural industrialization could be seen as an important strategy in the programme of integrated rural development designed to remedy the problems of the rural sector. The main purpose of this study is to identify the constraints and potentials faced by Sheetalpati (Reed-mat) handicraft industry in a peripheral and underdeveloped region of the district of Cooch Behar in the State of West Bengal, India, and targeted the entrepreneurs and workers in the Sheetalpati handicraft enterprises. The study is based upon both qualitative and quantitative analyses of materials derived from field-work in several villages in the study area. It seeks to place handicrafts production within the broader theoretical context of rural industrialization and the development of traditional and peripheral rural areas of Cooch Behar. The analysis exhibits that though the sector in the

study area attracts skilled artisans and continues the industry's tradition moderately, units suffer from the problems like low productivity, monopoly of middlemen in marketing system, low level of investment, lack of credit facilities, slow growth in volume of production and no diversification in production system. Present study attempts to formulate constructive guidelines for the eradication of the inherent problems so that maximum utilization of the potentials of the sector is ensured.

## C08.26-04 - Local Development in the Urban Space

*Chair: Suman Sao*

### Effects of counter-urbanisation on the metropolitan areas of Romania

*Liliana Guran-Nica (Spiru Haret University), Mihaela Frasineanu (Spiru Haret University), Dragos Frasineanu (Spiru Haret University)*

Counter-urbanisation, the process by which people and employment leave the large urban areas moving into the countryside, is a continuous trend beginning with the 1960s. This process of decentralisation spread out from the most developed areas to the developing ones and it is present nowadays in the majority of the European countries. Romania has also experienced the process during the last decade as the result of the socio-economic changes issued from the political turnover in 1989. Counter-urbanisation affected mainly the rural-urban fringes but spectacular transformations occurred in the metropolitan areas. There are 9 such areas officially defined in Romania that are characterised by important demographic and socio-economic changes under the impact of urban-rural migration. The causes and the effects of this process are the main subject of the paper. The large diversity of settlements in these areas implies a complex set of determinants and responses, resulting in a number of behavioural types. Each metropolitan area is analysed based on a representative set of indicators, the results being the supporting information for the comparative study indicating the evolution tendencies for the next period.

### Creation of social capital in the context of festivals and local development

*Leena Hagsmo (Karstads University)*

Keywords; local development, place, social and cultural impacts, social capital, festivals  
In the context of local and regional development there is an ongoing discussion about the role of culture. One cultural phenomenon is festivals of different kind which can be important for local development especially in smaller places. In this discussion I will focus on the social and cultural impacts that a festival have on its host community, and if and how this in turn can have significant effects for local development. Soft factors as spirit of community, cooperation, happiness and confidence may be important for the wellbeing on a place and may affect its development. The essence in my discussion is the meaning of social capital and how significant this can be in the context of festivals and local development. When I am using the concept of social capital it is about trust and reciprocity between people, both within a special group but also between different groupings. The question is if those soft components, which may be strengthened in a festival contexts, in return can create benefits for the place and become important for the local development. Can the presence of social capital, which in turn can lead to a stronger confidence, affect the local development positively? Sometimes people need to cooperate

and act together to get things happen, so their creativity will be able to function. Festivals are such an arena where this is possible. A lot of work and engagement are required from the people within the festival organization; these people also spend a lot of time together in this group which may strengthen the social capital. In this context I am thinking about the social capital from an individual perspective and the potential individuals that benefit of social capital. If you as an individual are included in the "right" kind of social network you can hold a rich social capital, which may create some advantages for the individual in different ways. Networking and contacts are important aspects in a person's life. And I want to discuss how the engagement in a festival may have meaning for these people and in turn have meaning for the place. It is also necessary for the festival organization to create contacts with actors both within the local community as well as outside the community. Perhaps links can be created between groups and individuals, links and contacts that may be able to remain and survive outside the festival, meetings that otherwise would not occur. In terms of annual festivals, this can create lasting networks, which in turn can be positive for the local society.

### Innovation potential of Polish cities

*Piotr Sika (Polish Academy of Science)*

Themes of innovation have gained importance in recent years, both in scientific discussions and practice, where the concept of innovation has become a key issue used in the development of enterprises. The popularity of this theme, however, contributed to the ambiguity of many basic concepts and the difficulties in the emergence of a uniform methodology. Synthetic description of the models of the innovation processes which are most common presented by Philimore and Marinova (2003). On the basis of subsequent models the concept of innovation systems was created, where existing term innovation potential which is the main subject of study in the presented paper. The main aim of this study is to identify the innovation potential of selected Polish cities and its relationship with the characteristics of the analyzed economic development in urban centers. There will be also structure of innovation potential presented. Spatial range of the study is 65 cities with county rights and the time span covers the years: 2000, 2004 and 2008. According to review of the literature and available statistic indicators five basic components of the innovation potential were identified. Those five components are: science, research and development, supporting institutions, industrial enterprises, enterprises structure. In total there were 21 indicators taken into account. In the first stage of analysis cities were divided into three groups (metropolitan centers, regional and sub-regional) to make greater transparency of the presented results and also to come forward with additional analytical findings. The second step of the analysis was to create a synthetic indicator of innovation potential. At the beginning there was made standardisation by Z-score of data. Next they were checked in terms of variability and separation demands. Calculation of the partial indicators (five basic components) was done by the method of distance from the model. Synthetic indicator of innovation

potential based on the method for the classification of multi-feature objects. In the third stage using the correlation coefficient Spearmana and Pearsona an analysis of relationships between the potential for innovation and economic growth was made. The last stage was factor analysis which based on 21 variables used also in construction synthetic indicator of innovation potential. The results presented data of innovation potential for each group of cities, showing how the individual centers change their potential for innovation in the subsequent time points. It also describes the relationship between the potential for innovation and the characteristics of urban economic development, which indicates a moderate correlation essentially static. On the basis of factor analysis there where identify three basic dimensions in structure of innovation potential.

### **Does FDI help local industries in Japan to survive? A case study of two local industries in Shikoku**

*Atsushi Taira (Kagawa University)*

This study aims to explain the relations between overseas operations and the locality of the local industries through a case study of glove- and towel-related industries in Shikoku, Japan. Local industries ("jiba sangyo" in Japanese) have been struggling to survive rapidly increasing globalization particularly since the 1980s. For a long time, over a century in many cases, these local industries have played crucial roles in the regional economies. Some local firms began to internationalize their operations starting in the 1970s due to mainly labor shortages at first and then because of soaring production costs. The glove- and towel-related industries in Shikoku, Japan, are good examples of this phenomenon; both consist of small and medium-sized firms, and both have a domestic share over 60 percent. However, the significant percentages of their products are now produced in their foreign affiliates, especially in those in China. Along with the growth of overseas production and sophistication of product quality, the home regions in Shikoku are trying to redefine their positions and functions in their 'glocal' networks. A paper by Japan's Small and Medium Enterprise Agency reported that the number of domestic employees of small and medium-sized firms in Japan starting FDI first declined sharply, but later grew steadily, while the number of those not performing FDI kept dwindling. Is this also the case with the glove- and towel-related industries in Shikoku? What are their challenges? This study tries to provide answers of those questions.

## C08.26-05 - Assessment of Local Development Projects and Initiatives

*Chair: Ayda Eraydin*

### Participatory assessment of development in Ghana and Burkina Faso

*Ton Dietz (African Studies Centre)*

Between 2008 and 2012 in Northern Ghana and Southern Burkina Faso nine workshops took place in which a method was tested and improved to assist local populations to write their own local development histories and to assess and value the many development initiatives that came to their areas, partly initiated by the central and local governments, partly by non-governmental agencies, churches and mosques, and partly by private commercial agencies. A vlot of it was funded or sponsored by foreign donor agencies and well-wishers. In this paper I will highlight the geographical differentiation in 'development density', on the basis of the information gathered in all nine workshops, and the impact of these differences in 'density of development initiatives' on peoples' perception of development and change. The research was funded by three Dutch development NGOs (ICCO, Woord en Daad and Prisma) and undertaken by a consortium of Dutch, Ghanaian and Burkinabe partners: in the Netherlands these were the University of Amsterdam, the African Studies Centre and the Royal Tropical Institute; in Ghana the University for Development Studies in Tamale and in Burkina Faso the Expertise pour le Developpement du Sahel. Research took place in Ghana's Upper East Region (Sandema), Upper West Region (Nandom and Lasia Toulou), Northern Region (Langbensi, Wulensi and Daboya) and in Burkina Faso's Southern region (To, Silly, and Niabouri). Reports and a guidebook can be found on [www.padev.nl](http://www.padev.nl). Ton Dietz, December 2011

### Economic Resilience: Adapting to and Benefiting from the Volatile Conditions Imposed by Globalisation

*Ayda Eraydin (Middle East Technical University)*

Economic Resilience: Adapting to and Benefiting from the Volatile Conditions Imposed by Globalisation Studies into the impacts of globalisation have emphasised its positive effects on metropolitan economies, firstly by enhancing the appeal of such places for international capital; secondly, by enabling local agents to export their products and services all over the world; and thirdly, by allowing benefit to be drawn from the spillover effects of globally circulating knowledge, information and technologies. The common key word in all these debates is 'competitiveness,' which has become a way of discussing the relative economic performance of territories in their achievements in the generation of income, employment and new enterprises. However, the recent debates following the economic and ecological crisis experienced in the last decade, the concept of economic resilience received increasing attention not only by academics but also by policymakers

(Hudson, 2010). As Hill, Wial and Wolman (2008) emphasise despite the growing importance of the idea of economic resilience it has not been carefully defined or measured. This paper aims to define the attributes of economic resilience and operationalise the concept with the help of case studies that explore and compare the characteristics regional economies and strategies of the different stakeholders of the regional economies that are successfully adapted to the crisis and even benefited from the volatilities and the ones not. REFERENCES Hill, E., Wial, H and Wolman, H. (2008) Exploring Regional Economic Resilience, IURD Working Paper Series, Institute of Urban and Regional Development, UC Berkeley Hudson, R. (2010) Resilient regions in an uncertain world: wishful thinking or a practical reality? Cambridge Journal of Regions, Economy and Society 2010, 3, 11'25

### Rebuilding Babel: Finding Common Development Solutions Using Cross-Contextual Comparisons of Multidimensional Well-being

*Gilvan Guedes (Vale do Rio Doce University), James Hull (Brown University)*

We build on the theoretical tradition of livelihood strategies and capital portfolios to empirically assess wellbeing among rural households, with an eye to comparison across contexts. First, we estimate a multidimensional measure of poverty based on fuzzy logic, for two rural frontiers: Nang Rong, Thailand and Altamira, Brazil. To enable cross-contextual comparison, we calculate a second estimate using a subset of shared measures. We find that the pattern of response over the range of many key variables - for example education, income, and demographic dependency ratio - is robust to model specification, suggesting that comparative generalizations, useful in formulating cost-effective policy interventions across contexts, could be satisfactorily identified in many instances. More generally, our approach provides researchers and policymakers with a framework for understanding the interaction of context and the subjective construction of wellbeing that is useful for distinguishing stable corollaries of poverty from those that are volatile across contexts.



# C08.27

## Marginalization, Globalization, and Regional and Local Responses

## C08.27-01 - Interpretations of Marginality 1

*Chair: Etienne Nel, Walter Leimgruber*

### From merge to place: Pewenche's case

*Hugo Capella Miterique (Universidad de Chile)*

Nowadays, Pewenche's territory is split in the Andes, between Argentina and Chile, but in the past, it was seen as a unity based on the adaption of a transhumance mountain society, related to the Andes. Present marginality and poverty discourses in that area, are based on the difficulty to live in the Andes, according to physical determinism discourses that hide the real historical and cultural marginalization process, under national identity interests. The present article focuses on one hand to prove how a cultural marginalization in the split Pewenche's territory has been hidden behind natural causes and on the other hand, we deep into the need to study the area as a whole unity, to encourage a new glance to this land and its own development ways. The new glance on Pewenche's unity would be a useful answer to regional development, close to ecological sustainability principles and at the same time a way to recognize the Pewenche's marginalized identity, after years of Argentinian and Chilean National rules dominions.

### The colonias populares of Mexico City: Spaces of marginality?

*Antonine Ribardiere (Université Paris), Jean François Valette (Paris)*

This paper aims to examine the pertinence of the concept of marginality (GURUNG G.S., KOLLMAIR M., 2005) in understanding the specific characteristics and the evolutionary dynamics of the lower-class neighbourhoods that lie on the outskirts of Mexico City. Our analysis is centred on three aspects of marginality. The first of these is social, and characterizes the resident population according to its standard of living as well as its access to basic services and decent housing conditions. It relates to the definition of marginación urbana that has been adopted by the Consejo Nacional de Población for establishing official economic and social development programmes (CONAPO, 2009). The index based on this definition is specifically intended for the colonias populares, large built-up areas on the fringes of the city proper that became urbanized through the settling of the local residents, despite them not possessing any title deeds. These areas are also characterized by two other forms of marginality. One of these is spatial, and concerns their peripheral location at the time of their urbanization as well as their poor connection to networks. The other is property related, and reflects the irregular status of their occupancy of the land. This land tenure insecurity assumes a strong political dimension for two reasons: first, without title deeds, the residents may potentially be deprived of civil rights, and second, land and physical regularization processes require the involvement of clientalist games at different levels. We propose to examine the relationships between these three aspects of marginality. To what extent does the illegality into which these

lower-class neighbourhoods are born operate as a determinism, imprisoning them and their residents in their marginal status? Is it possible to establish a link between progress in land and physical regularization and changes in the indicators of social marginality? A diachronic study of the socio-demographic indicators of vulnerability will serve to demonstrate how such lower-class neighbourhoods may be identified as sites of social marginality. Several subtleties will be taken into account in this interpretation: we will show that social marginality is also associated with other types of areas, and that the colonias populares take on a wide variety of forms and encompass various degrees of social marginality. Most notably, today, the earliest generations of colonias populares are largely integrated into the city proper. Yet, the simplistic relationship between regularization and social and urban integration should be examined. Thus, we will compare progress in regularization with changes in the social profiles within a sample comprising four recent peripheral areas, which sprang up some twenty years ago, in order to reveal the complex and changing relationships between the social, spatial and property-related aspects of marginality.

### Spatial reproduction of floating population: Social geographical perspective

*Yao Huasong (Guangzhou University)*

Social space of floating population is a reproductive space impersonated of their natures and activities based on urban roots. Firstly, this paper inducted the forms of spatial reproduction, which included physical space, behavioral space and cognitive space (differentiated space, segmented space, space under fordism and information age, compressed space, flexible space, space of flows, problematic space, suppressed space, representational space). Second, tapping event history analysis, discussed the construction process of social space of floating population. It is found that social space of floating population is indicative of marginalized space, which resulted from socialization of their natures, social discrimination of related regimes, ne-liberalism of urban governance, fierce competition for urban space, profits-seeking of entrepreneurs, exclusion of local citizens. Spatial reproduction is also the process of reproduction of original production relations. Lastly, facing pressures from other groups, they tend to alter their spatial adaptability, pushing forward their relations with cities where they live.

### The Rural - Urban Topological Space of Finnskogen: Conveying Marginality to the Marginal?

*Camilla Berglund (Karlstad University)*

The forest landscape of Finnskogen, in the county of Värmland in Sweden, has faced a dramatic depopulation and hence a loss or decline in provision of public services - due to institutional and livelihood changes. These changes could probably be said mainly to have started when the forests became of interest in different phases of the industrial development. If the pre industrial forest landscape offered a diversified livelihood related



to the shifting seasons and practices associated with these, and meant a life in a relatively time and space compression, the post industrial forest landscape could perhaps be said to once again offer diverse way of living, in a time and space compression out of mobility. In the traces of depopulation houses are sold to people from mostly urban areas in Sweden, Norway and northern Europe, and become second homes. For those individuals with longer roots in the area, still living there, this leads to (new) meetings in values and knowledge of the forest landscape and practices related to it. Who or what is being marginalized becomes of relatively blurring boundaries even though the area of Finnskogen as such is considered one of economic and geographical marginality. The area of Finnskogen is just a geographical entity, defined and valued by its users and consumers, and what is considered marginal by who seems to differ, especially when marginality becomes of a value as such. The history of decline in Finnskogen could almost be described as a prerequisite for the development of a marginality in the meaning of rareness (i.e. silence, freedom, authenticity) desired today by many urban dwellers. It is interesting here to reflect on the topology as an alternative to the concept of relational - of rural and urban space and time connected through the mobility of people and their views and values. The purpose of the paper is to discuss some theoretical ideas and considerations grounded in for instance literature about marginality: How are the concepts of decline, development and marginalization articulated and used by different settlers in Finnskogen and what kind of multiple landscapes will come out of this? The theorization will be discussed and illustrated from field studies, participant observation and interviews carried out in the area during the years of 2010-2011.

## C08.27-02 - Interpretations of Marginality 2

*Chair: Etienne Nel, Walter Leimgruber*

### The global food issue in the marginality context

*Walter Leimgruber (University of Fribourg)*

The problem of food supply and nutrition have been the objects of discussion ever since Malthus wrote his famous essay. Usually, the roots of and the solutions to this problem are exclusively sought in environmental and technical fields: harvest failures due to meteorological and climatic reasons, inadequate food distribution channels, food prices and so on are quoted - in other words, the approach has been dominated by quantitative arguments. While these factors doubtlessly play an important role, they are not the only reasons for the fact that about one billion people on our Planet suffer from hunger and/or malnutrition. This paper proposes a number of reflections on the superficial and on the deeper reasons for the food problem. It argues that we are confronted with a much more complex situation that is linked to the intimate relationship between environmental and societal problems. Agriculture (the food provider) is not only dependent on physical conditions (soil, water, weather etc.) but is anchored in cultural practices. Besides, the lust for power and the greed for material profit all along the food chain have transformed this entire field into a political and neoliberal playing field with dire consequences for the underprivileged and the poor. The answer to the global food crisis lies therefore not only with the many solutions technology seems to offer but to an even greater degree in the attitude humans across the globe manifest towards food and nutrition. Keywords: world hunger, food, nutrition, energy, value systems

### Does English marginalize other scientific languages – the case of Slovenian Geography?

*Stanko Pelc (University of Primorska)*

»English as a lingua franca« undoubtedly became a mean of communication between speakers of different first languages. It is widely used in international contacts in politics, business and tourism as well as in science. Internationalization and globalization of research carried out at universities and research institutes strengthens the dominating role of English as a scientific language. It became the current most significant publication language. The slogan long present in academic society 'Publish or perish' has therefore been changed into 'Publish in English or perish'. As we are forced to publish internationally and usually in English we no longer do our research work with respect for local problems and needs. On the contrary, we are selecting the topics that can be interesting for international audience and are therefore internationally publishable. Slovenian universities and Slovenian Research Agency are all encouraging (forcing) researchers to publish internationally through evaluation of their work that is based on

numbers of bibliographical units published in scientific journals with higher impact factors included into indexed databases such as SCI, SSCI, A&H and ERIH. As the number of citations is also very important for researchers that want to be successful at national level have to publish about the topics that are relevant for larger number of researchers (on the international 'research market'). This redirects the focus of research away from many nationally important topics. Furthermore it impoverishes the national scientific language. In case of Slovenian geography its Slovenian geographical scientific language. National terminology cannot develop if researchers that are using it are doing so predominantly in foreign (English) language. From this point of view in today's globalized science the Slovenian geographical scientific language may be considered as marginalised (similar as many others) and the scope of our paper is to give some evidence of this fact and to discuss the present and expected consequences of it.

### Changing Livelihood Strategies and Practices of a Marginal Community of Bhutan

*Raghubir Chand (Kumaun University)*

Bhutan is a country of diverse and rich ecosystems and being increasingly looked upon as a model for nature conservation by other countries. Bhutanese live in close proximity to nature and derive their livelihood from natural resources from centuries. The subsistence farming, livestock rearing and forest based activities are the major components of traditional livelihood practices. Bhutan's rugged mountain terrain and cold climate exhibit a crucial challenge for the growth of agriculture and dependence on itself. People have thus developed local arrangements and use of time and space factors to evolve various indigenous strategies to balance their livelihood systems. For last few decades a lot of developmental initiatives are taken to improve the living of Bhutanese population. As Bhutan has evolved into a new era of democracy in the year 2008, the issue of people's living has gained significant momentum. It is in this perspective that the present paper addresses the existing and changing livelihood strategies of a very remotely located Shingkhari-Lauri region of Bhutan. Lauri gewog (block) of Samdrup Jongkhari dzongkhag (district) is one of the remotest gewog of far-east Bhutan. The gewog is three days walking distance from Jomotsangkha (previously known as Diagam) dzongkhag (a sub divisional administrative unit) and a border town at the foot hill adjoining the plain of Assam, India. Village Lauri is selected for livelihood strategy survey conducted in January 2009. The data gathered from 100 households suggest that a majority of 77 households derive their main income from non-agricultural pursuits such as wage labour and porter charges, manufacturing of local traditional goods, carpentry and masonry works, collection of wild medicinal herbs, weaving and painting and performing rituals by local priest called gomchens etc. It is also observed that labour and porter charges are common source of income for all households along with all other means of livelihood. There are two ways in which the wage labour is practiced by the village people. One is more immediate which absorbs them in transporting food grains and other essentials



including raw material required by the on going community development schemes. The second and more important is the labour migration as part of seasonal move to low lying warmer valleys during winter. Jomotshangkha is the main destination of Lauri people where a majority of 62 households were found working followed by 39 households in Langchenphu at the time of survey. People also move across in to Arunachal Pradesh of India in search of jobs. This paper thus presents an overview of selected livelihood components in the changing environmental context.

### Spatial Representation in the Marginality

*Antonie Schmiz (Universität zu Berlin)*

Migration is predominantly taking place into cities. While there is a national responsibility for migration management, the communal level deals with migrants' daily and practical hurdles and challenges in the settlement process. Since large parts of the former Vietnamese contract worker community in Berlin nowadays live in Berlin's marginal districts of Lichtenberg and Marzahn-Hellersdorf, this group is hardly visible in the central parts of the city while it does not command a spatial representation of its economic activities. As a reaction on this absent spatial representation, Berlin's communal politicians repeatedly tried to establish a Chinatown to accommodate Asian entrepreneurs at one site. The self-evident but unconsidered lack of a common identity of Asian migrants in Berlin, the randomly chosen local sites, as well as the top-down approach contradicted the grown structures of the multi-layered Vietnamese community in Berlin. Hence, these projects were never realised. Using the example of the Dong Xuan Centre (DXC) in Berlin, it will be demonstrated how a 'Vietnamtown' grew on a marginal site in a bottom-up process. Currently, this centre receives growing attention by tourists, scientists, artists and the administrative urban planning units. The DXC, as a developing, prosperous project newly takes the global brand of Chinatowns as a role model. Its endogenous development is based on reciprocity and a mutual trust between the wholesale traders and the Vietnamese management. Its vision of a holistic development with a residential zone, a TCM-medical centre, a building for cultural events and a hotel contradicts the administrative planning restrictions. Thus, the centre's management is in an ongoing conflict with the district of Lichtenberg's administrative planning units. On the one hand the districts administrative planning follows Berlin's interest to establish the DXC as a Chinatown to gain a spatial representation for Asian entrepreneurial communities in Berlin and for an official marketing in tourist guides and on touristy websites. The marketing of this place further targets the development of a cosmopolitan urban concept as a soft locational advantage for the settlement of knowledge based and creative industries. On the other hand, the district obliges a planning tool which has been generated to protect retail trade in stated urban centres. Following this tool, retail trade and the provision of services, which is currently taking place in the DXC informally, shall be prohibited. The paper discusses the further development of an endogenously grown place as a possibility to avoid conflicts of former related projects while it already enjoys

the acceptance of the Vietnamese community. Thereby it provides an example of a marginal group contesting on a marginal site which is hidden by processes taking place in many regions of the globalised world.

## C08.27-03 - Marginality in a Globalizing World

*Chair: Etienne Nel, Walter Leimgruber*

### Östmark, Marginalized in a Globalized World – Some Future Possibilities

*Gerhard Gustafsson (Department of Geography and Tourism)*

By the help of experiences from a case study, the Östmark area in Värmland, Sweden, globalization may be treated as both a problem and an advantage - a problem because of the economic force that can be seen as promoting urban growth and that makes different areas in the world look more alike and an advantage because the process brings people closer to each other due to different kinds of communication and this implicate that different areas have much in common. In this presentation there is a try to see how marginality in this situation can be seen as something positive in the sense that areas like Östmark represent a social structure that represent more of a society that can survive in a future society more adapted to the threats from 'climate change'. The presentation consists of both empirical examples of changes in the area, between global and local constructions, and more philosophical ideas about changes in society. All together the presentation is based on a discussion of different ways of develop marginal areas as well as other areas in the future. The conclusion is that development in marginal areas can be seen as a total social change strategy and is no longer marginal, but central.

### The local-global interaction in the Uco Valley (Mendoza, Argentina): overcoming marginality or increasing heterogeneity?

*Margarita Schmidt (Universidad de Cuyo)*

In a previous case study about the Uco valley in the province of Mendoza (Argentina), we referred to the local transformations in the agro-industrial activities in a mountainous area under the influence of globalization. Based on the results of that study, presented in a former meeting of the Commission of Marginality, we reconsider one of the problems of the area, to deepen its analysis. In that opportunity, we stated that the recent developments of the last twenty years 'constituted essentially by the incorporation of large non-local and often foreign viti- and viniculture enterprises- have allowed to overcome some conditions of insufficient integration and of lower development level that characterized the area. Nevertheless, one of the negative consequences of these transformations is represented by an increasing structural heterogeneity. This deeper contrast between globalized actors and traditional actors represents the marginality characteristic that is being accentuated. In the present study, those conclusions are reconsidered with the aim of deepening in the problem of the divergent development of different agents and activities in the Uco valley. Lately, we can realize the coexistence of a globalized world and a traditional world that goes beyond the viticultural activity, and progressively acquires manifestations in other areas. The launching of new undertakings

belonging to diverse areas, like entertainment, tourism, gastronomy, sports, residence, among others, is added to the large and modern wineries of high technological level with their respective vineyards. All these activities are oriented towards a very selective public, of high income, non-regional and frequently foreign origin and with interests that are very far away from those of the locally rooted population. Although these developments are still incipient, they already show some evident territorial effects. In this sense, an objective vision of these transformations is presented. They include the new undertakings and their consequences in the traditional ambit. Between these last ones, the abandonment of agricultural activities, the sale of properties to non-regional investors, the change in the size of the parcels of land, the reconversion and the change of activities can be mentioned. The perception of the positive and negative effects of these new undertakings and activities that have the diverse involved actors is also examined. The valuation of the integration degree they reach in the context of the local community is finally considered. In this way, the integration, complementation, coexistence or confrontation between territorial actors with deeply different productive and activity profiles is analysed from diverse complementary perspectives. Herewith, we try to evaluate the results of this local-global interaction and its influence on the marginality conditions of the region, particularly the heterogeneity between the different groups.

### Local development through tourism and new localism

*Yasutaka Matsuo (Senshu University)*

This research aims to explore the indigenous sustainability of rural areas. The center of interest is the formation of localism through tourism. In the vast depopulated areas in Japan, a few local habitats are competent enough to live a stable life through the prosperity of tourism. Local development has been attained in the substantiation process as the tourist spots. In the first place, the following is investigated. What kind of special natural resources or social conditions has made the local development possible? Whether some common characteristics are recognized or not among the flourishing tourist spots? Next, the research deals with the tourist spots where the inbound tourism has become prosperous. The inbound tourism means the tourism of the foreigners into Japan. As Japan is characterized by its ethnic homogeneity, the introduction of the inbound tourism was rather a big decision for the rural local residents. Its success probably had a widespread influence upon the locality. This suggests that the formation of the new localism is potentially under way in the inbound tourist spots. It is examined whether and how the new localism is manifested in the phases of land management, landscape care, social structure and psychology, local networks and so on.

### Getting even more marginal: Global economic crisis and regional disparities in Romania

*Raularian Rusu (University of Cluj-Napoca)*

Global economic crisis has severely hit Eastern European countries, and Romania made no exception. Since 2009, the crisis has determined the government to make a financial agreement with the IMF, which led to budgetary cuts, including a 25% reduction of wages of all public sector employees, the cancellation of almost all bonuses and an increase of VAT from 19% to 24%. These measures resulted in lower living standards and an overall reduction of consumption. In addition, higher taxes and especially the compulsory tax for all companies, regardless of their profit, led to a general collapse of the microeconomic sector, resulting in the bankruptcy of thousands of SMEs and increasing unemployment rates. While these facts point out to the economic and social decline at national level and the increasing marginal position of Romania in the European Union, there is a growing differentiation within the Romanian society as well. The dissolution of hundreds of schools in the rural areas and the closing of hospitals in small towns enlarged the existing gaps between central regions and large cities, on the one hand, and rural and marginal areas, on the other hand. The concentration of investments in or around the large cities and along the main development axes is also in favor of centralization. In contrast, the scarcity of subsidies for the primary sector determined many farmers to abandon their activities. Therefore subsistence agriculture is still the main economic activity in the countryside, producing next to nothing for the national economy as it has almost no connection to the market. The decommissioning of many mining sites and heavy industry plants also had a high impact in formerly developed regions, especially in mountain areas, where unemployment rates reached maximal levels. The strategies of highlighting the tourism attractions of these areas and to change the focus of their development to service provision (mainly tourism) proved partially unsuccessful. The analysis of regional disparities at the regional and county level shows ever increasing imbalances and inequalities between the developed and underdeveloped areas. While the hierarchy remains largely the same, with Bucharest and Ilfov County still way ahead of the other regions, the largely rural counties are getting even more marginal.

## C08.27-04 - Regional and Local Responses to Marginality

1

*Chair: Etienne Nel, Walter Leimgruber*

### Formalizing Urban Agriculture and Practice an Response to Economic Marginalization: Evidence from Zambia's Copperbelt

*Etienne Nel (University of Otago), Tony Binns (University of Otago), Jessie Smart (University of Otago)*

Urban agriculture is now widely recognized as a both an inevitable and a legitimate response to the lack of economic opportunities available to the residents of the burgeoning cities of the Global South. Unfortunately many government's still adopt a negative response to the growing of crops and the keeping of animals in urban areas, leading to the destruction of crops and enhanced suffering on the part of the poor. One area of the Global South which has been particularly hard-hit by economic change is the once thriving Copperbelt of Zambia where the collapse of once prosperous mines and industries from the 1990s has forced the majority of the population into a reliance on informal livelihood strategies and urban agriculture. Partially in response to the scale of economic loss, the City Council of Ndola, in a move which is virtually unique in Africa, has decided to overtly support urban agriculture through policy support, collaboration with key stakeholders, including the Ministry of Agriculture and efforts to leverage infrastructural and financial support. This presentation is based on extensive fieldwork in the area undertaken over a 3 years period. An overview of the scale of the economic loss the area has experienced is provided, the key role which urban agriculture now plays in people's livelihoods is outlined and emphasis is placed on an assessment of the impact of policy support. The latter leads into a discussion on what else the city still needs to do and the broader implications of such support for cities elsewhere in Africa.

### Intégration des régions montagneuses d'Asie du Sud-Est continentale, 1960-2010: entre adaptation et marginalisation

*Steve Déry (Université Laval)*

L'adaptation des sociétés humaines aux transformations profondes de l'économie mondiale, et plus généralement de l'environnement dans lequel nous vivons, constitue un défi pour les humains du XXI<sup>e</sup> siècle. Les régions montagneuses d'Asie du Sud-Est constituent un terrain fertile pour étudier ce processus. Les États modernes centralisés y reconstruisent une nouvelle territorialité dont la légitimité repose en partie sur l'organisation politique et économique mondiale. L'intégration au reste du monde s'est accélérée et intensifiée depuis les indépendances et les années 1970, déclenchant des processus d'adaptation mais aussi, une marginalisation de plusieurs populations

affectées. Dans ce contexte, cette communication vise à faire un premier bilan des processus d'intégration de cette région aux systèmes socioéconomiques et politiques nationaux et internationaux. Qui sont les acteurs? À quel niveau se situe leur action et sur quel terme temporel? Qui sont les populations visées? Quelles transformations sont induites? Le cas spécifique du Vietnam sera examiné plus précisément. Mots-clés: Asie du Sud-Est continentale, Vietnam, État, niveaux géographiques, intégration, marginalisation

### Impact of rural restructuring on the time-space behavioural patterns in marginal area

*Vladimir Ira (Slovak Academy of Sciences)*

The contemporary era of rural restructuring in marginal regions of Slovakia is set by earlier changes in the rural world and by the pace and persistence of change in transition period as experienced during the last decade of the twentieth and early twenty-first centuries. The characteristics express the way in which recent rural change has been driven by processes of transformation (modernization, post-communist transition, marginalization, and globalization). The contribution sought to analyse recent and contemporary rural restructuring by examining time-space behaviour of people living in marginal mountainous municipality of Lom nad Rimavicou in Central Slovakia. Several time-geography concepts applied in the study are presented and results from three surveys (based on time-space budgets) conducted in the years 1986, 1997 and 2011 are analysed. The processes of rural restructuring and their time-space consequences in individual's behaviour might lead us to re-think the way in which we approach the changes in rural life.

## C08.27-05 - Regional and Local Responses to Marginality 2

*Chair: Nel Etienne, Walter Leimgruber*

### **Demographic and Economic Change in Small Towns in New Zealand**

*Etienne Nel (University of Otago)*

Small towns are widely regarded as 'under-researched' elements in the urban systems of most countries. Contrary to conventional wisdom in the 20th Century which argued that in most OECD countries small towns were broadly in a phase on long-term decline, recent evidence indicates a reversal in the fortunes of many, but not all, small towns. Counter-urbanization, globalization, the retirement of the 'baby-boomers', tourism, new forms of rural enterprise in a 'post-productivist' or an increasingly 'multi-functional' reality have helped small towns in many areas to experience what has been referred to as the 'second modernity'. Such change is not however universal as it is apparent that some towns are either better located to benefit from change or have greater capacity to initiate endogenous development processes. This paper provides a comprehensive overview of what has been happening in New Zealand's small town system since the early years of the 20th century. While initial emphasis is placed on demographic shifts and associated small town growth and decline, the focus then shifts to examine economic change. Activities associated with the 'second modernity' clearly are having an impact, however a key question which need to be assessed is whether such processes can reverse population loss and economic decline in all centres. Evidence from places which have 'reinvented' themselves are contrasted with places which have failed to do so in order to arrive at the paper's key conclusions.

### **Development, Marginalization and Problems of Identity: The Post-Liberalization Scenario in West Bengal**

*Lakshminarayan Satpati (University of Calcutta)*

West Bengal, as a state of the Indian Union, holds a unique position in regard to historical, political, economic and cultural aspects of the country. During the British period the then Bengal Province used to play key roles in the administrative affairs also, as Kolkata was the capital till 1911. Taking several physical and human factors as advantages for development, there was tremendous industrial-economic growth along the Hooghly River leading to excessive concentration of wealth and population within and around Kolkata, which became a megacity during the recent past. Even after the shift of India's capital to Delhi, the Kolkata-centric growth continued through Independence. Although the State Governments of West Bengal successively tried to establish a few industrial-economic growth centres at Asansol-Durgapur, Siliguri and Haldia areas, the rural agrarian economy could not find any significant achievement to curb unemployment,

poverty and selective migration from rural to urban areas. The influx of population from countryside and also from the bordering Bangladesh became an important issue that was responsible not only for the change, so some extent, of demographic character of the state, but also became one of the crucial political regulator, especially during the 1970s when the Left Front Government replaced the Congress-led government. Owing to liberalization in 1990s, West Bengal had to face drastic change in economic policy of the Indian Government. The ideological conflict, at least theoretically, between the Left and Non-left parties came into the forefront; but in reality market became the key player. Subsidized education, shift towards ICT- based industries, substantial increase in the incomes of the high middle-class people with corresponding rise of purchasing power favoured the emergence of a new type of consumer-society. The developments again led to accumulation of wealth in Kolkata conurbation, and the rural areas became more impoverished and marginalized. The political and administrative decisions continued to be centralized and a sense of deprivation among the rural poor became imminent. As the prevailing education system does not have much relevance to job and income, the educated youth of the remote areas wanted to proclaim their identity and a series of socio-political crises having economic root took prominence. The disturbances in so-called Jungle Mahal, Darjeeling Hills and among a section of the minority communities cannot be resolved without addressing the issues. This paper is an attempt to analyze the socio-political crises of post-liberalized West Bengal taking into consideration the historical as well as regional contexts of development in the state.



# C08.28

# Modeling Geographical Systems

## C08.28-01 - Geocomputations and Applications

*Chair: Therese Steenberghen, Stewart Fotheringham*

### Progress on shape metrics for edge analysis

*Steven Roberts (Wilfrid Laurier University)*

Shape is the property of a geometric figure that is invariant under translation, rotation and scaling. Earlier efforts to use shape metrics to analyse polygonal boundaries in landscape spatial data utilized Kendall coordinates (Roberts et al., 2000). This works well for shapes that have well defined landmarks. We demonstrated at the Canadian Association of Geographers Conference 2007 how to use statistical shape analysis tools for the automatic parsing of morphological features from GPS tracking points of Grizzly bears and also shape metrics as a way to formulate an alternative stopping criteria for the Douglas-Peucker line generalization algorithm. However, the lack of a canonical dimension for the metric is a significant drawback for studying landscape boundaries that often lack unambiguous landmarks. The metric of Small and Le (2002) avoids this problem of lack of landmarks via a parametric representation. However, the shape representation introduced creates a problem for the use of this metric with geographic spatial data as there is no apparent canonical way to parameterize a closed curve. In this paper we demonstrate the use of a shape metric to analyse the structure of landscape feature edges specifically by partitioning a set of boundaries between different landscape feature types into classes based only on shape as defined above. The partitioning is via a pruning algorithm operating on an Minimum Spanning Tree of shape distances between the set of boundary edges. We also introduce a solution to the problem of calculating unambiguous shape distances for closed curves when using the Small-Le shape metric. S. A. Roberts, G. B. Hall and P. H. Calamai, Shape-based Properties of the Boundaries between Landscape Feature Types, in P. Forer, A.G.O. Yeh and J. He (Eds.), Proceedings of the 9th International Symposium on Spatial Data Handling, Beijing, 1b.27-50, 2000 (Aug). C.G. Small and H. Le, The statistical analysis of dynamic curves and sections, Pattern Recognition, 35: 1597-1609, 2002.

### Temporal assessment of land use and occupation of the city of Conde, Brazil

*Maria Emanuella Firmino Barbosa (UFPB/IFPB), Nathália de Alcântara Rodrigues Alves (Ciência e tecnologia da Paraíba), Denize Monteiro dos Anjos (Ciência e tecnologia da Paraíba), Michelly Gomes de Araújo (Ciência e tecnologia da Paraíba), Michele Beppler (Ciência e tecnologia da Paraíba)*

The municipality of Conde is located in the metropolitan area of João Pessoa, Paraíba State, Brazil. Is between the geographical coordinates of 7 ° 11 '48 "and 7 ° 23'49" south latitude, 34 ° 47' 35 "and 34 ° 57 '25" west longitude and occupies an area of 174 km<sup>2</sup>.

The cited above municipality, located in the coastal region has a great importance in the tourism sector due to the presence of natural beauty, attracting investors, particularly land property, hospitality, and tourists to the site, generating income for its inhabitants. This paper aims to show the advancement of the use and occupation of land in the last decades through the preparation of thematic maps (land use and occupation, vegetation, slope, hypsometric and geomorphologic). The Cartographic Base to be used in this study, still has in the Geodetic Reference System SAD69. However this study also aims to update the cartographic base for the Geodetic Reference System SIRGAS2000, through the development of an application in the Java language. The information to generate the base map of the project will come from satellite images CBERS 2B, aerial photographs and topographic charts of the area. All data processing and generation of thematic maps will be done with the help of the software SPRING 5.1.7. During the research will be necessary field visits for data acquisition and verification of information acquired. The results to be achieved with this research project is the creation of a geographic database with information about the locations of irregular occupation and deforested areas in the municipality of Conde, providing a database for those who seek to information about the municipality.

### Site Selection for Ecotourism with Emphasis Red List (IUCN), Case Study: Miankaleh Peninsula (Iran)

*Manijeh Ghahroudi (Shahid Beheshti University), Seyed Hasan Sadugh (Shahid Beheshti University), Mohammad Ali Nezammahalleh (Shahid Beheshti University)*

In Miankaleh Peninsula, ecotourism is in its incipient stage of expansion. As the political and economic circumstances of the developing countries, rapid global growth in the industry and the national situation of the area, penetrating and establishing of ecotourism facilities in the near future will be inevitable in the area. Therefore, it is essential to identify suitable sites for development of the facilities in the area as the objective of the research. To select the most eligible sites for this objective, three sets of environmental, economic, and geodata criteria are essential. Maps, satellite images, available researches, statistics, and questionnaire data were used to define 17 criteria and weight them. We devised some novel methods, in addition to common methods, for assigning within subject weights to these criteria. The red list categories of IUCN present a method based on which it is possible to identify the plant and animal species that in the near future will be in danger of extinction. Therefore, the 8 categories of the list in a new method are used as a tool to determine within subject weights in both plant and animal habitats as two environmental criteria for site selection of the study. We conducted two stages of field work survey, on 1 year distance, including for observation and collecting data and then to try on the produced results and understand the analysis accuracy. In the first stage, some data gathered to measure dune vulnerability index parameters and check the boundaries resulted from image classification as well as collecting questionnaire data.

Data on position and dimensions of the active sand dunes, on vegetation densities and dune particle sizes were gathered and stored in predesigned sheets. From these data we attempted to determine within subject weights for some criteria. The values of individual criteria that are in different ranges and calculated in different units must be normalized into a standard scale to integrate in the final analysis. In normalization each given point that is assigned a grade of membership using Fuzzy membership functions, assumes a degree of suitability for the purpose of site selection for sustainable ecotourism facilities development. The AHP method, readily applicable in spreadsheet program, was used to determine appropriate weights for layers. In the method the decision making problem is decomposed into a hierarchy of sub-problems and the relative importance of the elements can be evaluated in a pairing standard comparison way, for between subject weights, with respect to the main goal above that hierarchy. Multi-Criteria Evaluation (MCE) method help us to integrate the conflict criteria and goals. The results indicate that the sites qualify the included criteria conditions and that the decisions with conflict goals can accurately be made prior to any action to conserve the environment.

#### **Analysis of the solution effectiveness of visibility search techniques in multiple observers siting problem**

*Young-Hoon Kim (Korea University), Evans Andy (University of Leeds)*

This paper demonstrates a set of solution techniques for multiple observers siting to maximise their visible areas whereas the observers has no overlapped visible areas on gridded terrain surface. As this problem reflects multi-objective function (i.e. maxmin problem), visibility modified spatial heuristics are discussed for which greedy search techniques, swap algorithm and genetic algorithm are explored. As topographic features that show candidate solution for the spatial heuristics, peak, pass, pit, valley, and ridge features are extracted from DEM data in South Korea. A benchmark test is undertaken to compare the solution quality and computing time of the solution techniques - i.e. visible area sizes, CPU time. The summaries of the analysis are as follows: First, it shows that the relationship between high elevation positions and their visibility is not highly correlated. It also suggests that highly elevated observers are not necessarily better visible areas and they are not suitable for search for largest visible areas. Secondly, the positions that can see large visible areas are highly correlated with their elevation and are distributed within a certain range which has small deviation of their correlation between visibility and elevation. This means that, when selecting potential observers, geographical dispersion is also important, and it is necessary to employ the positions located at relatively high elevation area. Thirdly, the visibility results of the topographic features are compared with the results from a whole surface area. It is identified that the topographic features show similar or better visibility results for the DEM data, which can guarantee optimal candidate sites for visible large areas. Finally, as practical purposes, visibility assessment of current watch towers for detecting forest fires are carried out in order to determine their visibility performance. Then, searching for a set of best watch towers

location that satisfy the multi-objective visibility function is undertaken by employing algorithm testing environment: spatial heuristics, topographic features using greedy search technique, and using genetic algorithm. As topographic features based search, distance buffering methods are explored, and their results are compared with those of spatial heuristics in terms of the solution quality (i.e. visible area size). Finally, this paper found that the GA method is outperforming to search the optimal sites, compensating large computing time than the swap algorithm and the topographic features based distance methods. The swap algorithm technique is also generating optimal solution with reasonable computing performance. The experiment also indicates that the proposed topographic features based method shows much better computing performance than the genetic algorithm and the swap algorithm if other extra computational processes are undertaken.



## C08.28-02 - Modeling Human and Physical Processes 1

*Chair: Pavlos Kanaroglou, Jinfeng Wang*

### Modeling the Effects of Endogenously Triggered Changes on Dynamic Repertoires of Activity-Travel Behavior

*Ifigenia Psarra (Eindhoven University), Harry Timmermans (Eindhoven University)*

Modeling the dynamics of activity-travel behavior is high on the research agenda of activity-based analysis. The conceptual framework of modeling the effects of endogenously triggered dynamics on activity-travel behavior is presented in this paper. Endogenous dynamics are caused by factors internal to the individual, rather than imposed by reasons beyond an individual's control. Conceptually, we consider both a top-down (life trajectory affecting daily activity agenda) and a bottom-up process (problems with daily rescheduling inducing changes even in long-term time horizon). The first approach is related to the exogenous changes, as it focuses on an individual's reaction and adaptation to external factors/policies. Conversely, the bottom-up chain of influence concerns the endogenous changes, as it examines how people learn from their behavior and reconsider their activity schedule. Some cases when an endogenous change is induced are the following: First, when traveling, people will see new locations, which they may decide to explore. This may result in changes in the current activity patterns, as reinforcement of beliefs and update of the memory trace may take place. Second, people may be passively exposed to advertisements or other information sources. Third, information exchange and adjustments of the aspiration values may occur, through social contacts. A person's desire to comply with the behavioral patterns of a social network can lead to exploration of new options. Finally, as the environment is non-stationary, it is realized that differences usually exist between preference (an ideal state) and choice (an actual state). These discrepancies can be called stress and give rise to emotions that can trigger choice change. Most people's behavior is characterized by inertia, as they avoid making perpetual, marginal adaptations to their choice behavior, in order to keep themselves at their optimal (utility-maximizing) state. Thus, stress can be regarded as a disutility. However, if accumulated stress goes beyond some threshold, individuals will be actively engaged in trying to reduce it. This may involve short-run changes, drastic changes (in order to enhance the prospect of exploring new alternatives) or even more dramatic decisions (e.g. moving house or finding another job). To sum up, in the suggested framework, endogenously triggered dynamics are examined through the prism of dynamic choice sets formation, stress and aspiration values. Of course, it is taken into account that the validation of any dynamic model of activity-travel patterns cannot be similar to the validation of a static model. There is a need to broaden the methodological horizons and we should be satisfied with a partly estimated and expert-knowledge based model. Currently, numerical simulations are conducted in order to

assess the performance of the model. Thereafter, the model will be calibrated with empirical data.

### Simulating Spatial Growth Patterns in Developing Countries: An Agent Based Modelling Approach

*Justice Inkoom (University of Cape Coast)*

In Sub-Saharan Africa, rapid urban growth is characterized by prolific expansion of unplanned (informal) structures, and unguided spatial expansion. These unguided expansions by human agents have outstripped the regulatory capacities of central and local government. Governmental institutions in their bid to find solutions to the unguided expansion in unplanned use of land need to invest in the modelling process of what influences the spatial decision and role of human agents in the growth of informal settlement. The objective of the study is to simulate spatial growth pattern of settlements in the Shama district using an agent-based model. The study was conducted within a framework of NetLogo. The NetLogo assisted to incorporate and simulate driving forces that affect location decision-making by households and the growth of informal settlement. A preliminary survey was conducted to obtain household location decision preferences. The development of unplanned settlement has been a function of land price, proximity to economic centre's, household economic potential, and the location decision-making patterns of households. The exploratory analysis found particularly that majority of spontaneous development took place on areas liable to floods suggesting that some structures fall outside the required building regulations. The application of the proposed model indicates its potential to improve urban planning policies and decision-making processes in emerging cities of developing countries. Also, the result of the simulation suggests potential preferential location for residential development. The research justifies an approach in the area of simulating urban dynamics with agent-based models.

### Gully Erosion Mapping Using Remote Sensing Techniques in the Capricorn District Municipality, Limpopo Province, South Africa

*Nthaduleni Samuel Nethengwe (University of Venda), Ndifelani Mararakanye (Department of Agriculture, Forestry and Fisheries)*

Gully erosion is a major global environmental problem confronting land and water resources. In order to address it, the spatial extent of the problem has to be established and monitored. Recently in South Africa, gullies have been mapped using manual digitizing. However, this process is time consuming and laborious, as such it will be expensive to repeat for monitoring purposes. This study investigated Imagine Objective (IO) and Seed Tool (ST) mapping techniques in order to address the problems of manual digitizing. IO maps gully by extracting them from SPOT 5 satellite imagery using functionalities such as threshold and clump, probability and size filters. ST maps gullies individually by visual interpretation of SPOT 5 satellite image and growing the seed pixel



automatically. The kappa accuracy was used to assess the performance of the techniques against manually digitized gullies. IO maps yielded a kappa accuracy of 0.52 whilst ST yielded an accuracy of 0.86. Both techniques were found to be very useful for future studies. IO is particularly useful for identifying priority areas and ST is useful for detailed investigation especially in a smaller area. KEY WORDS: Gully Erosion, Mapping, Imagine Objective, Seed Tool, Capricorn District

## C08.28-03 - Modeling Human and Physical Processes 2

*Chair: Pavlos Kanaroglou, Jinfeng Wang*

### Geographical endowment and agriculture in China

*Xia Haibin (East China University)*

For a populous developing country like China, the importance of agriculture is self-evident. In fact China is still a large agricultural country so far. Geographical endowment played a decisive role in agricultural development. This paper selects three key time points which are the late Qing dynasty representing the Chinese agricultural civilization time, the beginning of the reform and opening up representing the Chinese industrial civilization time, and the tenth year in the 21st century representing Chinese early information era. As times change, Contribution of geographic endowments on agricultural productivity is not the same. The reason is that people improve the ability to use natural resources with the development of industrialization in China. Integrated value of geographical endowments in different times can well explain the Chinese agricultural spatial distribution, which determines the distribution of the population in China. In Qing dynasty, the population center gravity located the zones of the south of the Qingling mountain and Huaihe river. And the zones of the north of the Great Wall were pastoral areas. Since China enter into the industrial society, the population center gravity in China shift to the southeast of Hu Huanyong population line.

### Farm families on agricultural holdings on the South Downs, England: Modelling the factors affecting mid-20th continuity of occupation

*Nigel Walford (Kingston University)*

During the 20th century British agriculture underwent a series of upward and downward economic trends when productivity and output increased or decreased. The Second World War II provided a stimulus for growth and heralded a new era of state intervention that persists in various forms to this day. Following WWII the emphasis was on increasing production, economic efficiency and rationalisation brought about financial and other forms of support. This paper focuses on the decades around WWII when profound changes in the structure and operation of British agriculture occurred, and makes use of a collection of data sets linked through geography that provide unparalleled information on individual, identifiable farms. Anticipation of a war time emergency prompted the national government in the late 1930s to become concerned about the need for information relating to agriculture with the intention of implementing measures to revive this flagging industrial sector. This culminated in the National Farm Survey (NFS) of all farmers with over 5 acres (2.03ha) of land that was carried in 1941-43 in order to marshal information that would enable the government to tackle the problem of food shortages. The NFS is an unrivalled source of information about individual farms that was released to

research and the public through the National Archives in mid-1990s. It comprises three interrelated sets of documents: the 1941 Agricultural Census Returns; Ordnance Survey topographic maps annotated with farm boundaries; and a Primary Record of survey that details the state of each farm and includes an assessment of the farmer's managerial ability. The NFS documents and data on farm occupancy obtained from electoral registers have been captured digitally in a spatio-temporal database of the statistical population of some 500 farms in parishes across the South Downs in South East England. This paper draws on information for these farms together with related geospatial data in order to examine the contribution of a series of spatially uneven variables towards continuity of occupation of farms by the same family during the post-World War II decades. The variables relate to agricultural production, farmer characteristics, physical environment and farm structure and layout, and include farm area, degree of mechanisation, product mix, farm fragmentation, altitude, aspect, farmer's age and managerial ability. A series of spatial analysis techniques are employed to explore possible causes for spatial variability in continuity of occupation by the same family through the post-war decades.

### Improving crop yield simulations by taking into account effects of field heterogeneity

*Anja Stadler (University of Bonn), Matthias Langensiepen (University of Bonn), Moritz Kupisch (University of Bonn), Frank Ewert (University of Bonn)*

Crop growth models are potentially capable of calculating crop growth and yield realistically, provided they are properly parameterized, calibrated and validated using data from field experiments. Plant growth is often characterized in such models based on simplified approaches and assuming homogeneous soil properties within a field. We hypothesized that taking into account effects of soil heterogeneity on plant water and nutrient uptake in these models improves their predictive quality at the field scale. This approach is highly attractive for implementation in the context of precision farming, which is aimed at adapting crop management to spatial heterogeneities in environmental conditions. Combining precise farming techniques with spatially explicit crop modeling for decision making and scenario analyses is likely contributed to reduce the greenhouse gas emissions from agricultural areas and to optimize biomass growth and yield. The crop growth model GECROS was applied using information from winter wheat and sugar beet field trials carried out near Jülich, located in the central western part of Germany. These fields are all characterized by strong spatial variability in soil conditions and managed according to standard agronomic practice. GECROS was calibrated separately for each winter wheat and sugar beet cultivar grown on these fields by adjusting the respective parameters with the help of crop physiological measurements at point level. The soil model was parameterized for different field sample points (6-8 per field) for which measured information about soil physical characteristics was available to account for the spatial heterogeneity in soil conditions within each field. The crop growth model was then

tested whether it could reproduce the observed spatial patterns of crop growth and development in the selected fields through consideration of the spatial variability in soil properties. First results show, that GECROS simulates the measured data of phenological development, biomass, leaf area index and yield under heterogeneous field conditions in a realistic way. Without the adaption of the soil model to the variable soil properties, the crop growth model is not able to reproduce the observed heterogeneity of crop growth within a field. Spatio-temporal variability in soil water distribution and its effects on nitrogen availability are likely the main factors causing spatial variable crop growth within the selected fields of the study region. Considering variable soil water transport and related nutrient dynamics in model scaling to the field level will thus improve the predictive quality of the crop growth model at the field scale.

### **A General Understanding for the Food Security Situation of North Korea based on Remotely Sensed Data**

*Hongyan Zhang (Northeast University), Lei Wang (Northeast University), Xiaohui Yang (Northeast University)*

North Korea is usually mysterious for the world. Its food security issue is highly concerned by the international communities. In this paper, based on the data from GIMMS, the variables of dynamic yield estimation models for the crops were determined after analyzing the relations between actual crop yields and critical period of growth half-month NDVI of rice and maize in 1995-2005, and the models were established to estimate the grain production between 1982-2005. Based on the meteorological data from 27 observed stations of the country in past 30 years, we calculated the climate productivity in North Korea with Thornthwaite Memorial model and select some indexes, which can objectively reflect the food security situation of North Korea, to build food security evaluation system aiming at reveal the food security of crop estimation and the food security of the potential productivity, it can provide theoretical evidences for international assistance and emergency. The results show that: the linear fitted equation between the NDVI cumulant of second half month of September and the rice production is good, it can be the yield estimation model of rice. The linear fitted equation between the NDVI cumulant of first half month of October and the maize production was the yield estimation model of maize. The comparison of the crop yields estimated by the models and the actual crop yields showed that the relative errors of estimated yields were nearly 12%. The ratio of crop estimation yield and crop potential productivity were mostly between 10% to 20% and individual year was up to 30%. It showed that the North Korea's grain production still had much room for improvement. Finally, This study is to assess the status of food security of North Korea from the year 1982 to 2006. An integrated index of food security, including the food self-sufficiency rate, per capita share of grain, grain production levels, per capita arable land, fluctuation coefficient in grain production etc is constructed for quantitatively assessing the status of its food security by taking the coefficient of food security assessment method. Based on the facts above, the results of

evaluation revealed that the North Korea' grain production was in unsafe or critical safe, but in the ideal situation, it were safe overall, and could sufficiently meet the needs for the citizens in North Korea.

## C08.28-04 - Spatial Data Mining and Knowledge Discovery

*Chair: Prof Yee Leung, Professeur Ali Bennasr*

### Remote Sensing Image Mining for Mapping Coastal Wetlands Changes in Segara Anakan Lagoon, Central Java, Indonesia

*Nur Mohammad Farda (Gadjah Mada University), Projo Danoedoro (Gadjah Mada University), Hartono Hartono (Gadjah Mada University), Agus Harjoko (Gadjah Mada University), Udo Nehren (Cologne University of Applied Sciences)*

During the last decade, satellite remote sensing imagery is the source of the most significant recent image database in observing the Earth's surface especially coastal wetlands. Humans will also be trouble, and even almost impossible to find information based on knowledge and patterns in the images when dealing with large data collections. This situation makes the "knowledge gap" in the process of reducing and extracting the information from remotely sensed image. In another side, the symptoms of climate change is also affected from the changes that occur in wetlands, with the release of carbon from slash and burn wetlands forest, drying the wetlands, and land use change that are not controlled in the wetlands. Remote sensing here will play important role to mapping coastal wetlands changes. According to above issues, this research have an objective to develop framework and image mining technique that are suitable for mapping coastal wetlands by considering fuzzy objects. This research study is expected to produce framework and techniques of remote sensing image mining in order to mapping coastal wetlands changes. Keywords: remote sensing, image mining, coastal wetlands changes.

### Geospatial methods for collective urban sensing

*Thomas Blaschke (University of Salzburg), Bernd Resch (University of Osnabrück), Günther Sagl (Research Studio Austria iSPACE)*

Geospatial technologies have been becoming better known to a general audience due to virtual globes such as Google Earth. Despite increasing spatio-temporal resolution and availability of image data, and greater access to data and derived products, the understanding of urban systems will not be satisfied by remote sensing as a stand-alone technology. The combination of in situ data and mobile sensor derived information supports new applications when addressing human-environment interactions, particularly in Public Health and for security and safety applications. Coincidentally, the miniaturization of components has enabled sensor systems to be nearly invisible, and sometimes wearable, so that individuals can move around and interact freely, supported by their personal information domain. We hypothesize that fine-grained urban sensing

coupled with well-established remote sensing mechanisms greatly enhances our knowledge of the environment by adding objective and non-visible data layers in real-time. These systems help us increase our capacity to observe and understand the city, and the impacts on and by society. This seems to be a very desirable state, as more accurate data about local air temperature, atmospheric humidity, air pollution, and traffic flow can positively influence areas such as public health, traffic management and emergency response. Apart from this information enrichment, accurate sensor measurements also have a much broader influence: considering, for example, that 'air quality' is only a surrogate for the effects of pollutants on humans, which make a fine-grained air quality map a very sensitive information layer. We will describe some of the technical realms aiming to support a better understanding of the urban environment and 'ubiquitous-' or 'collective-sensing' and the visions of 'people as sensors' or 'citizen as sensors' may become more realistic. We claim that while useful and important, traditional airborne and spaceborne remote sensing provides limited 'snap-shots' of urban environments that are (currently) unable to fully capture urban dynamics. Urban areas are structurally complex 3D environments that evolve with time. Furthermore, the numerous activities within these environments are typically more dynamic than their physical structure. In an effort to better understand urban environments, we discuss two currently separate technologies: (i) remote sensing and (ii) in situ sensing. At the moment, these two technologies remain predominantly separate but lay a foundation for a common use. A critical part of making sensors webs useful is an adherence to good measurement protocols: understanding the sensor, its source area and its siting, so that the user can understand what the measurement represents and how that fits with a particular application.

### Adding the spatial dimension to the assessment of predictive performance of and variable importance in statistical and machine-learning models

*Alexander Brenning (University of Waterloo)*

Tapping the potential of predictive methods developed in the fields of computational statistics and machine learning in geographical applications has just recently begun. While these relatively novel methods offer new opportunities for modeling nonlinear and interactive relationships and dealing with high-dimensional problems, new challenges as well as opportunities arise due to the presence of spatial autocorrelation in geospatial data. Spatial resampling-based methods (cross-validation, bootstrap) have recently been proposed to assess the performance of such complex models in supervised spatial classification and regression, revealing in some geospatial applications a lack of spatial transferability due to overfitting. Similarly, permutation-based measures of variable importance have been adapted to the context of spatial prediction using spatial resampling, providing a focused assessment of the utility of predictor variables in spatial modeling. This contribution extends this approach to exploring resampling-based predictive performance and variable importance as a function of distance between

training and test samples. This creates a novel tool for the explicitly spatial assessment of prediction models as well as for the characterization of spatial variables. The tool is applied to landslide susceptibility modeling, remotely-sensed land cover classification and spatial interpolation in precision agriculture. In spatial interpolation, the proposed computational measures are compared to traditional geostatistical approaches, specifically the semivariogram for characterizing spatial relationships, and the kriging variance for quantifying predictive uncertainty. It is concluded that the proposed novel spatial accuracy assessment and variable importance tools provide insights that were previously only available in the narrow context of parametric geostatistical methods, and offers these insights in the broader contexts of supervised classification, regression and interpolation. The proposed methods are also relevant to other situations in which autocorrelation occurs in a continuous or discrete space, such as time series, lattice data and data on networks.

#### **Landscape scale digital soil mapping using field scale geophysical sensing data**

*Karsten Schmidt (University of Tübingen), Thorsten Behrens (University of Tübingen), Ulrike Werban (Centre for Environmental Research), Thomas Scholten (University of Tübingen)*

This talk presents and compares multiple approaches to integrate field-scale geophysical sensing data (EM and Gamma) into landscape scale DSM. Hyper-scale digital terrain features were used as the only predictors for building the regression models. The following four concepts were compared: Benchmark: build and apply a landscape-scale soil property model based on the soil samples using terrain features (no geophysics) MoreSoil: i) build and apply a patch-scale soil property model based on the soil samples using the interpolated geophysical data ii) build and apply a landscape-scale soil property model based on the extended soil data pool using terrain features ExGeo: i) build a patch-scale soil property model based on the soil samples using the interpolated geophysical data ii) build and apply a landscape-scale geophysical model based on the interpolated geophysical data using terrain features iii) apply the patch-scale soil property model on the extrapolated (landscape-scale) geophysical data ExGeoAdd: i) build and apply a landscape-scale geophysical model based on the interpolated geophysical data using terrain features ii) build and apply a landscape-scale soil property model based on the soil samples using terrain features and the extrapolated geophysical data as additional predictors Eighty calibration samples covering the feature space of the interpolated geophysical sensor data were used for building the soil property models. Validation was based on 20 samples outside the sampling areas covering the geographical space. Validation shows that neither MoreSoil nor ExGeo show any benefit compared to the Benchmark. Compared to this, the ExGeoAdd concept returns a boost in R<sup>2</sup> validation accuracy of up to 11 %. This strong increase clearly shows that it is crucial how the field scale geophysical data is included in the landscape scale modeling

framework and that field scale geophysical data can successfully be used for landscape scale DSM.

## C08.28-05 - Spatial statistics and Applications

*Chair: Yee Leung*

### Evaluation of spatial autocorrelation by the concept of intrinsic spatial distance

*Yee Leung (University of Hong Kong), Deyu Meng (Xi'an Jiaotong University), Zongben Xu (Xi'an Jiaotong University)*

This paper proposes the concept of intrinsic spatial distance (ISD) for the study of spatial autocorrelation between any two points in space. It is a distance measure that takes into account the nearness of two points with respect to their physical and attributes distances. Associated with the concept is the ISD algorithm constructed for the measure of the ISD. Under the concept, two points in space are related through a transitional path linking one to the other. The smaller is the ISD, the stronger two points are auto-correlated. It is theoretically argued and empirically demonstrated that the ISD is not predisposed in favor of the first law of geography but it considers directly the varying situations of nearness in physical distance and attribute distance in order to derive the extent to which two points are spatially auto-correlated. Moreover, the information uncovered by the ISD is more elaborate than that revealed by the Moran's I, the local Moran's I and the semivariogram. It gives a meticulous account of relatedness in both the local and global contexts. It is apparent that in further research, the proposed approach can be extended to the study of spatial autocorrelation in the 3-dimensional space. More importantly, it can be extended to the study of spatial autocorrelation over space and time. The ISD concept is also general enough to study relationship with respect to multiple attributes.

### Mapping of Above-Ground Phytomass of Lichen Tundra Using Remote Sensing Methods

*Yurate Plyushkyavichyute (ETH Zurich), Elena Golubeva (Moscow University), William Gareth Rees (University of Cambridge), Olga Tutubalina (Moscow University)*

Assessment of the supply of Above-Ground phytomass is one of the challenges in addressing to monitoring climate-induced changes. Nowadays using the Remote Sensing methods this goal is achievable. The main aim of the research project was to find the possibility of using very high resolution (QuickBird) satellite images for mapping the supply of Above- Ground phytomass. The research work is focused on three sites of the Kola Peninsula with diverse vegetation types. Therefore were gathered during field works different vegetation samples of phytomass for the further analysis. Optical properties of tundra landscapes in Kola Peninsula are diverse and after analyzing all possibilities were determined, that the main types of vegetation, which values of supply of phytomass can

be easily distinguish- are the lichens. The main correlation parameters were NDVI and Average spectral reflectance value in the visible spectrum. Based on results by using ground spectroradiometry data and ArcGIS programs the maps of above-ground phytomass on the key sites were compiled from QuickBird image. The future goal is to use this method for the other vegetation types. Therefore discover the new parameters, which will allow to mapping the supply of Above- Ground phytomass for the whole vegetation types in Forest-Tundra Ecotone. This research work is a part of PPS Arctic-the IPY project which investigates current status and last changes in the circus-arctic tree line zone. This study is financially supported by the Benefits Russo-Norwegian project of the Norwegian Research Council (OST 185023/S50).



# C08.29

## Mountain Response to Global Change



## C08.29-01 - Environmental history and climate change in the high mountain ecosystems of monsoon Asia during the late Holocene

*Chair: Jussi Griebinger*

### Variations of the Asian Summer Monsoon system derived from millennial juniper tree-ring chronologies.

*Achim Bräuning (University of Erlangen-Nuremberg), Bao Yang (CAS), Lily Wang (CAS)*

Asian junipers provide millennial or even multi-millennial archives for the reconstruction of moisture conditions in High Asia. Precipitation reconstructions are usually derived from local or regional tree-ring chronologies that may reflect long-term local precipitation variations, but rarely take spatial changes of atmospheric moisture sources into account. We study tree growth variations within a unique tree-ring network of 15 juniper sites covering the northern, eastern and southern fringes of the Tibetan plateau, covering the climatic realms of the eastern and southwestern branches of the Asian summer monsoon season, respectively. By applying Rotated Principal Component Analysis (RPCA) for different time slots, we evaluate temporal changes in the similarity patterns of ring-width variations and investigate tree growth behaviour during prominent climate excursions like the well known drought period of the 1920s, the coldest phase of the Little Ice Age period and the Medieval Climatic Optimum. Furthermore, we test the temporal stability of climate-growth relationships to see if the influence of monsoon variations on local tree growth underwent changes during the late 20th century. In addition, the spatial extend of drought periods is mapped from the chronology characteristics of the tree-ring network. Finally, we study the temporal stability of certain frequency bands in the chronologies by wavelet analyses and evaluate spatial changes in characteristic frequency bands related to variations in summer monsoon patterns.

### Tree ring recorded May–August temperature variations since A.D. 1585 in the Gaoligong Mountains, Southeastern Tibetan Plateau

*Ze-Xin Fan (Chinese Academy of Sciences), Achim Bräuning (University of Erlangen-Nuremberg)*

High-resolution proxy data are still scarce in the southeastern Tibetan Plateau, which limit our understanding of climatic variability before instrumental records. In this study, we developed 595-year tree ring-width chronology from *Larix speciosa* near the timberlines of the Gaoligong Mountains, southeastern Tibetan Plateau. Ring-width site chronologies and a well-replicated regional chronology (RC) showed significant positive correlations with warm season temperatures from May to August. Using RC as predictor, we

reconstructed mean May/August temperature for the study region that extends back to A.D. 1585. Cold conditions prevailed during the periods 1600s, 1620'30, 1640'50s, 1700s, 1730'40s, 1760s, 1810'20s, 1850s, 1900'10s and 1955'70. Warm episodes occurred during 1610s, 1660'1680s, 1710'20s, 1750s, 1780'90s, 1820'40, 1920'50 and 1980'present. Spatial correlations with gridded land surface temperatures revealed that our reconstruction represents regional temperature signal for the southern Tibetan Plateau. Comparison with other tree ring-based temperature reconstructions from surrounding areas implies a high degree of confidence for our reconstruction.

### Altitude-dependent Characteristics of tree-ring width of *Sabina przewalskii* Kom in the Western of Qilian Mountains and its linkages to the Atlantic Ocean climate variability

*Chun Qin (Chinese Academy of Sciences), Bao Yang (Chinese Academy of Sciences)*

The western Qilian Mountains lie close to the boundary between the continental westerly-dominated west and the monsoon-dominated east. Due to lack of historical documents and other proxy data, Qilian juniper is unique proxy record. Many studies were carried out with respect to the tree ring-based climate reconstructions. However, little is known about the altitude effect on ring width/climate relationship. In this study, we attempted to clarify whether there is a difference in tree growth-climate relationships along an altitudinal gradient in a mountain slope in the western part of the Qilian Mountains. For this purpose, we collected 140 trees from the mountain slope. The relationship between tree-ring width and age, temperature, precipitation were investigated based on four elevations ranging from 3000-3500 m. In addition, we established a moisture-sensitive chronology, and found out that there is a good relationship between tree growth and NAO SST variations.

### Climate-induced changes in geomorphological processes in the high mountains of Taiwan

*Margot Böse (Universität Berlin), Dirk Wenske (Universität Berlin)*

Present-day geomorphological processes in the mountainous landscape of Taiwan are driven by three main factors: 1) seismicity and uplift, 2) humid monsoon climate including typhoons, and 3) the resulting steep slopes. Though these factors seem very dominant, the results of recent studies provide evidence that hillslope processes are variable in space and time. On short time scales, erosion is related to high-magnitude rainfall events, often but not exclusively linked with typhoons, and sometimes its impact is only local. The combination of earthquakes and subsequent typhoons increases the propensity of slopes for landslides. Consequently, interdependent slope and river systems show an unsteady, more or less chaotic behaviour, making it difficult to identify phases of specific activity from few archives. Slope-riverbed coupling is a major research issue in the attempt to learn more about present-day processes. Even today, processes

change with altitude, the highest part of the mountains being less affected by climatic forcing. Reduced precipitation above the monsoon circulation provides less soil moisture. In addition, the slope processes depend also on the catchment situation, either belonging to the short eastward directed valleys with strong headward erosion or the westward directed valley systems with much reduced present-day hillslope processes and the preservation of older landforms such as glacial landforms and sediments. Climate changes in the Late Quaternary may have influenced erosional activities. The preserved archives are sparse, but detailed studies of sediment properties as well as dating by means of OSL protocols and the radiocarbon method have brought insights into the timeframe of varying processes. During the Late Holocene a phase from about 4 to 2 ka was characterised by increased slope activity relative to present-day conditions in high altitudes above 3000 m asl, possibly including a phase with wildfires, as charcoal has been found repeatedly. In the non-glaciated mid-altitudes, a reduced slope activity in late MIS 4 / early MIS 3 appears possible; silt was deposited in a depositional sequence of a terrace remnant. This silt layer is referred to as loess-like sediment, as no present-day processes form similar deposits in this environment. This suggests a drier climatic phase with transport and deposition of exclusively fine-grained material. By contrast, the presented evidence points again to a phase of high slope activity around 38.5 ka. The climatic LGM is still not well documented, whereas at least in altitudes above 3200 m glacial slope formation and glacial deposits such as terminal moraines and boulders deposited by glaciers are dated to the Late Glacial / Holocene transition. Besides the strong internal geological factors, Late Quaternary climate change has also played a role in changing erosional activities in Taiwan.

## C08.29-02 - From Himalayan Dilemma to Climate Change Dilemma? Challenges for High Mountain Development 1

*Chair: Hermann Kreutzmann, Teiji Watanabe*

### Climate Change and Social History of Mountain Regions in the Modern Period

*Jon Mathieu (Universität Luzern)*

During the recent decades, the evidence-based reconstruction of past climates has progressed rapidly. For the modern period since the sixteenth century, used as reference period in the present paper, the available data have multiplied and been processed in sophisticated ways. Together these research efforts have resulted in a high-resolution portrait of climate change during the last five hundred years. At the same time, however, the knowledge about impacts of climate change on past societies has not progressed very much. We are still lacking basic empirical and analytical knowledge of many regions and periods. Moreover, there are still fundamental discussions as to the adequate method of impact assessment. How can the effects of climate variability on livelihoods and development be examined in a truly interdisciplinary way? In mountain regions this unbalanced state of the art is perhaps even more conspicuous than in other regions. Most scholars start from the assumption that upland societies are particularly sensitive to climate change. The assumption appears to be safe, yet it is not easy to provide relevant and systematic proofs for it. The paper deals with the issue on different levels: it points at current scholarly contributions to the field, discusses methodological strategies and presents selected regional evidence. In general, it aims at sharpening our sense for present and future relationships of climate and mountain society, by critically looking at aspects of its known historical past.

### Climate change and Natural Hazards: Probable Impacts in the Upper Kali Gandaki, Central Himalayas (Nepal)

*Monique Fort (Université Paris)*

The consequences of climate change have recently become a major concern, especially in mountain regions. In the Himalayas, this issue is particularly debated, with different outcomes depending on the type of primary data and scaling methods utilized, and the areas considered along this 2500 km long mountain range. In the last decades, glaciers decline and their consequences on natural hazards and water resource have been the focus of most studies. Precipitation nature (rainfall, snowfall), amount and seasonality were also considered, with more uncertainty in their evolution hence in their impacts. Other parameters such as ground ice are less considered yet in the upper Himalayan valleys they might be significant and affect local populations. Our focus is on upper

basins of Central Nepal. There, the Himalayan range is at its narrowest with, on very short distance, strong contrasts between low valleys and high peaks, between monsoon and arid environments. Settlements are concentrated either on quaternary terraces or along valleys and river junctions, mostly relying economically on irrigated crops, trade and tourism. We focus on the upper Kali Gandaki, characterized by a semi-arid, continental climate. The impacts of climatic change may appear in different ways. Firstly, despite limited glacial cover, the possibility of glacial outburst flood may again occur from the Man Shail such as the one in the late 1980?. Secondly, increasing ground instability is also expected along north facing, shaly slopes such as in the vicinity of Muktinath, hence triggering earthflows and occasional debris flows activity that might affect the new road and growing settlements. Thirdly, rock avalanches induced by permafrost melting of the steepest cliffs (i.e. Nilgiri North face) may also develop and impact the valleys floors of tributaries and Kali Gandaki (see '1000 yr-old rock avalanche remnants between Jomosom and Tukuhe). Fourthly, water availability in the near future is more difficult to predict, due to possible change in the spatial influence, intensity and timing (onset and duration) of the monsoon precipitation, all parameters poorly constrained by the models. Any change in precipitation amount may affect groundwater reserves, hence springs discharge. The combination of higher snowfall and rapid melting may also favour the occurrence of destructive flash floods with direct impacts on irrigation canals and fields. Eventually, the overall potential increase of natural hazards may jeopardize any efforts of opening these upper valleys and their integration to the rest of the country.

### Irrigation Problems in Hussaini Village within the Valley of the Karakoram Mountain Range

*Kazuo Mizushima (Nihon University)*

This report deals with the problem of irrigation in Hussaini village and also with the development of a commercial economy. Hussaini village, comprised of the ethnic Wakhi minority, is located on moraine sediment of the Gulkin glacier. The Wakhi economy depends on raising transhumance livestock and the irrigational farming of rotated wheat and bean crops. Although the geographical environment of the Hussaini village does not allow for easy access to sufficient irrigation water even with traditional irrigation farming, water shortages are not much of a problem. In the 1990s, a goods/money economy penetrated the geographically remote mountainous area where the uncivilized Wakhi had settled. Hussaini village coped with the situation, as did other Wakhi villages. Under the guidance of AKRSP, Hussaini village started potato cultivation, selling the potatoes to obtain the cash necessary for a transition to a cash-based lifestyle. It is noteworthy that Hussaini village had no tourist facilities and thus could not obtain income from tourism. The village was left to depend on potato cultivation alone. Ample irrigation water is a requisite for sustaining the volume and quality of cash crops in the dry mountainous area directly impacting cash flow. However, the problem of chronic water shortage in Hussaini village presented a serious challenge for the expansion of the potato cropland. As a

solution, Hussaini village decided to draw water from the end of the Gulkin glacier, and to transport the water approximately 1 km to the existing five irrigation ditches at the water intake point. The method involved installing steel pipes to serve as an aqueduct. After Hussaini village got money from the Pakistani government to purchase the pipes, the three pipes were placed at the end of the glacier. In 2005, water drawn through the steel pipes poured into irrigation ditches. The long-sought solution for the irrigation water problem of Hussaini village was finally found. This report clarifies the contributing factors for the shortage of irrigation water in the vast alteration of irrigation farming in the Hussaini village and the method that was adopted for resolving this issue.

### **The Current Status of Lifestyle and Industry in the Wakhan Area of Tajikistan**

*Yasuhiro Ochiai (Nihon University)*

Wakhan lies in the southern part of the Pamirs beyond the Panj River, which serves as a border between Tajikistan and Afghanistan. The Tajikistan Wakhan area covers the main part of Ishkashim, the southernmost area of Gorno-Badakhshan Autonomous Oblast. The inhabitants of the area are called the Wakhi, and they are spread out in the four countries of Afghanistan, Pakistan, China, and Tajikistan. Although the people of each country originally have had similar culture, the separation of their domiciles has given rise to differences in each one's lifestyles. Especially in Tajikistan, since its inhabitants have lived through the era of the Soviet Union and have witnessed drastic changes in its economy, they show peculiar patterns and face several problems in industry and lifestyle. The traditional irrigated cultivation and transhumance styles are still prevalent in Tajikistan Wakhan area. Recently, however, the innovations in the cultivation of cash crops, and selling of animals and dairy products have been general status in this area, most of the inhabitants are not able to make an adequate living out of agriculture. As the result, with the exception of a few people who are able to find employment in other industries in the local area, plenty of youth have emigrated or migrated to cities in Tajikistan or Russia. Promoting innovation in tourism is most effective way of increasing opportunities for the local people to earn a decent living, as regional resources for tourism (e.g. the magnificent landscape of the Pamirs, the unique culture of the Wakhi, historical ruins, hot spas, and so on) are abundant. Lately, foreign visitors to this area are increasing, and several 'home stay's, which are the small lodgings kept by villagers at their private houses, have been established in each village. Although this area shows great promise for development of new industries connected to tourism, it faces several problems in the promotion of the tourism industry. Improvement of infrastructure (e.g. provision of electricity and drinking water, paving of roads, and improvements in the transportation system) is necessary in order to construct suitable lodging establishments and attract foreign tourists. Moreover, for promoting individual and sustainable development of tourism, upholding traditional agriculture styles and the original culture of the Wakhi and encouraging the formation of independent tourism organizations are important.

## C08.29-03 - From Himalayan Dilemma to Climate Change Dilemma? Challenges for High Mountain Development 2

*Chair: Hermann Kreutzmann, Teiji Watanabe*

### Himalayan pastures are overgrown on this side: Land use history of Nepalese transhumant sheep herders.

*Kazuyuki Watanabe (Ritsmeikan University)*

Pastoralism has been misreading frequently. It was seen as causes of forest degradation or grazing of goat promotes desertification. Also, in recently, as global warming started to be alarmed, discourse of forest degradation influenced environmental policies, grazing of livestock could be banned or restricted for protection of forests. In order to revise such a discourse, contribution of historical ecology is considerably important. As studies of 'slash and burn cultivation creates increasing of forest'. Geographical data of land use or historical changes of distribution of forests are should be exemplified where and how forests are increasing or decreasing. In addition of land use, change of the land users is also important. In case of Himalaya, population pressure has been seen as main cause of forest degradations. However, Neo-Malthusian discourse faces empirical phenomena. Recently, decreasing of population is faster than increasing by migration to cities or oversea employment. This paper aims land use history of grazing pasture. Using maps of 1960 and 1990, land use change of pastures are shown. Fieldworks are also carried out. Users of the pastures are compared 1998 to 2010. Research is carried out among transhumant Sheep herders of East Nepal. They have a village in the midland mountain (1300m), and migrate from summer pasture (4700m) to winter pasture (650m). As a result, it is considered that their use of pastures is far less below the limit of over grazing. Reclamation of forest lands or establishment of villages carried out even before past 40 years especially among the midlands areas where the sheep herders use as their village and seasonal pastures. Users of pastures and numbers of gazing livestock are decreasing considerably (-33%) between 1998 and 2006 due to retirement sheep herders. Rather than forest degradation, abandoned use of forest is more important problem. Abandoned fields and pastures are also emerged. They are almost forest because succession is rapidly going on. This is not sustainable for sheep herders. Poisonous grass grows thick on migration route, where sheep herders stopped their uses, and emergent of worm sucks the blood of their sheep. So, nature of the pastures is maintained when it is used by farmers and herders appropriately. Effect of global warming is also not simple for pastoralists. In case of Nepalese pastoralists, where monsoon rains come considerably, serious problem is not expected. Rather, for the Tibetan pastoralists, where monsoon rains blocked by Himalayan mountains, water supply for seasonal pastures could be decreased, if rise of temperature would cause meltdown of glaciers. So, geographical variety should be considered by extended fieldworks.

### Landscape vulnerability and rehabilitation issues to the context of hydropower projects in Garhwal region, Himalaya

*Vishwambhar Prasad Sati (Govt. KRG PG Autonomous College)*

The Himalaya enjoys with rich bio-diversity and provides wide varieties of natural resources including the life sustaining water to the Indian sub-continent. Significant increase in the number of proposed hydropower projects has been witnessed in various river basins. During the 1980's, there were 22-hydropower projects proposed in the areas of dense human settlements and productive agricultural patches. Further, mushrooming hydropower projects started immediately after Uttarakhand got statehood. Currently, there are 220-power projects proposed with capacity of 30,000 MW electricity generations. Out of which 52 large, 36 medium and 132 are small-scale projects. These projects are certainly going to engulf the already marginalized productive agricultural fields, thus implying more hardship to local population in times to come. Landscape of Garhwal region is vulnerable as it is ecologically fragile, geologically unstable, and tectonically and seismically active. Here, ecological and rehabilitation issues, due to the construction of hydropower projects, are renowned. Most of the villages are located along the river valleys. Due to construction of dams, natural resources base - agricultural land, forest land, and grass land are being depleted. It has negative impacts on the culture - distinct identity, language, customs and location, and on the ecology - fauna, flora, avi-fauna as above 65% geographical land is forested, although, hydropower projects lead to the economic development, if properly commence. The Garhwal Himalaya is witnessed to a large-scale agitation against the construction of power projects by the local people and the environmentalists due to mismanagement and poor policy measures. Lacking in proper site selection and compensation packages further accentuated it in the Garhwal Himalaya. This article looks into the issues of ecological, rehabilitation and landscape vulnerability. It also focuses for the better policy frame and implementation of the hydropower projects. Keywords: Rehabilitation issue, landscape vulnerability, hydropower project, agitation, Garhwal region

### Mountain Poverty and Climate Change in the Nepal-Himalayas

*Alexandra Titz (Institute of Geography)*

Various scientific studies suggest that mountain environments are particularly sensitive to climate change and it is assumed that mountain environments are likely to be amongst the most severely affected regions. Nepal, where fragile mountain environments share the total land area in large parts, is among the poorest and least developed countries in the world. Almost 84 percent of the population lives as subsistence farmers in rural areas. Agriculture is the principal source of food, income, and employment for the majority of the rural population, particularly the poorest. Therefore, mountain people will feel the most adverse effects of climate change on various conditions affecting agriculture in particular. Having only marginal coping and adaptation strategies, they are particularly vulnerable to climate change. Impacts could be even more severe for women and marginalized,

socially excluded groups. Climate change and its various impacts on agricultural resources will likely exacerbate the poverty situation and continue to hamper the economic growth. Nevertheless, there do still exist gaps in understanding the nature of both ecological and societal vulnerability to climate change impacts and opportunities for adaptation measures to increase resilience on a regional and local scale. Since mountain people in the Nepal-Himalayas always had to adapt to climatic variability, their livelihoods are actually quite diversified and perfectly adapted to their habitat. Thus, they already have skills and experience in adaptation. Nevertheless, climate variability may increase in the future, confronting mountain people to swiftly adapt to dramatically changing environmental conditions. A study carried out in three villages in Kaski-District/Nepal showed that mountain communities are already noticing the effects of climate change in the Himalayan region. A decline in agricultural productivity, an increased incidence of pests and diseases as well as less flow in springs and streams were some of the impacts on their livelihood system they experienced. Even if the livelihoods of the communities are quite diversified, surprisingly, only few coping and adaptation mechanisms were currently utilized. One explanation can be seen the fact that the communities are exposed to multiple stressors like food insecurity, frequent natural disasters, domestic conflicts and political instability and insecurity. Most important, a trend towards feminization of agriculture as a result of migration of men for work can be observed. Thus, in their income diversification strategy, farming only plays a secondary role, and adaptation measures to climate change are rarely utilized. In order to respond adequately to climate change impacts in a timely way, mountain communities in the Nepal-Himalayas may need external support to expand their existing opportunities for adaptation measures.

## C08.29-04 - Mountain Ecosystem Response to Global Change 1

*Chair: Jörg Löffler, Anders Lundberg*

### High mountain geosystem response on climate change in Altai-Tuva region

*Kirill Chistyakov (Saint Petersburg University), Dmitry Ganushkin (Saint Petersburg University)*

To estimate the factors of dynamics of high mountain landscapes in Altai-Tuva region from the LIA we analyzed spatial structure and variability of climatic characteristics and modeled variability of landscape structure determined by climate. Dynamics of nival-glacial landscapes was studied within mountain massifs Mongun-Taiga, Tavan-Boghdola, Turgeni-Nuru, Harhira. Beside the study of present state of the glaciers we generalized information on the structure of moraine complexes to characterize the evolution of glaciation since the finishing of the LIA. Most detailed information was obtained for the glaciers of Mongun-Taiga massif. The period after the maximum of the LIA in general was unfavorable for them. Intervals of positive mass balance took place from the mid-1910-s to the mid-1920-s and 1950-s - 1960-s. Both of them were caused by the increase of precipitation: on the background of high temperatures in the first period and cooling in the second one. After the mid-1960-s, especially in 1995-2008 mass balance was negative, aridization and distinct warming took place. In 2009-2011 a sufficient increase of snow accumulation in the massif is observed, the snow line returned to its position of 1994-1995. Similar features of dynamics of glaciation are observed within other mountain massifs of the region. Ubsu-Nur depression and its mountain outline were used as a main model polygon for the study of the reaction of landscape structure on climate change. Summer precipitation and average summer temperature are the limiting factors of the extension of forest geosystems. 150 mm of summer rainfall is considered as the value that limits the lower tree line. Optimal average summer temperature is 12-13°. The upper tree line can be defined by the average summer temperature 9°. Considering model scenarios of warming/cooling we admitted 2° increase of summer temperature over present values as basic condition, for the scenarios of fluctuation of precipitation we admitted 25% decrease of summer rainfall (relative to present amount). In case of aridization decrease of mountain tundra and forest geosystems in general, expansion of psammophyte and valley solonchak geosystems, decrease of area of caragan and koeleria steppes, increase of area of herb-feather grass steppes can be asserted. In case of changes of temperature we revealed different tendencies of changes of the state of the geosystems. In case of cooling the area of Kobresia mountain tundra geosystems can increase sufficiently; the area of cedar-larch and steppified forest geosystems will increase slightly. In case of warming oat grass steppes will expand, the area of sheep fescue steppes will remain the same. We revealed

that precipitation is the most important factor of transformations of the landscapes of the region.

### Comprehensive Analysis of Hydrological Responses and Resulting Constraints under Climate Change in mountainous Switzerland

*Ole Rössler (University of Bern), Pascal Hänggi (University of Bern), Nina Köplin (University of Bern), Raphael Meyer (University of Bern), Bruno Schädler (University of Bern), Rolf Weingartner (University of Bern)*

Mountains are meaningful indicators of climate change since wide ranges of climate zones occur at a very small horizontal extend. In terms of hydrologic responses, a potential effect of climate change is the acceleration of the hydrological cycle that in turn will likely cause changes in the discharge regime towards higher winter discharge, earlier snow melt, and changed annual discharge distribution. As a result, socio-economic systems (e.g., tourism, hydropower industry) may be drastically affected. In this study, the various effects of climate change on mountain hydrology in Switzerland are analyzed: At first, discharge responses of approx. 200 catchments covering almost entire Switzerland were simulated using PREVAH and driven by latest CH2011 climate scenario data sets. Seasonal discharge changes are presented, the driving factors for these changes are analyzed and the most vulnerable catchments are identified. We found eight distinct response types of catchments, each exhibiting a characteristic annual cycle of hydrologic change. A general pattern observed for all catchments, is the clearly decreasing summer runoff. At second, within the analysis of future discharge a special focus is set on summer low flow situations in a selection of 29 catchments in the Swiss Midlands for which extreme situations might have great implications on water usage and biodiversity. The hydrological model PREVAH was re-calibrated with a multi-variable approach using base-flow and gauged discharge and driven by the same CH2011 climate data set. The magnitude and the duration of climate change induced low flows are presented and discussed. We found extreme low flow situations to be very likely to increase in both, magnitude and duration. At third, the spatial drought stress potential was analyzed by simulating the soil moisture level under climate change conditions in a high mountain catchment. Due to the spatial explicit character of the study, the distributed hydrological model WaSiM-ETH was applied. The results show soil moisture conditions in forests below 2000 m a.s.l. are affected at most, which might have implication to their function as avalanche protection forests. However, we found the results to be highly dependent on the downscaling method applied. At last, we analyzed the effect of hydroclimatological variability on the hydropower production by coupling the hydrological model BERNHYDRO with a hydropower management model, both driven by climate change scenario data. We found that hydro power production will benefit from the changes in discharge regime, at least until 2050. This holds especially true if hydropower management is able to deal with the presumable increasing natural hazards. These different aspects of climate change impacts on the hydrosphere reveal a differentiated

picture involving potentially threatened and widely unaffected catchments, hydrologic parameters and hydrologic constraints to the society.

### **Forest cover change and its impact on water and sediment fluxes in degraded Andean catchments**

*Veerle Vanacker (University of Louvain), Armando Molina (Universität Göttingen), Gerard Govers (KU Leuven)*

In human-modified landscapes, land use/-cover change may have a profound effect on riverine water and sediment fluxes. The effect of forest cover on water yields has been demonstrated for small catchments where natural vegetation was removed and/or replaced by plantation forests. Little is known about disturbed ecosystems where forest plantations have been established on highly degraded land. In this paper, we analyse the hydrological response to complex forest cover change for a highly degraded Andean catchment. The land cover analysis (1963-2007) indicates different pathways of change : deforestation, reforestation, and spontaneous recovery. Forest cover changes occur in spatially distinct regions, with deforestation taking place in remote uplands and recovery and reforestation were particularly important in the lower parts where agricultural and bare lands are prevalent. There was a net average loss of native forests of ca. 45.5 ha y<sup>-1</sup>, and 74% of the total deforestation results from conversion from native forests to agricultural land. The total area of 'bare land' decreased with 28 ha y<sup>-1</sup>. Time series analyses of streamflow and rainfall data (1979-2007) indicate that the removal of native forest (by -22%) has contributed to the increase in total annual water yield, through an increase in annual baseflow by 25mm. The observed changes in extreme events are important as the maximum daily runoff decreased by ca. 5 mm despite somewhat higher daily rainfall amounts. The observed decrease in peakflows cannot be explained by clearcut of native forest, as the effect of deforestation on surface runoff generation is limited. This reduction is, on the contrary, related to reforestation of degraded lands to exotic forest plantations as well as spontaneous recovery of vegetation on remaining grazing lands.



## C08.29-05 - Mountain Ecosystem Response to Global Change 2

*Chair: Jörg Löffler, Anders Lundberg*

### Treeline changes at Khibiny Mountains, Kola Peninsula, Russia as the indicator of climate change

*Anna Mikheeva (Moscow University), Ingrid Mathisen (Norwegian Institute for Nature Research), Olga Tutubalina (Moscow University), Annika Hofgaard (Norwegian Institute for Nature Research)*

The interface between the boreal forest and the arctic tundra is the Earth's largest vegetation transition. It plays a key role in the global climate system because it is sensitive to climatic changes. Global warming in many Arctic regions has induced northward shifts in boreal vegetation distribution. Changes of the treeline transition zone have been analysed for the Khibiny Mountains, Kola Peninsula using aerial photos, high-resolution satellite imagery, and age structure data of birch (Tuliok River valley) and pine (Yumechorr mountain). Recorded changes were compared with regional temperature and precipitation data (Murmansk meteorological station) since 1936. The temperatures show no trend during the last 70 years, while precipitation shows a clear increasing trend. The uppermost trees were identified in the multitemporal imagery: air photos of 14/08/1958 (2 m spatial resolution) for both sites; QuickBird satellite image of 28/06/2006 (0.6 and 2.4 m) for Tuliok; and WorldView satellite image of 29/07/2008 (0.5 m) for Yumechorr. Locations of these trees were used as reference points and indicators of treeline change over the study period. Age structures of trees and saplings were derived from field data. According to the age structure analysis, treelines at both sites show consistent but slow upward movement of <30 m over the 50-year period. According to the remote sensing data, at Tuliok the treeline advance (birch) has been 29±4 m in 48 years; at Umechorr (birch and pine) it has been 27±21 m in 50 years. The large error margin at Umechorr is due to the absence of a detailed digital elevation model, which precluded precise analysis. Comparison with regional climate data indicated that the recorded treeline advance could be due to the increase of winter precipitation since the 1960s. This study is a product under the IPY core project PPS Arctic and is financially supported by the Research Council of Norway (grants 185023/S50 and 176065/S30 to A. Hofgaard), the Russian Leading Science Schools Programme, and Russian Scientific Educational Centres programme (grant 14.740.11.0200).

### Do trees and shrubs respond the same way? Dendroecological studies on birch trees and dwarf shrubs in the Scandes Mountains, Southern Norway

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Because of the absence of trees, polar latitudes and high mountain areas remained unnoticed from dendroecological research for a long time. However, dwarf shrubs as woody plants represent a potential complement to dendroecological studies of trees beyond arctic and altitudinal tree limits. Among them, dwarf birch (*Betula nana*) is a particularly interesting species to study because of its wide circumpolar distribution. However, it is not clear if dwarf shrubs and trees reflect the same climatological signals in their growth variations, since the former endure a different microclimate under winter snow protection. In our study we investigate growth histories of birch trees and dwarf shrubs and compare their growth-climate relationships in the lower alpine belt of the Norwegian Scandes (Filefjell), where both species occur close together. Samples of *Betula nana* were collected at different microsites along a snow depth gradient through a snowbed. Ring-width was measured from digital photographs of microscopic thin sections of the dwarf shrub stems. By using a variant of the 'serial-sectioning-method', most of the ring-width curves could be synchronized. Two ring-width chronologies of *B. nana* were established, including plants from the ridges and the inner part of the snowbed, representing sites with low and high winter snow cover depth, respectively. Surprisingly, the chronologies showed high similarity and were therefore merged into one dwarf shrub chronology. This dwarf shrub chronology was compared to a reference tree chronology of *Betula pubescens* ssp. *czerepanovii* growing at lower altitudes on the same slope. Despite representing different life-forms, the ring-width chronologies of both species showed a high similarity. Positive correlations between the ring-width indices of *B. nana* and *B. pubescens* ssp. *czerepanovii* and monthly mean temperatures indicate that growth-ring variations are mainly influenced by summer temperature, particularly of July. The results suggest that ring-width variations of *B. nana* are not strongly influenced by the snow gradient, and that in contrast the growth-ring variations from all microtopographical sites contain a regional climate signal. Furthermore, because of the strong influence of mean temperature in July, the species can be used as an indicator for summer temperature above the alpine timberline.

### Recession of Tipra Glacier in Nanda Devi Biosphere Reserve, Garhwal Himalaya

*Suraj Mal (University of Delhi), R.B. Singh (University of Delhi)*

Glaciers are promising indicators of climate change. They have been receding rapidly in the Himalayan region over last few decades. Glacial retreat and mass loss have significant implications on fresh water supply, hydropower and other economic activities

in Himalayan high land and low land (Indo-Gangetic Plain). Therefore, continuous monitoring of Himalayan glaciers is immediately required. The snout, surface area, volume and elevation change of Tipra Glacier of Garhwal Himalaya were examined using Survey of India (SOI-1962) topographical sheet and ASTER images (2004) together with intensive field investigation. Snout positions and other glacial feature e.g. moraine and glacial lakes were surveyed using GARMIN Etrex GPS in 2010. Two DEMs generated from SOI and ASTER data were compared for calculating volume and surface elevation change of Tipra glacier. The study reveals that area of glacier decreased from 9.09 sq km (1962) to 8.53 sq km (2010). The total loss of glacier's area is estimated to be about 0.54 sq km. The snout retreated about 288, 404 and 600 meters in right, central and left part of the glacier with average rate of 6 m a<sup>-1</sup>, 8.41 m a<sup>-1</sup> and 12.5 m a<sup>-1</sup> respectively during 1962 to 2010. The snout retreated about 60 mts upslope. Presently, the snout is located at 3820 mts about msl. Its mean width reduced by about 10 mts. The range of elevation has significantly decreased from 3760-5739 mts (1962) to 3820-5532 mts (2004). Total ice mass loss is estimated about  $-470 \times 10^6$  m<sup>3</sup> we during 1962 to 2004. The snout retreat rate is not high as it is heavily debris covered. However, lower ablation part has become dead ice mound due to inadequate supply of ice from accumulation zone. Besides, the glacier appeared empty during field survey in lower ablation part with many longitudinal cracks and debris cover making its surface collapse any time.

### Dynamics of the nival-glacial systems of the mountain massifs of the Eastern Altai and Western Tuva

*Dmitry Ganushkin (Saint Petersburg University), Kirill Chistyakov (Saint Petersburg University)*

Mongun-Taiga, Harhira, Turgeni, Tavan-Boghd-Ola mountain massifs are situated in the center of Altai-Sayan mountain system, they reach the altitude of 3900-4300 m. Average annual temperature in the region is from 0 to -3°C, annual precipitation 100-400 mm. Perennial snow patches are the most sensitive to climate change among the studied objects. In 1966-2008 their number in Mongun-Taiga massif reduced 4-fold, their area - 15-fold. Snow patches on western slopes disappeared. The altitudinal belt of snow patches moved 300-400 m up. Diversity of morphological types also reduced. In 2009-2011 the area and the number of perennial snow patches increased. The lower limit of their distribution descended 250 m. Total modern glaciation of 4 massifs is about 120 km<sup>2</sup>. Areas of most glaciers do not exceed 1 km<sup>2</sup>, valley glaciers reach 2-5 km<sup>2</sup>. Glaciers form several complexes with united accumulation zones. Since the maximum of the LIA the glaciers retreat. Glaciation of Mongun-Taiga massif lost 59% of area, glaciation of Tavan-Boghd-Ola massif - 41%, Turgeni-Nuru - 34%, Harhira-Nuru - 50%. Short stabilizations of glaciers took place in early 1920-s, mid-1960-s and mid-1980-s. Deglaciation was especially fast after 1995. In 1995-2008 glaciation of Mongun-Taiga massif lost 19% of area (1,5%/year), glaciation of Tavan-Boghd-Ola massif in 2002-2009 lost 12% of its area (1,7%/year). Firn line on the glaciers in 1995-2008 elevated 200-300

m. In 2008-2011 snow accumulation increased, firn line returned to the level of 1994-1995. degradation of small glaciers became slower, valley glaciers continued to retreat with average rate 5-10 m/year. Ground ice in high altitude zone is represented mostly by bodies of glacial genesis divided into 3 groups. The first is connected with moraines of LIA which consist of ice core and debris cover. The second group objects were formed after the middle of 1960-s. They are debris covered parts of the former glacier. Objects of the third group lost their connection with the main glacial masses and turned into dead ice in 1995-2008. Main modern processes for the first 2 groups are exposure of ice by melt water streams, collapse of moraine cover and melting out of the ice core. Objects of the third group are in the process of intense armoring, in the last 3 years perennial snow patches appeared on the surface of armored glaciers, creating their multilevel vertical structure. Rock glaciers of the region have mostly glacial genesis. We mapped 17 rock glaciers with total area of 5.5 km<sup>2</sup>. We estimate the average rate of the advance from the beginning of LIA of 2 active rock glaciers in Mongun-Taiga massif 0.5-0.7 m/year. The main cause of trends in dynamics of the studied object was aridization on the background of warming with cooler and more humid conditions in early 1920-s, mid-1960-s, mid-1980-s and 2008-2011.

## C08.29-06 - Mountain Environment and Rural Livelihoods in the Tropical Andes: Local Responses to Global Change

*Chair: Perdita Pohle, María Fernanda Lopez Sandoval*

### Governance of complex socio-ecological systems in the Andes of Bolivia: toward a transdisciplinary and reflexive approaches

*Patrick Bottazzi (Center for Development and Environment), Stephan Rist (Centre for Development and Environment)*

'Governance' is a core concept of sustainable development. It refers to the ways multiples stakeholders collectively take decisions or influence each other during the process of creating, implementing and actualizing norms, rules and regulations related to natural resource appropriation. In the field of sustainability sciences, governance approaches are facing a double complexity. On the one hand, the inclusion of multiple stakeholders from diverse socio-cultural origin are extending and diversifying the ways in which a given problem is perceived and transformed into institutional decisions. On the other hand systemic approaches of natural sciences are considering a growing number of interrelated biophysical parameters that are making the scientific field even more complex increasing through this the distance between the views of scientists local resource users and practitioners. Knowledge provided by social and natural sciences need to be more systematically related, but not to define immutable dependencies internal to the scientific view; the integration must rather provide core transversal variables that support stakeholders in making decisions in complex situations. Governance in sustainability science is the target of a large number of theories but synthetic approaches are still needed to help understanding core aspects of socio-ecological system. The aims of this paper, is thus to revise some of the most recent approaches of natural resource governance and to see how reflexivity and transdisciplinarity approaches can help finding acceptable compromise in a growing level of complexity. Based on results from inter and transdisciplinary research carried out by the broad network of scientific cooperation that CDE maintains with Andean Universities in Bolivia and Peru this presentation addresses the following three important key criteria to be considered in order to facilitate transdisciplinary integration different forms of knowledge into more reflexive processes of governance of natural resources in view of the principles of sustainability: · 1) a better articulation between biophysical and sociological scales and levels of collective action; · 2) the importance to include sociological and ecological system characteristics into an holistic understanding of the roles and functions played by institutions; · 3) the role of different forms of knowledge production by different 'epistemic communities' and valuation on the power distribution influencing governance processes This paper will successively discuss each of those dimensions to propose a reflexive and transdisciplinary governance framework that can be useful for researchers as well as practitioners in the field of sustainable development.

### The role of vertical exchange for socio-ecological resilience in the Andes, the example of climate change

*Dorothea Hamilton (Universität Marburg)*

Using the altering climate between the different ecological floors has always been one of the main Andean strategies for survival. The Quechua people living in the Andes have traditionally made use of the climate variability in two ways; for creating resilience by planting at different altitudes, and increasing variability through the use of crops with different climatic necessities. In this sense, the climatic diversity has been the main driver for the evolution of the high bio-cultural diversity we find in this region, have created a high agrobiodiversity in the area. This is argued, to be among the main forces behind a highly resilient environment. As the Andean region is a fairly densely populated mountainous region, resilience has to be seen in a socio-ecological context; considering the human and environment interaction and the role of customs and institutions is crucial for sustainability. In Andean terminology this is known as 'Ayllus' meaning the interchange and interaction between different realms, as well as the tangible as the intangible aspects, which have been the basis for survival for millennia. The traditional Andean system of resource management has proven to be highly resilient to ecological and social shocks. Nonetheless, external influences such as the introduction of a market economy, altering beliefs, demographic growth and the influence of government and NGO activities are having strong impacts on the Ayllu system. Furthermore, ecosystem changes mostly seen in extreme weather events are impacting the rural livelihoods in the Andes in a negative way, and are threatening the socio-ecological resilience of the fragile ecosystem. In this presentation I will discuss the findings and reflections of action research undertaken in the Cusco region of Peru. I will focus on the historical role of verticality for resilience and the current climate challenges that Andean communities are faced with. As the socio-ecological adaptation to climate change is a complex system, the implication of changing climate in one of the ecological niches for the neighboring regions, such as the tropical Andes will be explored. Solutions to climate change in a vertical environment can only be found in the context of distinct ecosystems following the traditional way of resilience. Possibilities and challenges for Andes communities shall be subject to discussion.

### Integrating farming and paramo conservation on the Colombian paramo

*Ophélie Robineau (CIRAD/INRA UMR Innovation), Martin Châtelet*

The Andean páramo is a unique mountain grassland ecosystem, with high biodiversity and endemism, located between 3,000 and 4,200 m.a.s.l. The will to strictly protect paramo in Colombia has led to the creation of conservation areas where all kinds of productive activities are excluded. Although the Colombian environmental policy is unfavorable to farming in the páramo ecosystem, it is believed that an integrated management of the páramo is possible, and that farming activities can be part of the solution at this agriculture-environment problem. This issue has become particularly acute

on the Rabanal páramo (western cordillera) where the projected expansion of a core protection zone will soon include major areas used for agriculture and settlements. We show how a multi-scale approach combining agronomy, geography and management sciences, can help to identify areas of flexibility within the páramo farms for the introduction of technical and organizational changes that combine conservation and sustainable livelihoods. A study of local agrarian history and aerial photos indicates that this zone has been a dynamic part of local farming systems since at least the 1950s and that the páramo has evolved from a subsistence farming area to a zone that now includes intensive potato production conducted by external entrepreneurs. The presence of entrepreneurs is mainly due to the need of family farmers for a solution to maintain the productivity of their pastures. Through a process of interviewing participants in the debate, as well as mapping land use in the contested area, perspectives for action were developed that would result in more sustainable farming practices.

### Global Change and territorial transformations in mountain areas of Northwest-Argentina

*Pablo Paolasso (ISES-CONICET-UNT), Gerhard Rainer (Universität Innsbruck),  
Fernando Ruiz Peyré (Universität Innsbruck), Martin Coy (Universität Innsbruck)*

Northwest-Argentina comprises five provinces with a land surface of approximately 470.000 km<sup>2</sup>. From a physical-geographical point of view the region can be subdivided into two main areas: the western part is dominated by a high mountain range that surpasses 6000m of altitude while the eastern part consists of an extensive lowland plain with an extremely low gradient (Llanura Chaqueña). The altitudinal variations cause profound differences in precipitation levels, soils, types of vegetation etc. which, together with a great variety of societies, have led to the formation of diverse territories. Historically, Northwest-Argentina was characterized by a strong interdependency between mountain range and lowland plain. While the population center was originally located in the mountain range, with the arrival of the Spaniards and especially with the advance of capitalism from the second half of the XIX century on, the lowland plain converted into the economic and demographic core of the region. This growth was based on the use of natural and human resources from the mountain range (water, soil, climate, seasonal labor force). The agro industrial economy that was promoted in the lowland plain (principally the cultivation and industrialization of sugar cane) caused massive seasonal movements of population from the mountain range to the lowland plain contributing to a displacement of population and to a strong economic regression in the mountain range. Today the mountain range of Northwest-Argentina is one of the poorest regions of the country. Nevertheless, in the last decades some areas of the mountain range have experienced a process of revitalization caused by changes in the demand of national and global markets. The strong orientation towards international markets provoked a restructuring of certain traditional activities (vitiviniculture, horticultural production and tourism) and the appearance of new activities (olive farming, large-scale

mining). This process was made possible by the appearance of new actors, from local to global, and by climatic changes (fundamentally an increase of precipitation - something of fundamental importance in an area that is characterized by its aridity). These processes can be subsumed into what is known as Global Change. Due to this fact, the goal of the presentation is to analyze the changes that occurred in the territorial structure of the Northwest-Argentinean mountain range as a result of Global Change, knowing that the articulation between global processes, different actors and local processes that intervene in the area of study caused the (re) construction of diverse territories.

## C08.29-07 - Vegetation response to climate change in tropical mountain ecosystems and consequences for biodiversity and land-use options

*Chair: Achim Bräuning, Aster Gebrekirstos*

### Vegetation succession in relation to glacial fluctuation and global warming on Mt. Kenya

*Kazuharu Mizuno (Kyoto University)*

Dramatic changes are taking place in the glacier-covered high mountains of Africa. The only African mountains still capped by glaciers are Mt. Kilimanjaro, Mt. Kenya, and Mt. Rwenzori. Recently, these glaciers have been retreating at an accelerated rate. Mt. Kenya (5199 m) is an isolated, extinct, denuded volcano that lies on the equator (0°6' S, 37°18' E), approximately 150 km NNE of Nairobi. Although there were 18 glaciers on Mt. Kenya at the end of the 19th century, only a few remain, including the Lewis and Tyndall Glaciers. The glaciers of Mt. Kenya have been diminishing rapidly in recent years, and plant species have advanced in response. This study primarily examines the real-time response of plant communities to glacial retreat and global warming during the last half-century, as well as the recent glacial fluctuations, and discusses the effects of glacial retreat and global warming on ecosystems. The Tyndall Glacier, the second largest glacier on Mt. Kenya, retreated at a rate of approximately 3 m year<sup>-1</sup> from 1958 to 1997, but the rate increased to approximately 10 m year<sup>-1</sup> from 1997 to 2002, 15 m year<sup>-1</sup> from 2002 to 2006, 9 m year<sup>-1</sup> from 2006 to 2009, and 7.5 m year<sup>-1</sup> from 2009 to 2011. The leading edge of *Senecio keniophytum*, the first pioneer species to establish after glacial retreat, has advanced in close correlation with glacier recession. Other pioneer species including *Arabis alpine*, mosses, lichens, and *Agrostis trachyphylla* are also advancing. The distribution of plants in quadrat (80 m x 20 m) placed in frontier region with the glacier snout in 1996 was very different from that same quadrat in 2011, from the distribution coverage of *Senecio keniophytum* and the number of species (from one to four). Although changes in the leading edges of *Lobelia telekii* and *Senecio keniodendron*, large woody rosette plants, appeared unrelated to glacial retreat until 1997, the species have advanced since then. The succession of these species does not appear to be directly related to glacial retreat, but rather may be linked to soil development. Although *Helichrysum citrispinum* had not grown at altitudes higher than the Tyndall Tarn (4470 m) before 2006, 32 plants of this species were identified on lateral moraines above 4470 m in 2009. The advance of this species in outer areas of old glacial flow paths may also be linked to recent increases in air temperature rather than being directly related to glacial retreat. Monthly mean minimum and maximum temperatures at the 1890 m site of Mt. Kenya have increased by more than 2°C over 47 years from 1963 to 2010 at 1890 m. The recent temperature increases are thought to be accelerating the expansion of some species into higher altitudes.

### How do tropical tree species respond to nitrogen fertilisation? Tree growth along elevational and nutritional gradients in Southern Ecuador

*Susanne Spann (University of Erlangen-Nuremberg), Thorsten Peters (University of Erlangen-Nuremberg), Achim Bräuning (University of Erlangen-Nuremberg)*

The tropical mountain forests of southern Ecuador are strongly threatened by land-use changes and degrading environmental effects. In the near future increasing frequency and intensity of drought-events and higher atmospheric nitrogen depositions are expected (IPCC 2007), thereby affecting tree-physiological processes in a major way. As part of a scientific nutrient manipulation experiment, tree growth of different tropical tree species (*Podocarpus oleifolius*, *Graffenrieda emarginata*, *Persea feruginea*, *Alchornea grandiflora*, *Prunus* sp., *Weinmannia elliptica*, *Weinmannia ovata*, *Graffenrieda harlingii*, and *Prumnopitys montana*) were examined at two elevations (2000m and 3000m a.s.l.). The aim of our study is to investigate to what extent long-term fertilization with nitrogen will affect tree growth and variations of stable carbon isotopes in the wood as indicators of changes in water budget of the trees along this altitudinal gradient. Since July 2010 high resolution dendrometers have been installed measuring stem-diameter variations of fertilised and non fertilised trees in 30 minutes intervals. Cumulative growth, daily radial change and daily amplitudes were calculated and linked to climatic factors like precipitation, vapour pressure deficit and irradiation with particular attention to drought events. In addition, intra-annual variation of carbon and nitrogen isotopes will be analysed by cores which have been taken from the different tree species. We expect that intra-annual variations of stable carbon isotopes provide a further technique to detect seasonal, environmental-induced plant physiological reactions.

### Responses of African species to climate variability and change

*Aster Gebrekirstos (World Agroforestry Centre)*

In vast areas of Africa, knowledge on the range of natural climate variability and the range of tree species tolerance to climatic extremes is scarce. We have used stable carbon and oxygen isotopes in tree rings to explore their potential as climate proxies and as a means to assess adaptations of tree species from East to west Africa along altitudinal gradients. Most of the study sites and species in Ethiopia, Tanzania and Burkina Faso showed vulnerability and substantial growth reduction during drought years. Stable carbon (<sup>13</sup>C) and oxygen (<sup>18</sup>O) mean values showed similar inter annual patterns. In general, both <sup>13</sup>C and <sup>18</sup>O show negative correlations with rainfall, humidity and PDSI. On the contrary, they are positively correlated with sunshine hours, maximum temperature and evaporation. The results showed valuable information with regard to the adaptation and vulnerability of African species to climate variability in different agro-ecological zones. This has great implication in land use management, species selection in restoration and agroforestry practices and in our efforts to adapt and mitigate climate changes.

### Growth-climate responses of various sub-tropical tree species in Ailao Mountains, southwestern China

*Ze-Xin Fan (Chinese Academy of Sciences), Achim Bräuning (University of Erlangen-Nuremberg), Aster Gebrekirstos (World Agroforestry Centre)*

Climatic conditions in the Chinese monsoon regions are changing, affecting local hydrological and land-use systems. The Ailao Mountains of central Yunnan (southwestern China) lie in the region of Asian summer monsoon. Evergreen broadleaved forests flourish in this mountain area, with a humid summer and cloudy winter climatic conditions. Using dendrochronological techniques, we explored the effects of inter- and intra-annual climate variations on radial growth of various tree species growing in the subtropical forests. Regional moisture variability during the past two centuries was reconstructed from tree-ring parameters, like ring width and stable carbon and oxygen isotope variations derived from multiple tree species. Seasonal cambial growth dynamics were monitored by high-resolution electronic dendrometers for ten studied species. Our results showed that most of the studied tree species had visible tree-ring boundaries and it was possible to cross-date the interannual growth patterns. Correlation analyses with regional climate data revealed that trees growing in the mountain cloud forest are sensitive to climate variations. Thus we conclude that many evergreen tree species in this subtropical mountain climate are suitable for dendrochronological studies and that the dendroclimatological potential to study regional climate change in the subtropical evergreen forests is much higher than so far explored. Further exploration should focus on long-term climate reconstruction, as well as modeling growth-climate response of different species, especially under future climate change scenarios.



# C08.30

# Political Geography

## C08.30-01 - Conflicts over natural resources

*Chair: Paul Reuber*

### **Social Movements and the Political Geography of Water Conflicts in India**

*Michael Brinkschröder (IfG Münster)*

After the introduction of India's New Economic Policy in the 1990s, processes of liberalization, urbanization and ambitions of modernization have rapidly changed developmental choices and priorities in the country. This trend has drastic consequences on the availability of natural resources, particularly water, leading to a great variety of water related conflicts. Social movements that developed around water distribution conflicts between industry and agriculture are a prime example for this. The mass rally of 30.000 peasants against the water distribution from the Hirakud reservoir to industries in Orissa in 2008 and the protest mobilization against the Maha Mumbai Special Economic Zone (SEZ), connected to water distribution from the Hetavane dam in 2009, are only two current examples. This PhD project utilizes both examples as case studies because of their regional peculiarities. In both cases, civil society movements managed under very different regional circumstances to initiate mass rallies around water related issues and rise to powerful political actors. But their influence on processes of water governance and rural territorial development in the respective federal states differ significantly. In the case of Mumbai, the highly strategic resistance movement managed in 2011 to withhold the biggest SEZ project in India's history. In the case of Hirakud, the mass movement is still ongoing and confronted with various problems. In this short presentation, I would like to present a few empirical findings and theoretical ideas that may lend to support the discussion about Water Conflicts in India, particularly the genesis of regional specific protest movements and their influence on water governance and rural territorial development processes. The study focuses on the following questions: 1. How did the regional specific protest movements around the Maha Mumbai Special Economic Zone and the Hirakud dam arise and how did they manage to persist over time? 2. If, and to what extent, have these protest movements been able to participate in and influence the establishment of norms, regulations and practices that direct the water governance processes in the respective regional case studies? 3. Which relationships between the analyzed water conflicts can be drawn with special emphasis to the development of new civil society movements and their influence on water governance processes? The empirical findings are based on the results of a 6 months field research, conducted through an internship in the Forum for Policy Dialogue on Water Conflict in India.

### **Comparing political frameworks: What lessons can China's South-North Water Diversion learn from Spain's Ebro Water Transfer?**

*Teresa Sprague (TU Dortmund)*

In response to the combination of anthropogenic and naturally occurring stress to water resources, state actors use frameworks to guide decisions-making and to find solution to the uneven distribution of resources. One theme that emerges within this discussion is the construction of large infrastructural schemes such as major water diversion projects. This paper provides a case study comparison of the political frameworks determining water diversion projects in the Ebro River Basin in Spain (the 2001 Ebro Water Transfer), and in the North China Plain, (the South-North Water Diversion). The study applies an original application of a framework analysis based on Tony Allen's Five Water Management Paradigms. The focus and purpose of this study is the determination of what decision-makers in China can learn and apply from major water diversion projects, particularly focussing on the diversion project within the Ebro River Basin. The analysis first evaluates the comparability of political frameworks and then specifically what recommendations are offered to the South-North Water Diversion (SNWD). Recommendations, or 'lessons learnt', are evaluated through three categories: the shift to the Third Paradigm, ecological considerations, and alternative strategies. Concluding recommendations are comprised of the realization of limits imposed by a lingering Hydraulic Mission, the importance of increased public participation, and the need for further attention to alternatives and environmental concerns as political frameworks shift toward the Third Paradigm.

### **Struggling for inclusion: The quest for collective action of Tamil Fisheries Cooperatives Societies in North Sri Lanka**

*Joeri Scholtens (University of Amsterdam)*

Collective action literature in the context of natural resource management has revealed a range of conditions which make it more likely for communities to build successful institutions to use their common property resources in a sustainable fashion (e.g. Ostrom 1990, 2002). In recent years, Agrawal (2001, 2003) and others have criticized this approach for being too a-political and a-historical, as institutions tend to be politically contested and operate in a historical-political context which, for example, determines their position vis-à-vis the state. This article contributes to this discussion by analyzing novel empirical material on collective action among Tamil fisheries cooperative societies (FCS) in post-war Northern Sri Lanka. These FCS, which function as producer organizations and local governance bodies at the same time, are just recovering from a protracted 30-years civil war in Sri Lanka, during which the fisheries sector faced severe restrictions and fishermen multiple hardships. As the war is over and the dust settling since 2009, FCS have shown to play a vital role not only in the reconstruction of the sector, but even more pronounced in taking the lead in a highly politicized struggle to



reclaim their traditional fishing grounds from poaching Indian trawlers. The FCS' capacity for effective collective action, however, appears to be critically affected by political interference in the organization's functioning, which is connected to a more general marginalization of the Tamil community. Apart from local conditions, these political-historical factors appear crucial for understanding the characteristics of collective action among fishermen, both in terms coordinating sustainable resource use, production benefits, and their struggle for fishing rights. This research is based on a complementary combination of quantitative and qualitative research, conducted during 12 months fieldwork among fishermen in Northern Sri Lanka.

### **Geography of natural resources. Biofuels, Brazil and potential new conflicts in the international arena.**

*Elisa Freitas (University of São Paulo and University of Lisbon)*

In this period there is a global race for food and alternative energy, it is necessary to meet the growing global demand and find an alternative to replace oil that is considered a major contributor to global warming. In this case, Brazil is one of the most important countries in the world that can produce food and biofuels at the same time. First, because it has a large territory containing a large amount of natural resources. Secondly, Brazil has the technical conditions to produce them in large numbers. Therefore, we can observe that there have been some phenomena, such as the acquisition of Brazilian land especially by transnational corporations Cargill, ADM, Morgan Stanley, Bunge and others. These transnational corporations want to produce agricultural commodities and raw materials for biofuels such as sugar cane to produce ethanol, and soybeans for biodiesel and food. In addition, supranational actor like the UN (United Nations), EU (European Union), OECD (Organization for Economic Cooperation and Development) and others have raised question, the production of biofuels in Brazil is sustainable or not. In addition, major NGOs (Non-Governmental Organizations) such as Greenpeace and WWF have argued that biofuel production can result in change of land use (LUC). For these reasons, it is noteworthy that Brazil will have to go a long way until you reach the leadership in the global biofuels market. For both the Brazilian government will have to demonstrate that the Brazilian production of biofuels is sustainable. After this, Brazil must promote the sustainable expansion of sugarcane production in countries that can produce this kind of raw material as the Latin American countries and African countries, especially those who have natural conditions for it. Our purpose in this article, therefore, will discuss policies and actions that the Brazilian government is creating to lead a global biofuels market and how these policies can cause some conflicts between the various countries that make up the world of the international system. Finally, we would like to find an answer to this question: Will biofuels are a solution or a problem to address environmental challenges?

## C08.30-02 - Environmental Geopolitics and Climate Change

*Chair: Jürgen Oßenbrügge*

### The imaginative geographies of climate wars

*Benedikt Korf (University of Zurich)*

There has been much talk about 'climate wars', both in public discourse as well as in academic publications (e.g. themed issue in Political Geography, 26 (6)). Most of these writings predict a neo-Malthusian kind of scenario of climate change leading to resource scarcity, which in turn is likely to trigger violent conflict. This discourse of 'climate wars' has even been co-opted by UN general secretary Ban Ki Moon and his advisor Jeffrey Sachs who suggested that the Darfur crisis was the first onset of such climate war. In this paper, I will argue, that these neo-Malthusian predicaments are deeply flawed for two reasons, one methodological, the other empirical. Methodologically, it is difficult to extrapolate from current or past conflict dynamics to what will happen in the future. Empirically, the neo-Malthusian hypothesis has been proven inadequate in explaining current and past environmental conflicts on various accounts. I will trace these inadequacies and illustrate the tacit geographical imaginations that trigger the talk about climate wars and its hidden and open geopolitics.

### The Effect of Vulnerability on Climate Change Mitigation Policies

*Amit Tubi (University of Jerusalem), Eran Feitelson (University of Jerusalem), Itay Fischhendler (University of Jerusalem)*

The problem of climate change negatively affects many countries throughout the world, and will most likely be exacerbated by rising concentrations of green house gases in the atmosphere. The success of measures meant to mitigate climate change is highly uncertain, and previous attempts to explain countries' mitigative policies have been largely deficient. Thus, the purpose of this study is to improve the comprehension of mitigation policies adopted by various countries, through the introduction of the different factors that comprise vulnerability. For this purpose, vulnerability has been defined in the widest possible manner, including factors of its two basic components: impacts (expected damages due to climate change) and adaptive capacity (the ability to moderate those damages). These factors include both socio-economic and natural variables. In addition, the declared and implemented components of mitigation policy have been differentiated and examined separately. The effect of vulnerability on climate change mitigation policies was examined by OLS regressions, incorporating a wide range of control variables. Results obtained by the analyses indicate that vulnerability has only a limited effect on mitigation policies. Adaptive capacity, the factor mitigating vulnerability, has a positive effect on the level of declared policy, though it becomes insignificant once

implemented policy is examined. This finding suggests that the 'free-rider' problem prevents high capacity countries from following through on much of their declared policy. Furthermore, the effect of impacts on both declared and implemented policies is insignificant. Further analyses indicate that this insignificance is caused by the uncertainty in assessments of future impacts, as well as pressing domestic problems in low capacity countries. Finally, findings obtained by this research suggest new hypotheses regarding the effect of vulnerability on mitigation policies.

### Regulating the Future? Geoengineering as Techno-Political Assemblage

*Thilo Wiertz (Heidelberg University)*

How can we explain the political changes that accompany new technological developments? Contemporary approaches within Political and Cultural Geography have demonstrated how the Social is produced and renegotiated through language. More specifically, post-structuralist approaches explain the formation of regimes as discursive formations that organize the social but that are, at the same time, subject to critique and dislocation. These approaches point to the tension between stabilization and (re)negotiation of social relations, emphasizing their radical contingency and the working of power in discourse. However, conceptualizing the social as an exclusively symbolic domain is limited in understanding political change in relation to physical-environmental and technological change. In this contribution, I will draw on recent writing on assemblage and on lines of thought within Gilles Deleuze philosophical project to discuss technological regimes as a concept to critically explain (de)stabilizations of socio-material reality. This allows taking serious the role of natural scientific research and geophysical processes in explanations of political change, and it allows extending conceptions of space beyond a merely discursive category. The implications for political geographical research on emerging technologies are discussed using geo-engineering and its implications for climate politics as an example: the debate about large-scale manipulations of the climate system has emerged as a field in which scientific research is particularly powerful in anticipating - and potentially regulating - future socio-material realities.

### Environmental dystopias, popular geopolitics and the (missing) political geography of corporations

*Elena dell'Agnese (University of Milano-Bicocca)*

Representing the future is always a good strategy to speak of the present. While describing a threatening future, dystopian texts offer a glimpse of the worries of their time: the first dystopian fictions, at the beginning of the Twentieth century, were haunted by over-urbanization; the ones of the Fifties by autocratic governments; in the Seventies, limits of growth and gender relations were the most relevant issues; and now, the most ominous aspects for the future seem to be the consequences of our lack of respect

towards "nature", in terms of genetic manipulation or, simply, bad behaviour. Indeed, environmental dystopias, offering apocalyptic visions of post-human landscapes dotted with the remnants of consumerism and abundance, are fashionable, both as works of arts (such as Cormac McCarthy's *The Road*), and as more commercial products, such as videogames, or feature films. If McCarthy's literary masterpiece leaves unknown the causes of the disaster that has cancelled the biosphere, other products tend to conjugate their open environmental message with a more political undertone, underlining the incumbent presence of corporations. The theme was present since the first dystopian images: already in the German movie *Metropolis* (1926), a forerunner of the genre, the urban landscape is metaphorically dominated by corporate buildings. And it is also central in celebrated 'film vert' of the Seventies; in *Soylent Green* (1976); for instance, a private corporation has the total biopolitical control over individuals' life. In contemporary environmental dystopias, however, private corporations assume a role even more relevant, not only as their greed is often the ultimate reason of disaster (*The dawn of the planet of the apes*, 2011); but also because they play a central political role, orienting public institutions (like in *Idiocracy* (2006), where the Brawndo Corporation purchases the U.S. Food and Drug Administration, in order to promote its beverages, instead of water, for any use, even irrigating crops), or even assuming the functions of governments themselves. In the computer-animated movie *Wall-E* (2008), the situation is pushed to its extremes, since a super-corporation, called Buy n Large, after dominating every conceivable field in human life, has reduced the planet to a pile of garbage, forcing the last human survivors (all fat and unable to walk) to live in a giant spaceship. The idea of a private corporation assuming world leadership still belongs to dystopia. But the political power of corporations is a reality, as the role of United Fruit Co. in the Fifties Central America, should remind us. Popular geopolitics is offering its own specific contribution to the topic. While, unfortunately, political geography, and formal geopolitics more in general, seem to be, in this perspective, still lagging behind.

## C08.30-03 - Conceptual approaches and theoretical debates within Political Geography: The relationship of representation and practise

*Chair: Annika Mattissek*

### Political geographies: Being more-than-representational

*Matthias Lahr-Kurten (University Mainz)*

In political geography, in recent years the aftermath of the representational turn led to discussions about the relevance of 'discourses' and 'practices'. Some tried to find the answer in enhancing the concept of discourse in order to include practices (Müller 2008), others tended towards the importance of the everyday state in some sort of practices (e.g. Painter 2006). In my paper, I want to shed light on the question what political geographies could look like if we were to use a theory that combined both: 'practices' and 'arrangements' (e.g. discourses). The US-American social philosopher Theodore Schatzki offers such a theory that is entirely based on these two analytical categories (Schatzki 2002). In my talk, I will draw on findings taken from my recently finished PhD thesis (i.e. German foreign language politics) where I consequently applied this approach and wanted to show how political geography could be 'more-than-representational' (Lorimer 2005) - without either focusing on 'mere emotions' or losing hold of geometries of power.

### About Loopings, Structuration and complexity: Integrating Politics of Representation and Practices.

*Frank Meyer (Leibniz Institute for Regional Geography)*

Critical geopolitics as well as other political-geographical sub-disciplines have concentrated on representational articulations and effects of politics such as geopolitical imaginations. In a different field, Marston, Smith and Jones have undertaken efforts to transform the influential scale debate away from pre-given hierarchical orders towards a relational conception of power. In addition, Painter managed to articulate territory/territoriality - one of the most popular representational geographical topics of research - within a re-conceptualization as the effect of power-networks. This theoretical move has led - in analogy to similar moves within political sciences such as the government stories (Rhodes/Bevir) or political practices (Nullmeyer/Pritzlaff) - to the ability of political studies to engage both matters - representation and practice - within research designs. This borders key topics of recent theoretical debates such as the one about the distinction of matter and discourse. The presentation will attempt to present a coherent depiction of the foundations for a praxeological account of representational politics. Especially in combination with premises of complexity theory such as nonlinearity and

circularity, one will be able to reconfigure this account into heuristic designs to approach complex relationships (e.g. such as the relation between border regulation, border discourses and subverting practices) and help design theoretically sound empirical studies. Example-research designs from border studies (regarding the EU external border), peripherization studies (regarding shrinkage and its discourse) and the studies of antagonistic political projects will be used to detail these theoretical elaborations along the key question of 'How can be the intergration of representation and practice be achieved are operationalized empirically'?

### Contesting the rules of the game!? - New forms of disagreement in urban development conflicts.

*Iris Dzudzek (University Frankfurt)*

Conflicts over urban development strategies seem to have radicalized. Struggles over large-scale projects such as Stuttgart 21 or the question 'in whose name' the creative city develops in Hamburg, for example, show that more and more citizens do no longer agree with the formalized rules of political participation and do not feel represented by their elected representatives anymore. Participatory planning tools seem to have shifted from an emancipatory instrument into a neoliberal rationality of governance. The governmentality studies have criticized participatory planning processes as a form of 'governing through community' (Rose 1996). They mainly focus on hegemonic rationalities and interpellations of (neoliberal) governance. But forms of contention, practices of resistance and their role for the change of common forms of political participation more than often remain black-boxed. This paper tries to open this black box through a case study on conflicts over the transformation of the university campus in Frankfurt/Main into a so-called 'campus for culture', where different cultural institutions and industries will be located. The planning process is highly contested because people fear the loss of affordable housing and locally rooted non-profit cultural institutions. The local newspaper writes about the planning conflict: 'Petra Roth' Lord Mayor of Frankfurt/Main 'fights her own battle. 'Participatory democracy' she calls it? (Journal Frankfurt 2011-02-22). Participation occurs as conflict, consensus as weapon. New forms of protest, resistance and subversion which are connected to the right-to-the-city-movement can be observed in this context. They question established forms of political participation and representation. Based on several weeks of participatory observation and qualitative interviews the presentation focuses on new forms of disagreement in the sense of Rancière and on processes of articulating new political identities in the context of contemporary urban development in Frankfurt/Main. The presentation shows that these new forms of performative critique are able to question and contest the 'rules of the participatory game', neoliberal forms of exclusion and thus the post-political consent in a way that traditional forms of protest were not able to do.

## Spatial Practices in Italian Autonomist Movements: “Taking over the City” by Milanese Social Centers

*Shinya Kitagawa (Mie University)*

The purpose of this paper is to analyze spatial practices to invent social relations autonomously from the below under the condition where the society or the nationalized social citizenship has been disrupted and has tended to be subsumed really under capital. Some scholars say recently that urban scale is critical for such invention of alternative society or citizenship. There we focus upon autonomous geographies of Italian social centers (*centri sociali*) particularly in Milan as one of the (re-)creation of “the right to the city” under the neoliberal condition. It is worthwhile to note the concept of autonomy in Italian political context. Roughly, it began to be used actively in a radical-left movement in 1950s and 60s that was called “workerism (*operaismo*)”. The theoretical point put in emphasis was that mass workers could organize themselves, create collective relations for struggles on their own, autonomously, without the Communist party and Unions, in factories as a site of production. However, as class composition has changed, as immaterial workers have become one of the main figures in semio-capitalism since 1970s, and as productive labor has diffused from the factory to the whole society, autonomous practices were developed both in the level of intensity and of the sphere. In this phase, material and immaterial workers have found that they could organize themselves, create relations for struggles and social lives autonomously, without the state and corporations in cities as a site of production and reproduction or of biopolitical struggles. Therefore, autonomy means refusal of the exiting social, economic, and political condition and, importantly, also autonomous production of alternative collective subjectivities. To consider its potentiality in the past and the present in which being precarious become hegemonic ontological condition, we analyze the space of the social centers which have created convergent relations or sociability, being based upon its physical space in which subjectivities can be expressed in territories like the neighborhood and the city. These practices of the social centers are processes in which it proposes and searches for some urban society differing from existent one. They can be called as “social opposition” in the city not for helping the state and capital but for de-centering and challenging them. We can say that they imply a form of common practices creating a way to urban citizenship.

## C08.30-04 - The (Geo-)Politics of Identity: Case Studies on Different Scales

*Chair: Anton Gosar*

### Nation-Creation in Turkmenistan

*Hendrik Meurs (Universität Heidelberg)*

In a difficult neighbourhood and after a series of coloured revolutions in other post-soviet countries, the Turkmen autocracy shows great political stability. To a considerable degree this is owing to an efficient system of government induced nation building, paternalist allocation of income from the rentier state's vast gas reserves, extreme repressions, international isolation, the usage of foreign countries for the creation of legitimacy, widespread surveillance and an unmatched cult of personality created around the country's presidents. Most of these measures penetrate public and private spaces alike. Since all aspects of this system are interrelated, the term "nation building" is seen as insufficient and "nation creation" is being suggested instead. Until today largely isolated, Turkmenistan receives little attention in international media. And the majority of reports focus on its vast gas reserves and the country's presidents' extravagant cults of personality. The cult, however, is only the most visible part of a complex system of top-down nation creation. When Turkmenistan became an independent nation in 1991, it was without any national legacy. Therefore a great history of Turkmen nationhood has been constructed as both, proof for the right of independence and to develop the incumbent president as legitimate successor of great ancient forefathers. Additionally by renaming cities, landscapes or streets, Soviet space was turkmenified. Turkmenistan's borders, de facto drawn in the early 1920s are claimed to define a territory, Turkmen people have inhabited for millennia, largely ignoring the people's nomadic past. This is supported by the repetitive usage of national myths, traditions and symbols. Furthermore the president was established as omnipresent, omnipotent and omniscient producer of apodictic truths. An exceptional governmental construction-boom in the country's capital Ashgabat aims at the creation of pride among the population and supports clientelistic structures among elite groups. Finally a vast system of extreme restrictions of even the most basic human rights complements this development. Foreign newspapers, satellite dishes and foreign mobile phone providers, to name only very few, are being banned. Freedom of information and media have been restricted to insignificance. The government controls virtually all aspects of public and many parts of the Turkmen people's private life. Thus nation creation combines traditional aspects of nation building (such as the usage and/or invention of history, myths, symbols, images and territory) with an extreme cult of personality, excessive repressions, the usage of crowd psychology, sultanistic patterns and governmental behaviour of exceedingly rich rentier-states. It is the aim of this presentation to describe both, the interwoven methods as well as the flaws of the Turkmen system of nation creation.

### An exception in the Balkans: Albania's multiconfessional identity

*Peter Jordan (Austrian Academy of Sciences), Gottfried Hofmann (Austrian Academy of Sciences)*

Much in contrast to the other nation states in the Balkans, Albanian national identity is not bound to a denomination. While all the Orthodox nations (Greeks, Bulgarians, Macedonians, Romanians, Serbs, Montenegrins), but also the Roman-Catholic Croats and the Muslim Bosniaks define themselves primarily by religion, the population of Albania is split into three confessions roughly in the proportion 70% Muslims, 20% Orthodox and 10% Roman Catholics, which makes religion not an appropriate identity marker. Communist Albania had declared itself even an atheist state and had suppressed religion even more than other Communist countries - not the least to overcome this internal division and to enforce national homogeneity. Post-Communist Albania was quick to restore freedom of religious confession and to re-establish all religious denominations into their religious and societal functions. All of them have indeed used this opportunity very well and substantially gained ground. They are appreciated by the population as institutions not having been involved into Communist policies and play important roles also in the social field and in education. And although the vast majority of Albanians are Muslims, the state has avoided any privileged relation to this denomination and is also on the international scene not acting as a Muslim country or cultivating more than expectable relations with other Muslim countries in the wider region (e.g. Turkey). It goes even as far as to style the Roman-Catholic nun Mother Theresa, an Albanian from Skopje in Macedonia, an icon of Albanian identity - stressing in this way the nation's multi-confessional identity. The Roman-Catholic church, the smallest of religious groups and regionally concentrated on the Shkodra region in the north of Albania, is also - supported by Rome - more than proportionally visible in the fields of social and educational activities. The paper will investigate into the current development of denominations in Albania, into their extra-religious activities and into their relation to nation and state.

### Mapping neoliberal Bavarian identity. A contribution to applied critical geography.

*Gregor Glözl (Universität Bamberg), Holger Lehmeier (Universität Bamberg)*

In early 2011, a report about the future development of Germany's federal state Bavaria was discussed quite emotionally in the local media. The debated document was the result of the deliberations of an independent 'future council' ('Zukunftsrat') and should only have been a consultative resource for the federal state government. Its publication had not been intended, but due to an information leak and the following political pressure it was nonetheless released and discussed in the media. Despite the neoliberal ideology prevalent in the whole document, critical comments almost exclusively focused on a map which depicted a sharp distinction between well-performing centers and disconnected peripheral zones. In the course of discussion, local newspapers used modified versions of

the original map to illustrate the intentions of the council and/or the federal government. Without doubt, the report itself poses an interesting topic for political geographical research; for the debated map, which serves as essence of the document's message, this is even more the case. Following a critical cartography approach based on Harley (1989) and Glasze (2009), the study analyses the map's inherent statements as well as its interpretation and further use in the medial discourse. Furthermore, it deals with issues of political power and regional identity addressed in the map. Symbols, colors and descriptions show where the productive and non-productive parts of Bavaria are (or should be). To understand the messages hidden in the map, a cartographic interpretation inspired by Foucault's notion of discourse is applied. Not only the original map, but also the modified versions appearing in the media coverage are analyzed in this way. First results show that the discussion about the map quickly became independent from the original report. Due to the map's symbolic power, it became the representation for the whole report, notwithstanding the fact that it only referred to a very small part of its content. At the same time, the map's new versions step by step altered the original cartographic language by changing and omitting some elements or even adding completely new ones. References to the 'Bavarian' identity have received an especially great deal of attention. The distinction between the productive and well interconnected 'core regions' and the peripheral 'others', who should cooperate more closely with other centers outside Bavaria, was the main reason for the emotional discussion in the media. All in all, the study aims to contribute to post-structuralist political geography (Reuber 2011). By referring to regional development policies and the perception of rural areas, it addresses less commonly described - but nonetheless relevant - non-urban research questions of political geography.

### Critical geopolitics of global management gurus

*Sami Moisio (University of Oulu)*

One of the challenges of critical geopolitics is to inquire into the highly economized spatiality of contemporary world politics. This paper explores the content and operation of particular knowledge which treats the world in economic terms and which is an integral part of constituting the rational action within polities. Particular strategic theorizing, thus, denotes an emergence of specific political conditions out of which certain political practices become rational and some others irrational. By reading management texts of some of the "global management gurus" against the concept of global governmentality, I first discuss the role of management authorities not only as public intellectuals who portray the spatiality of the world primarily in relation to the market rationality but also as geopolitical theorists. Secondly, I explicate the ways in which the contemporary condition is conceptualized as a particular spatial order in selected writings of Harvard Professor Michael Porter. In so doing, I shall contribute to the recent debate on the linkages between capital-driven globalization, new forms of state power and the ongoing crafting of subjectivity as it unfolds in neoliberal governmentality.

## C08.30-05 - Conflicts and Revolutions in the Near and Middle East

*Chair: Vladimir Kolosov*

### Changes in muslim world - The Egyptian Revolution

*Dragos Frasineanu (Spiru Haret University), Mihaela Frasineanu (Spiru Haret University)*

Without claiming completeness, this document attempts to explain recent events have included a Muslim majority area, spread over three major regions of the world: North Africa, Middle East and the Middle East. Analysis of the situation in Egypt, emblematic as we shall see, was chosen as a landmark interpretation of the complex geopolitical process currently taking place in this space. Propagating on the classical principle of domino effect, involving elements of classical and modern means of expression but the ongoing revolutions in Muslim states continue to capture the complexity. The state of turbulence in the company included a breathtaking speed accused for years of apathy among policy, manifested in the form of real earthquakes whose strength has led to the overthrow of autocratic regimes stronger. The causes and impact of this geopolitical region and beyond boundaries of this, the ramifications of the most diverse areas ranging and complex, and the implications can not be contained point.

### Géostratégie de la conflictualité dans le Golfe arabo-Persique

*Philippe Boulanger (Université de Cergy-Pontoise)*

Le Golfe Arabo-Persique représente un centre névralgique de la sécurité internationale au Moyen-Orient. Pendant des millénaires, cette région a formé une aire d'échanges entre toutes les grandes civilisations qu'elles soient européenne, arabe, perse et asiatique. Cette vocation de « pont entre les civilisations » s'est modifiée sans disparaître à partir du XXe siècle. L'exploitation des richesses énergétiques et le développement économique après 1945, la diversité des régimes politiques mis en place, la présence de puissances militaires mondiales pour contrôler la plus importante voie maritime du pétrole, la permanence de tensions entre les Etats et la fréquence des guerres depuis 1980 témoignent de cette importance géostratégique qui s'est accrue encore au début du XXIe siècle. La conflictualité régionale, c'est-à-dire les formes d'opposition entre les Etats et les communautés, prend de nouvelles dimensions actuellement en fonction de la posture iranienne sur la question nucléaire, de la menace terroriste, des risques d'instabilité intérieure. La géostratégie du Golfe s'est donc complexifiée et chaque forme de conflictualité constitue un défi nouveau. Quelles sont les formes de conflictualité dans le Golfe - Pour y répondre, trois aspects sont abordés : les principales mutations géostratégiques du Golfe, les formes de rivalités majeures entre les Etats, les autres risques d'instabilité pouvant influencer l'équilibre régional.

### 'Contiguity' and 'Safe Passage': The Gaza - West Bank Disconnect in Israeli-Palestinian Conflict Resolution

*Aharon Klieman (Tel-Aviv University)*

Split polities and bifurcated states, territorially segmented and noncontiguous, pose a serious problem for peace making and for peace building. To the extent the Middle East peace process focuses on substance, diplomatic efforts aimed at a 'two-state' solution showcase the most contentious issues of borders, security, the right of return by Palestinian refugees, and the future status of Jerusalem. This paper redirects attention to the seemingly technical secondary agenda item of the relationship between the Gaza Strip and the West Bank since effective control over land and people goes to the very heart of Palestinian self-rule, Israeli-Palestinian coexistence and functional Middle Eastern regional integration. Dictated by human and physical circumstances, the arteries interlacing the area west of the Jordan River constitute the crucial 'integrative factor' in any blueprint for territorial compromise. Nevertheless, Israeli and Palestinian negotiators have been at an impasse since 1995 over the true intent of the 'contiguity' and 'safe passage' principles enshrined in the breakthrough 1993 Oslo accords. How to give these linkage clauses practical expression challenges cartographers, strategists and statesmen alike. Noting the West Bank and Gaza do not represent a natural territorial unit but are spatially partitioned by 32.1-56.2 kilometers of sovereign Israeli territory, the first section of this paper underscores the centrifugal effect of Gaza's remoteness from the West Bank seat of Palestinian authority, including the emergence of rival power centers and competing political elites. Bifurcation geographically, economically and politically into 'West Filastin' (Gaza) and 'East Filastin' (the West Bank) thus poses arguably the greatest challenge to Palestinian national unity and effective self-rule. The second section proceeds to outline legal, logistical and administrative barriers this Gaza Strip-West Bank disjuncture raises in bilateral Israeli-Palestinian negotiations, including the exact number of land and air corridors necessary for linking the two constituent parts of a future Palestinian state, their precise routes across Israel, as well as who is to exercise control. A concluding section cautions that an ungenerous or imposed territorial settlement premised on mutual separation could result in either extreme configuration: Israel interposing itself as a buffer between two divided Palestinian wings, versus a contiguous Palestinian state leaving Israel segmented. Juxtaposing stark scenarios of Israeli bifurcation or Palestinian bifurcation underscores which negotiating strategy -- zero-sum exclusivity or mutual compromise -- Israelis and Palestinians bring to bear on final borders and, daring to look beyond, on the nature of their inter-state relations.

### Sitting of the Fence

*Nurit Kliot (University of Haifa)*

Israelis are sitting or standing on their fences at all levels and scales: home, community region and country and fences of all kinds in Israel are neither neutral nor indecisive. Four conceptual contexts (not mutually exclusive) are presented for the study of fences:



Territoriality which involves the exclusive control of tract of land by an individual and a group and is expressed by aggression, displays of which are necessary to defend the territory (keep in/keep out). Defence and Security. Fence is short for defense and it is a barrier intended to prevent escape or intrusion or to mark a boundary. This is the political function of borders and fences. Defence and Protection of Property: the first fences were erected to protect and symbolize private ownership of property. Cultural - Social function of fences: relates to segregation of populations - voluntary and involuntary. This paper explores the motivations (real, assumed, perceived) for the construction of defences around rural communities in Israel. Forty-eight Regional Councils which incorporate 1018 rural communities were surveyed in relation to their system of fences and other security components such as gates, shelters, watch duties, watch towers, patrol roads and search lights. It was found that 485 rural communities out of the 1018 were classified by the Government as entitled for a full defence envelope mainly because of their proximity to the international borders of Israel which are depicted hostile (Lebanon, Syria, Jordan, Egypt and the Palestinian Authority). Sixty two communities which are located in a close proximity to Israeli-Arab villages also got a full defence package. Finally, rear settlements which are not entitled to Government funded defences, use their own resources to fend for themselves against criminal activities and to pronounce themselves as gated communities.

## C08.30-06 - Political Geographies of the European Union

*Chair: Georg Glasze*

### Transnational Expertise: Political Geographies of Knowledge in Brussels

*Merje Kuus (University of British Columbia)*

At the heart of European integration is the production of knowledge about how European space works or ought to work. To comprehend the process, we must understand what knowledge claims, from where, succeed in Brussels and what claims do not and how and why this is so. The most recent governance crises in the European Union underscore that the political and social space of Brussels knowledge production is far from the positivist image of objective expertise that is projected by the EU's bureaucracy itself. Rather, there are distinct geographical and geopolitical dynamics at play, especially the newly resurgent East-West and North-South stereotypes. Such stereotypes are especially visible in relations with Russia, which continues to be the subject of intense geopolitical maneuvering in Brussels. This paper examines what transnational expertise might mean in the context of EU-Russia relations: who make knowledge claims, how, and with what effects, and how they use geographical and geopolitical tropes in that process. The empirical material is derived from over eighty in-depth interviews with EU policy professionals, mostly in Brussels. Empirically, the paper clarifies how geographical stereotypes are being rejuvenated, contested, and transformed in Brussels today: how concepts such as northern and southern, eastern and western, old and new, member states are actually used by the EU policy professionals who devise and implement EU's policies toward Russia. Conceptually, the analysis is situated within the scholarship of critical geopolitics, critical policy studies, and geographies of knowledge. It contributes to our understanding of geopolitical and policy processes in the bureaucratic settings in which they actually unfold on a daily basis. Keywords: geopolitics, transnationalism, policy, Europe

### Europeanising Governance – blurring the nation state? The new tool “European Grouping of Territorial Cooperation”

*Tobias Chilla (University of Erlangen), Estelle Evrard (University of Luxembourg)*

In 2007, the European Commission invented and established for the first time its “own” juridical tool of governance for (sub-) national authorities, the so called “European Grouping of Territorial Cooperation” (EGTC). This tool officially aims to facilitate and to promote the “territorial cooperation” between public authorities on different political levels and on different sides of national borders. The paper at hand starts with a brief overview on how the already established ECTCs in different regions of Europe have developed. In particular, the sensitive question if and how competences can be delegated, is addressed. The main objective of the paper is to reflect on whose interest the new tool

actually can serve, beyond some technical facilitation: is there a by-pass of the national level? Can we observe a strengthening of the European institutions? Moreover, the potential establishment of a new political level is a crucial question: after some decades of an establishing trans-national political level, the trans-regional level might be a new form of European Integration. From a geographical point of view, it is interesting to note that this political process of establishing a new tool is linked to “territorial” cooperation: the fundamental category of territoriality has to be taken into account when reflecting on this link. The arguments of this paper are partly based on the involvement in several ESPON projects, notably ULYSSES and TERCO.

### Frontiere et technologie

*Amaël Cattaruzza (Ecoles de Saint-Cyr - Coëtquidan)*

L'usage des nouvelles technologies dans le domaine de la surveillance et du contrôle des flux aux frontières se généralise de nos jours. Autrefois limitée aux frontières contestées, les nouvelles technologies (senseurs, drones, robots sentinelles, etc.) sont aujourd'hui utilisées sur des frontières « pacifiées » dans un but de filtrage des flux (migrants, marchandises, etc.). Cette « technologisation » prend trois formes principales : numérisation (systèmes de fichages et d'informatisation du renseignement), développement de dispositifs de surveillance (senseurs, drones, etc.), robotisation (robot-sentinelle, entre autres). Aussi, cette diffusion des nouvelles technologies aux frontières a amorcé une double processus : d'une part une virtualisation de la frontière (virtualisation du renseignement informatisé, virtualisation de la surveillance, etc.), d'autre part, l'apparition d'une architecture frontalière de plus en plus complexe passant de la frontière-ligne à la frontière-zone et « pixelisée ». Ainsi, la technologie aux frontières permet de renforcer la possibilité de surveillance et de contrôle en-deçà et au-delà de la frontière. Pour Stephen Graham, cette transformation de la frontière entraîne l'apparition d'une frontière omniprésente (« ubiquitous border »), l'espace territorial étant intégralement « frontiérisé », permettant une surveillance et un contrôle permanent de l'étranger (comme du citoyen). Philippe Bonditti met pour sa part en exergue le fait qu'« effacer la frontière » dans le cas de l'espace Schengen a pour contrepartie le « traçage des individus ». Le lieu de contrôle physique et territorialisé que représentait la frontière tend à se transformer en un contrôle mobile (ou omniprésent), au fur et à mesure que l'identification des individus se fait plus précise dans l'espace européen. Ce constat présage une mondialisation à plusieurs vitesses, avec des phénomènes de blocages aux frontières non plus territoriaux (politique des visas), mais sociaux (contrôles sélectifs individualisés). Cette communication propose d'aborder et de développer ces différents aspects pour voir en quoi les frontières ainsi « technologiques » peuvent, ou non, changer de nature.

## Transborder openness of companies in divided cities at the Polish-German and Polish-Czech border

*Sylvia Dozbasz (University of Wrocław)*

The existence of national borders does not only mean formal-legal barriers, but also mental and economical barriers. Integration processes in the European Union create opportunities for the disappearance of internal borders and their separating impact. However, it seems that the effects of political barriers vanishing will occur with varying intensity not only at different national borders but also within particular borderlands. The pace and scope of integration processes will depend on local conditions e.g. local actors, physical barriers, infrastructural connections, differences in the level of economic development. Divided cities appear to be a good research subject for the integration processes at local level. It is connected with high intensity of social, economic and spatial phenomena and processes on both sides of the border and the opportunity to research the impact of the border on these processes, the border's existence in everyday life of the inhabitants (e.g. practical and really visible consequences of the border removal) and ample potential opportunities for integration. In order to assess the advancement of integration processes on a local scale, the divided city at the Polish-German border - Gubin/Guben, and at the Polish-Czech border - Cieszyn/ěeský Třín were chosen for analysis. The aim of this study was to research the permeability of Polish and its neighbours institutional space in a divided cities from the point of view of the everyday life of its inhabitants. The study covered the urban centres on both sides of the border. Economic entities providing chosen services for the people, such as: retailers, gastronomy, museums and selected offices were researched. The study aimed to show the level of openness of these institutions to clients from the other side of the border (e.g. offers in the language of the neighbour, possibilities of payment in the neighbour's currency, knowledge of the language). This allows, in turn, to determine the level of permeability of institutional space, its character, strength etc. The integration of institutional space is one of the first stages of integration of the divided city. This may lead to the formation of a common public space and strong functional connections. Comparison of Gubin/Guben and Cieszyn/ěeský Třín as regards transborder openness was also the aim of the study. Analysis has shown a significantly varying level of transborder openness of institutional space in examined divided cities. Moreover, differences in level of openness of companies depending on the type of activity were observed as well as an asymmetry in the scope of the influence of Polish, Czech and German institutional space. When comparing Gubin/Guben and Cieszyn/ěeský Třín, significant differences were observed, but there were also similarities found in character of transborder openness.

## C08.30-07 - Quantitative-statistical Case Studies in Political Geography

*Chair: Anton Gosar*

### Critical and functional approaches in geopolitics: Geopolitical vision of the world and the space of flows

*Vladimir Kolosov (Russian Academy of Sciences)*

The paper is based on the findings of the EuroBroadMap international project funded by the 7th European Framework Programme and, in particular, on the survey of about 9,400 undergraduate students from 18 countries. The objective of the project was two-fold. On the one hand, to analyse how their vision of the world is shaped by the historical and economic background, gender, number of languages spoken and personal experience. On the other hand, to reveal the relation of representations about a country and its 'visibility' in the mind of the young people with the 'real' importance of that country in the world economy and politics, its place in the space of flows. It was estimated through an analysis of the geographical distribution of foreign trade and direct investments, the pattern of migrations, regular air flights and the voting at the UN General Assembly. The initial hypothesis supposed that the geopolitical vision of the world depended on physical and cultural distance between the countries. This task required a combination of the methods developed in the framework of the critical and the functional approaches in geopolitics. Therefore, the methods typical for critical geopolitics like surveys, discourse and texts' analysis, and mental mapping were used together with a diachronic analysis of world flows and patterns. In general, the results of the survey and of the discourse analysis confirmed the initial hypothesis: a higher spatial mobility and income, the knowledge of foreign languages, as well as a broader personal acquaintance with the outside world contribute to a more positive but at the same time realistic perception of foreign countries, to the shaping of a more complicate feelings of belonging. Though 44% of the respondents have never been abroad, new generations are much more mobile than their parents. Most often the geography of respondents' travels includes three types of regions: 1) neighboring countries; 2) traditional historical centers in Germany, Italy, France, Great Britain, Greece, Spain, Czech Republic and Austria, 3) other popular tourist destinations. The geography of students' travels determines their knowledge of the world. The people who have a broader personal experience of the world have a more complicated identity and are more prone to associate themselves with supra-national communities. In answering to the key questions about the most and the least attractive countries where the respondents liked or do not like to live, in all countries they mentioned particularly often major world powers, neighboring states, the principal tourist destinations and few other countries - 'news-makers' like Israel, Afghanistan or Iraq.

### Gerrymandering in the Puszta

*Zoltán Kovács (University of Szeged)*

In Hungary when the collapse of the communist system became obvious the ruling party started 'roundtable discussions' with several opposition groups and organisations regarding the possibility of amending the Hungarian constitution and establishing a multi-party system. During these negotiations a compromise was reached and a new electoral law was passed by the Parliament with full consensus at the end of 1989. The post-communist Hungarian electoral system was modelled according to the German electoral system and comprised a mixture of a single-member electoral district and proportional representation using two rounds of balloting. The size of electoral districts was in harmony; their boundaries were set with consensus. Six free-elections were successfully held in the subsequent two decades according to the first post-communist electoral law. Even though the system of electoral districts became disproportionate over time due to demographic and migratory processes, no amendments were possible because for that the approval of at least two thirds of the MPs was needed. With the landslide victory of the conservative party in the 2010 Hungarian elections over two-thirds majority in the Parliament was achieved. With this political power a new electoral law was prepared by the ruling party provoking strong criticism on the side of opposition. This paper intends to point out the geographical bias of the new Hungarian electoral system. The main focus of investigation is the system of electoral districts. The new electoral law reduced the number of electoral districts from 176 to 106, consequently the map of electoral districts had to be completely redrawn. Using the results of the 2010 parliamentary elections we critically analyse how political advantages for the ruling party were created by the new division of electoral districts and what are the future prospects for malapportionment.

### Historical roots of contemporary voting patterns in the Czech Republic

*Tomas Kostecky (Institute of Sociology, Academy of Sciences)*

To pursue the aim of the paper we conduct an analysis of voting patterns in selected parliamentary elections that were conducted on the territory of the contemporary Czech Republic between 1920 and 2010. In each election the observed parties will be classified into six different party families (social-democratic, free-market liberal, Christian-democratic/conservative, extreme-left authoritarian and extreme-right authoritarian, ethnic). Voting patterns of individual parties as well as spatial patterns of electoral support for party families will be analyzed. The electoral results from the elections to the lower chamber of parliament in pre-WWII elections (1920, 1925, 1929, 1935), in the semi-democratic elections taking place during the early post-WWII era (1946), and from all but one of the elections that took place in the post-communist era (1992, 1996, 1998, 2002, 2006, 2010) will be used as the data source. Municipalities and districts will serve as units of observation. The main aims are:

## Semi-centennial Antarctic Governance: Lessons Learned from the Antarctic Treaty System

*Andrii Fedchuk (National Antarctic Scientific Centre)*

It is now widely acknowledged that the Antarctic Treaty signed on 1 December 1959 has become one of the most important milestones in solving the problems of international relations in the South Polar Region and the first well-developed institution to govern all kinds of human activities in the area south of latitude 60°S covering nearly 10% of the Earth's surface. This paper summarizes the results of activity of the Antarctic Treaty System and determines perspectives of its further development. In particular, it indicates the four main political precedents of the Antarctic international-legal regime. Firstly, the use of a whole continent exclusively for peaceful purposes. It is the first nuclear-free zone in the world. Secondly, it is a continuing and outstanding mechanism for resolution and prevention of international conflicts. Thirdly, it is an unprecedented international scientific collaboration. Finally, its well-developed environmental management based on ecosystem approach applied at continent-wide large scale. This study indicates the existence of an effective multilevel system of control for the political-economical decisions adopted within the Antarctic Treaty System by means of two major institutional principles: political-legal and organizational. The first one includes the Antarctic Treaty, relevant Conventions and Measures adopted by the Antarctic Treaty Consultative Meetings. For regulating the activities of the Antarctic community, the international governance bodies were established, which also serve as components of the Antarctic Treaty System. The current Antarctic legal regime is a dynamic system flexibly and timely responding to new regional issues such as demarcation of outer continental shelves, bioprospecting and regulation of tourist and non-governmental activity in the region. It is demonstrated that the absence of local authorities in Antarctica makes spatial management based on the principles of sustainable development a useful for a strategic approach, for regulating rapidly growing and diversified human activities in Antarctica, based on the principles of sustainable development. It is suggested that the basic provisions of the Antarctic legal regime might be contributed into international governance of another significant spaces beyond national jurisdictions, which all likely to become more contested in the future as environmental changes take effect and finite natural resources become scarce.



# C08.31

# Population Geography

## C08.31-01 - Demographic divide 1: Coping with local challenges of population decline and ageing

*Chair: Allan Findlay, Paul Gans*

### Coping with the consequences of demographic shrinkage and ageing: Strategies of decision-makers and households in rural inner peripheries in Germany

*Annett Steinführer (Johann Heinrich von Thünen Institute), Patrick Küpper (Johann Heinrich von Thünen Institute), Alexandra Tautz (Johann Heinrich von Thünen Institute)*

Demographic shrinkage and ageing to the east and west of the former Inner German Border are no new phenomena. Already in the 1970s 'dying' villages were predicted for the western parts of this region. Yet, these settlements exist still today. Once again, however, the whole region is subject to a demographic turnaround. The western parts which have been ageing and declining in their number of inhabitants since the 1970s experienced considerable migration influx immediately after the border was opened. Since the mid-1990s, however, migration balance is in most cases negative. Due to long-term negative natural population development, demographic shrinkage is accompanied by considerable ageing that brings some of the areas west to the former Inner German Border on the top of the ageing regions in whole Germany. In contrast, in the eastern parts out-migration used to be a continuous phenomenon after the fall of the Iron Curtain. Also here negative natural and migration balances lead to long-term population decline accompanied by ageing. Amounting to two or even more decades of demographic shrinkage, one can expect the existence of a number of established coping strategies on the side of both local and regional decision-makers and the population. Coping with and adapting to the consequences of the demographic (as well as the simultaneous economic and social) changes here is not a future question to be dealt with just theoretically but one of the present. Schools and surgeries were already closed down and transport connection thinned out, infrastructures are under-utilised and the number of vacant properties is increasing. Therefore, in a recent research project in the Harz Mountains, an inner periphery in Central Germany, we dealt with the questions of how decision-makers and the population cope with the negative impacts of the socio-demographic and economic decline of their regions and with the capacities they built these strategies on. The findings are based on semi-structured interviews with decision-makers and group discussions with senior residents. They indicate a wide range of such strategies applied but also their precarious dependence upon resources which are to be made available time and again. Coping and adaptation strategies of decision-makers and residents on all levels investigated (households, villages, small towns and regions) are therefore long-term endeavours which are themselves subject to continuous change. We distinguish defensive, reactive and pro-active types of strategies. In our paper we will

show under which conditions and with which rationales these strategies are applied and how they contribute to a further internal differentiation of the region investigated and, possibly, its socio-demographic future.

### Demographic decline and changing local governance in the rural areas of Japan

*Satoshi Nakagawa (Kobe University)*

This paper concerns demographic divide at national/provincial level and focuses on changing local governance affected by population decline and population aging. Low fertility and smaller number of reproductive-age population compared with preceding cohorts lead population decline and rapid population aging after 2000 in Japan. According to the official population projection based on the 2005 census, Tokyo Metropolitan Area continues to raise its proportion of population to the whole country in the next decades, however rural areas will lose 20-25 % of its population till 2035. Several hundreds of settlements are estimated to become uninhabited in the next decades. There is an apparent demographic divide even within Japan. We investigate rural/urban population dynamics of Hyogo province. Hyogo province is neighboring to Osaka, second largest metropolitan area of Japan, and Kobe city, the capital city of the province and located southernmost of the province, has 1.4 million inhabitants. Hyogo province has 5.6 mil. inhabitants in 2005 and the population is estimated to decline to 4.8 mil. in 2035. The population of the Kobe Metropolitan Area is almost stable till 2035, however several rural municipalities located central and northern part of the province will decrease more than one-thirds of their population in the same period. We have visited two rural municipalities of the Hyogo province intensively since 2006 and discussed with the residents how to improve local governance and attract young native residents to stay in a settlement or to return to the settlement after finishing higher education or after marriage in the urban areas. We conducted questionnaire surveys there, as well. Many young people born in the rural areas think even nowadays that they have to take care of their parents and the farmland inherited from the ancestry, even if the farmland yields only debt. And, the number of siblings is around two in the last decades even in the rural areas, and parents expect their limited number of children to live in the settlement and to succeed the farm. Nevertheless, it becomes more and more difficult to live only on the agriculture there and there are not enough non-agriculture job opportunities, in particular for those with higher educational attainment. The conservative atmosphere of rural settlements is unattractive for the younger generation. As a result, they tend to leave the settlements away and rural settlements continue to lose its population. Population projection of the rural area of Hyogo province on the settlement level is presented as well. We also draw the future settlement system of the region, which influences local people's purchasing behaviors and public services such as medical/welfare services. We show the results of the population projection and future changes in settlement system to the residents and discuss what we do now.

## The Role of Urban Planning in Germany within the Context of Demographic Aging

*Stella Altenburg (TU Dresden)*

The proposed paper addresses the question 'Which strategies for coping with demographic decline are most appropriate at the urban level?' The main focus is put on the role of planning in cities and how they deal with the challenge of demographic aging - the most distinctive aspect of demographic change in Germany. The repercussions of aging within the wide spectrum of urban planning are already discernable and will be a considerable undertaking for cities now and in the future. Different fields of actions are affected by the increasing number of people aged 65 plus and 80plus who require specific services, products or help. These fields include: social and technical infrastructure, mobility, housing, civic engagement, economy, labor market etc. To deal with the impacts of aging on these topic (e.g. changing patterns of demand) it is necessary to get a full understanding of the organization and actors within the field of urban planning. Accordingly, the proposed paper is dealing with the role of urban planning, using case studies of two cities in Germany which are both affected by aging in their own way: first, Bielefeld (North Rhine-Westphalia) which has chosen to let a so called 'Demography Commissioner' work for the city to put the topic on the political agenda and second, Baden-Baden (Baden-Württemberg) which has been heavily affected by the process of aging in the last decades while remaining a prosperous city with a wide spectrum of touristic attractions. The presentation discusses the following research questions: (1): How are cities affected by aging? (2): How is the topic 'demographic aging' integrated into the scope of city planning duties? (3): How is the field of actors shaped? (4): Is it possible to distinguish different approaches to the topic of demographic aging in urban development? A general overview of the spatial relevance of demographic aging (including duties and responsibilities) precedes the results of the case study as the main part of the presentation. Using them, multiple ways to approach the topic of aging can be revealed and distinguished. It can be shown that there has not been an exclusive focus on the constituent 'aging' within the context of demographic change so far. Considering the fact that both an aging population and urban planning are processes - not sudden events - discussions on demography should not be one-dimensional. Due to the diversity it is more decisive to develop overarching objectives and implementation measures. Hence, the selected cities show different approaches and strategies to the challenges of demographic aging. According to their individual and specific demographic conditions, city history and development they both implemented ways of actions which suit best for their cities and the respective challenges. The proposed presentation eventually leads to general conclusions and recommendations for practice and further research.

## The changing education infrastructure in shrinking regions

*Walter Bartl (Universität Halle-Wittenberg)*

Demographic change and economisation are among the central challenges of the welfare state. The proposed paper assumes that demographic change might enforce a further economisation of welfare services. It investigates demographically triggered mechanisms of economisation focussing on a comparison of education sectors in demographically shrinking regions. Institutions and infrastructures of the welfare state are geared towards certain volumes of (sub) populations. Due to education expansion participation rates are relatively high in the different education sectors of modern society. Hence declining population numbers might lead to less demand for education services. Therefore it is hypothesised that demographic decline creates a pressure to economise oversized education infrastructures. The analysis concentrates on a comparative study of education sectors in the East German state with the most pronounced fertility decline and outmigration. The analysis of the education system is based on secondary statistical analysis (state and county level) and expert interviews. Selective comparisons with other regions are applied complementarily. First results show that the economic pressure on education sectors created through smaller age groups is highly dependent on participation rates. In elementary education, where participation rates are traditionally high in East Germany, the number of organisations was reduced almost proportionally to the decline of the number of children up to six years. Nevertheless the economic pressure also stimulated the creation of multifunctional organisations providing care not only to one but to several age groups. The expansion of child care service units to after-school care was enhanced through the political decision of transferring this task during the transformation process from primary schools to child care organisations. Obligatory school attendance similarly makes general schools vulnerable to demographic decline. Economising effects of population decline are less obvious in tertiary education. Due to low participation rates and recently through education migration this education sector was able to further expand its size concerning numbers of students. Furthermore disciplinary differentiation was enhanced. The results can mostly be interpreted as supporting the proposed relationship between demographic decline and the economisation of welfare services. This relationship seems to be based on administrative planning and evaluation techniques within the public sector (e.g. in-kind calculations like "headcounts") fostered during the last years of NPM discourse. But they also show that not all fields are affected equally by the economising pressure of demographic decline and that other conditions (e.g. political programmes) have to be considered as well.



## C08.31-02 - Demographic divide 2: Migration and population change on regional level

*Chair: Prof Allan Findlay, Paul Gans*

### Spatial patterns of demographic shrinkage in post-soviet state (Lithuanian case)

*Dovil Krupickait (Vilnius University)*

Shrinkage of total population in 17% in 22 years (or in 12.3% in 10 years), net migration decrease -13.5%, natural decrease -3.5%: no war, no natural disasters, no urbanization or industrialization, but in some municipalities of Lithuania population decrease reached 20% in 10 years. Which spatial patterns did they have? What are the main spatial factors of the changes? According to analyse of long time tendencies of spatial population processes in Lithuania, we points out different patterns of devastating depopulation, depending of local demographical structure, post soviet transformations of urban structures and globalization.

### 'Go West, Young Man'!? The spatial structure of inter-regional migration in Germany and it's impact on regional population growth and age structure, 1995-2009.

*Nikola Sander (Wittgenstein Centre)*

Germany is currently undergoing a demographic revolution that is fundamentally transforming the country's population age structure. The pace of population ageing is set to rapidly accelerate when the oldest members of the baby boomer generation pass the traditional retirement age of 65 in 2020. As the number and proportion of elderly Germans increases, the processes underlying continuity and change in the spatial structure of internal migration become a fundamental issue. This is because internal migration is the most volatile component of population change and has thus become more important than fertility and mortality in shaping regional population growth and age structure. Migration among the elderly and out-migration of younger adults has far-reaching implications for economic development and for planning strategies to ensure adequate health, housing and welfare in the right place at the right time. However, little research has been conducted in Germany to identify past and potential shifts in spatial patterns. Existing work on internal migration is largely descriptive, mostly focusing on net-migration, or exclusively on migration streams between eastern and western states. This paper aims to provide a comprehensive profile of internal migration between Germany's regions. Central goals are to identify enduring empirical regularities and changes in the spatial structure of internal migration, to estimate the spatial interaction between regions and to determine the impact of internal migration on regional populations. Moving beyond

state-level analyses, migration flows by age and sex between 96 'Raumordnungsregionen' are analysed along the four dimensions intensity, connectivity, impact and distance (see Bell et al., 2002) to obtain a comprehensive picture of the spatial structure of international migration flows over the period 1995 - 2009. In addition, intensities and distance-decay of age- and sex-specific flows between 295 'Kreisen' are analysed to shed light on migration patterns within 'Raumordnungsregionen', and to take into account commuting patterns and labour mobility. The results are visualized using a novel mapping technique. The analysis reveals systematic spatio-temporal variation in the intensity and connectivity of migration, and in the impact of migration on regional population growth and age structure. It is demonstrated that analyses of migration at the level of the sixteen federal states fall short of providing a sound understanding of the spatial structure of internal migration, including patterns and intensities of east-west migration.

### A Study on the Rules of Rural-urban Migration during China's economic transitional period

*Guoxia Wang (Shanxi University)*

Since China's Reform and Opening-up there have been great changes and some rules are demonstrated in the rural-urban migration in China in the aspects of migration demographic characteristics, migration approach, spatial pattern and so on. Chinese scholars have been paying more attention to case studies of migration due to more availability to migration data since 1980's and making considerable accomplishments, but little progress has been made on migration theories. By doing a tentative work, the author concludes three migration laws by extending and integrating the present research results. 1.The migration motivation and the spatial pattern of migration follow the Economy-incentive Rule. The economic factor acts as the main driving factor of rural-urban labor force migration. The migration destination is adjacent to the migration departure. The spatial pattern of inter-provincial migration demonstrates a polarization trend. 2.The demographical features and the migration behavior demonstrate the Human Capital Differentiation Rule. Most migrants are elites in rural areas. The migration distance varies according to the migration's population: first an inverse increase and then an accelerative increase. Migrants with high human capital value tend to migrate to the urban areas with their family members. The new generations of urban migrant workers more desire to integrate into the city than their peasants. 3.The migration patterns and the employment selection follow the Social Relationship Rule. The chain migration is the most common migration pattern and their access to employment information still relies upon their social networks. In the future, a large-scale rural-urban migration will continue with the economic incentive still being one of the important factors affecting the population migration. Since urban areas centering metropolitans will continue to promote China's economic development and play an significant role in the process of urbanization, the places such as the cities in eastern China and the large and medium cities will

continue to be ideal destinations for migration workers. But with the implementation of China's policies on regional balanced development and other related efforts, the trend of large-scale inter-regional migration will be on decline and rural labor force will move to central and western regions or smaller cities (towns). Although the new generation of farmers have a strong will to live in cities, China's present institutional arrangement can not realize their dream at once so the migrant workers will continue to move between urban and rural areas. But the population who choose to live in the cities is predicted to rise. Key words: rural-urban migration, migration rules, China

### **Rural-to-Urban Migration in Turkey During the Past Thirty-Five Years: 1965-2000**

*Ayşe Gedik (Middle East Technical University)*

This study analyzes rural-to-urban out-migration during thirty-five years between 1965-2000 in the five five-year periods of 1965-1970, 1975-1980, 1980-1985, 1985-1990, and 1995-2000. Rural-to-urban out-migration is studied in terms of village-to-province center out-migration. The data is from the Population Censuses which are 100% sample, and the migration data are based on the de jure population. Various measures such as the size and the distribution of the village population, out-migration rates, percentage of intra-province migration, and the significance of the three largest metropolises are analyzed. The analyses are mainly descriptive. Some of the significant findings are as follows. Although after 1980, the village population decreased, and the number and rates of out-migrants displayed a V-shape with a dip in 1975-80 period. Percentage of intra-province out-migration decreased consistently. The distribution of the above stated measures of out-migration became more homogeneous, i.e. the respective entropy levels increased. Spatially, however, the differences between regions increased--especially between southeastern region (where fertility rates are 3-4 folds of the average for Turkey) and the rest of Turkey. The effects of the immense interregional differences in the fertility rates and the resultant differences in the pool of potential out-migrants, and the consequent possible significant future changes in the directions of the village out-migration patterns and the serious future problems are discussed.

## C08.31-03 - Demographic divide 3: Population decline in post-socialist countries

*Chair: Prof Allan Findlay, Paul Gans*

### Population changes in postindustrial areas in Poland

*Slawomir Kurek (University of Cracow), Tomasz Rachwa' (University of Cracow)*

Demographic trends in postindustrial areas can show a considerable differences depending on the level of their current economic development. In Poland and other Central-Eastern European countries, after the collapse of central planned economy and implementation of market economy, a rapid changes in migrations and fertility rates were observed. A consequence of these changes was acceleration of population ageing, which is one of the most distinctive demographic issues in modern society. There are, however, significant differences in the intensity of the population processes between countries and even more between regions. Population ageing leading to depopulation is particularly strong in old industrial areas with decreasing employment resulting in declining in-migration and fertility. Acceleration of ageing has been particularly observed in regions of countries which underwent the process of economic transition to market economy with declining heavy industry and restructuring old industrial areas. Most of those industrial districts underwent the process of restructuring with the development of services, closing down ineffective plants and reindustrialization. The changes resulted in profound increase in unemployment and re-orientation of migration processes. In some of them special economic zones were created to attract foreign investors in order to reduce regional economic disparities. However, the process of re-conversion of traditional industrial centers into modern technology clusters was mostly successful in the vicinity of largest cities with appropriate infrastructure. In some industrial centers with mono-functional type of economy and lack of qualified staff, a process of economic marginalization and negative demographic trends has taken place leading to increased economic disparities and social exclusion. This demographic divide between rapidly developing metropolitan centers and declining old industrial areas poses challenge to policy-makers how to level out existing socio-economic differences. The aim of the paper is to show population growth or decline, including the magnitude of migration and changes in fertility in postindustrial areas in Poland, according to a division into industrial areas from 1988 (before the transition). Changes in population age composition as a result of above mentioned population changes were also taken into account. The data comes from Central Statistical Office of Poland from 1988 and 2010. An attempt was taken to answer the questions how degraded and restructured postindustrial areas have an impact on population development in a local scale in the conditions of European integrations on the example of a country under economic transition.

### Demographic and social challenges in the rural areas of Romania

*Liliana Guran-Nica (Spiru Haret University), Mihaela Persu (Romanian Academy), Daniela Mihaela Nancu (Romanian Academy)*

Much of Romania is basically country-side, a significant proportion of population and of socio-economic life being profoundly rural, compared to other countries in which villages are not that numerous. The current demographic situation in Romania is unprecedented, e.g. lower birth-rates, a negative migration balance, intense labour migration abroad, higher life expectancy and hence a more numerous elderly population. This situation is supposed to continue and even worsen in the future, with detrimental consequences for society as a whole, given that the state-run social security system and other types of benefits will be subjected to greater pressure. The decline of the rural began under communism (in the 1980s) when the industrialisation drive used to attract large numbers of villagers to town. The restructuring process and the Land Law 18/1991 made the industrial population return to the native country-side. However, there are still many settlements that have been losing their population through aging and inevitably a higher mortality rate, and moreover the long-term migration abroad of the active and experienced labour force, in particular. In this way, the respective communities are being faced with acute social and economic problems. The aim of this paper has been to analyse the difficulties experienced by rural communities and the measures taken by the Romanian state and by the local authorities in order to revitalise the rural space.

### Population ageing – recent Demographic characteristics in Bosnia & Herzegovina

*Alma Pobric (Faculty of Science), Nusret Dreskovic (University of Sarajevo), Nusret Dreskovic (University of Sarajevo)*

At the turn of the 21st century population ageing has become dominant demographic process of many European countries as well as of Bosnia and Herzegovina. Bosnia and Herzegovina is the transitional country which is facing rapidity of ageing and its demographic situation is mostly similar to western style developed countries. One of the main drivers of population ageing is transition from high fertility to the low fertility which country recently experience. Bosnia and Herzegovina became society which is characterised by a decline in the proportion of younger people and increase of oldery as the result of decline in total fertility rate more than decline in mortality rates; this ageing is known as 'ageing at the bottom of the age pyramid'. The demographic trends is characterized not only by lower fertility but by emigration of working-age population and reproductive-age adults as well. The analysis are based on statistical data from the last two population censuses and estimates for the recent period. Recent demographic trends not only reflect contemporary socio-economic adjustments, but also past demographic characteristics, war and political events. Keywords: Population ageing,

Bosnia-Herzegovina, transitional country, fertility decline, increase number of older population

### **Below-replacement Fertility in European Post-Socialist Countries – the Example of Croatia**

*Vera Graovac Matassi (University of Zadar)*

At the beginning of 1990s, significant political changes occurred in European socialist countries, which resulted in new social and economic relations and in a remarkable demographic transformation. This transformation has been remarkable in its speed and scope and today most of European post-socialist countries are similar to Western European countries in view of fertility and marriage patterns, age at first marriage and child birth, population aging, etc. Croatia, as a post-socialist country, has experienced significant economic and demographic changes since its independence. However, the roots of negative demographic processes in Croatia date back to late 1960s. In the last twenty years, the most prominent demographic processes in Croatia have been depopulation and population aging. Additionally, since 1991 Croatia has had constant natural decrease whose consequences are visible in both economic and demographic aspects. For the last forty years, Croatia has been characterized by persistent below-replacement fertility levels. Namely, since the beginning of 1970s, TFR in Croatia has been below the level of replacement (in 1961 TFR was 2.15 and in 1971 it was 1.96). In the following decades the situation worsened significantly and since 2001 the TFR has been between 1.33 and 1.50 children per woman. Due to population decline and other negative demographic changes, coupled with specific socio-political changes, Croatia has been faced with many difficulties which are particularly evident at regional and sub-regional levels. In attempt to respond to natural population decline the Government introduced a new population policy in 2006, but its realization and effects are still questionable. The aim of this paper is to investigate the causes and effects of long-term below-replacement fertility in Croatia, the changes in age and marital status of child-bearing women, and compare fertility changes in Croatia with other European post-socialist countries. The secondary aim is to analyze demographic changes at regional level within Croatia and identify the differences between rural and urban areas. It is also necessary to investigate the influence of fertility and population declines, which have been more prominent in rural areas, on education, economy and infrastructure.

## C08.31-04 - Demographic divide 4: Differences in fertility and mortality

*Chair: Allan Findlay, Paul Gans*

### Global Population Trends – Convergence and Divergence

*Frank Swiaczny (Federal Institute for Population Research)*

In 2011 the world population hit the threshold of 7 Billion people and according to the latest population projections of the United Nations Population Division the population will continue to grow in the foreseeable future. Especially in the least developed countries fertility and related growth rates are still high and a population growth of another Billion within the next 14 years is most likely. At the same time more and more countries face ageing populations as a result of past declines in fertility and a growing life expectancy. According to the UN data global population trends are characterised by a general convergence of demographic indicators as more and more countries are moving forward in the process of the demographic transition. The United Nations Population Division has recently issued time a population projection covering the period up to 2100 for the first which is also based on a new method to derive the assumptions underlying the projection. The recent projection applies a probabilistic Bayesian Hierarchical Model to derive individual trajectories of fertility change for each country and probabilistic population projections are released as well. With the new method's use of past trends of fertility decline of individual countries the respective probabilistic projections produce more divergence among country's demographic patterns compared to previous projections. The presentation will provide an overview of global convergence and divergence of demographic processes based on the latest UN World Population Prospects and try to question consequences for the interpretation of the demographic transition of developing countries in the light of the newly available data.

### Changes of fertility patterns in Poland and UK

*Slawomir Kurek (University of Cracow), Nigel Walford (Kingston University)*

The decline of fertility below the replacement level is one of the indicators of the second demographic transition. The onset of the second demographic transition in Europe covered Western Europe in 1960s and diffused subsequently to other parts of the continent. In Eastern Europe a fall in total fertility rates below the value of 2.1 was recorded at the beginning of 1990s and was associated by some scholars to the collapse of the communist system and introducing market economy. At present countries of Eastern Europe show the lowest values of TFR (at 1.3-1.4) while in the west a fertility recovery is observed. Regional disparities in fertility within particular countries also exist resulting from different timing in the spread of value orientations associated with SDT, especially between urban, suburban and rural areas. The aim of this paper is a

comparative study of changes in fertility patterns between Poland and UK in spatial layout at the beginning of 21st century. Despite apparent differences at the national level, this research seeks to find similarities in the spread of second demographic transition from core to peripheral areas taking into account its diffusive character as well as to show what are the possibilities to reduce demographic divide between western and eastern Europe on the example of these two countries. The data were taken from national statistical offices.

### Comparison of urbanization's influence for demographic behavior in South and North Korea after 1950

*Pavel Em (Russian Academy of Sciences)*

Korean War divided ethnically identical nation to two countries in 1953. The main goal is to compare influence of urbanization to demographical behavior in two Koreas. For this research we used statistical materials of North Korea Central Yearbooks, Official Report of population census of 2008, Korea Statistical Yearbooks and South Korea's Statistical Information Service (KOSIS). Urban policy made main influence for development of demographical behavior. Northern part blocked excessive development of urbanization. Cities were closed for those who were born in rural locality. In contrast, cities in Southern part became magnets for a huge number of chip workforces. Urban policy began only on 1990 with partial decentralization of some industries. Comparison of urbanization showed that in the North urbanization increased twice from 1950 to 2010, and almost for four times in the South! Lifestyle in the South is absolutely changed. In the North idea of Juche is still dominated and deviations are abruptly punishable. From 1950 to 2010 main demographic indexes decreased, but in the South much more than in the North. Crude birth and death indexes decreased in the South accordingly at 3.3 and 1.6 times while only 1.6 and 1.2 in the North. At that, natural increase rate is still satisfied for normal reproduction in the North and do not in the South. Active building of careers and women's involving for economy were main reasons for increasing for age of marriage. In the South it is bigger for about 5 years than in the North. So, both Korean societies characterized by modern type of reproduction with stable decreasing of fertility rate (from 2.7 to 2.2 in the North and from 4.5 to 1.2 in the South). Herewith, stably increased number and rate of divorced, especially in the South. Better medical care rapidly decreased rate of infant mortality in the South and weakened it in the North. Boys always dominate in natural sex ratio. In Orient it is compounded with marked preference for boys. Remarkable changing in age-sex pyramid is increased rate of old people with parallel decreasing of children and employable people's rate. So, population in the South is getting older faster than in the North. Population in the North is almost identical regardless from type of settlement. At the same time differentiation of main indexes in rural and urban settlements in the South might be impressive. Regional differentiation of the demographic indexes is in the direct ratio from level of urban rate. These changes showed that Korean societies are on the first steps of demographic transition.

## Socio-Spatial Patterns of Population Growth and Associated Demographic Character in India

*Bimal K Kar (Gauhati University), Madhushree Das (Gauhati University)*

With 1.21 billion people (Census of India, 2011) the world's second most populous country India, which constitutes 2.4 per cent and 17.3 per cent of the world's land area and population respectively, has still been passing through a critical demographic phase. Although the annual growth rate of population in the country has witnessed a slight decline during the last two decades, it has still been as high as 1.65 per cent during 2001-11 as against world's 1.5 per cent, and it varies from 1.19 per cent in the country's southern zone to 1.83 per cent in the northern zone. Moreover, in respect of inter-religion variation in population growth rate, it has been as high as 3.12 per cent among the Muslims and 1.87 per cent among the Hindus during 1991-2001. Such a high population growth in the country is associated with the prevalence of considerably high birth rate and immigration particularly in the northern and eastern parts of the country. This is reflected in the significant increase of population share in the northern zone from 32.86 per cent to 36.46 per cent during 1971-2011 with consequent decline from 24.80 per cent to 20.90 per cent in the southern zone. What is more important here is that such a spatio-socially varied population growth rate with varying base population size in each zone/state witnesses significantly varied demographic character with far reaching future consequences. Moreover, if this trend continues, it is not very far for India to cross even the most populous country China. With this background an attempt is made in this paper to analyse the pattern of population growth and its associated demographic implications including changing pattern of population composition in India mainly during 1971-2011 primarily based on secondary data obtained from different Census of India volumes, UNDP's Human Development Report and Population Reference Bureau.

## C08.31-05 - Population geography in a post-census world 1

*Chair: Allan Findlay, Etienne Piguet*

### For better or for worse: The new population census in Switzerland

*Alexandra Stam (FORS)*

During the 2010 Census round, almost half of the European countries applied alternative census approaches, attesting to an increasing trend of moving away from traditional data collection methods. The alternative approaches are mostly based on register data, either exclusively or in combination with other data sources. In Switzerland, the new Federal population census results from the combination of four surveys. While the register survey provides information on the entire resident population as drawn from various registers, it is completed with a structural survey (an annual written survey of 200,000 people); thematic surveys (telephone sample surveys of 10,000 to 40,000 persons); and the Omnibus, a telephone sample survey of 3,000 persons on current issues. Changes occasioned by the move towards register and survey based censuses is of particular interest to FORS, the Swiss Centre of Expertise in the Social Sciences. FORS is actively involved in methodological research on data quality, including issues of survey non-response and minority representation. In addition, it closely collaborates with the Swiss Federal Statistical Office (SFSO) and serves as an intermediary between the SFSO and the research community in Switzerland. Rather than discussing empirical results - 2010 data have only been recently and partially released - the presentation will provide an overview of what is delivered to researchers and how this contrasts with the traditional approach. Based on discussions with key representatives of the SFSO, but also with some methodologists and users of census data, it will aim to share and trigger reflections on the consequences of such a move in terms of geographical representation, analytical content, data access, and data quality. Such reflections should contribute to framing researchers' needs and outlining strategies as to how improve data quality.

### Exploiting administrative data in the UK as an alternative to the census

*Gillian Harper (MHA and Cass Business School), Leslie Mayhew (Cass Business School)*

This paper takes the view that in the UK, not only is a 'post-Census' world possible, but also desirable and inevitable. This is based on our experience of developing and providing a methodology that counts populations entirely from local administrative datasets, bypassing any dependence on official statistics from the Census entirely. It discusses the datasets that feed into the process, the techniques that are required to link data in the absence of consistent personal identifiers in the UK, and how the different sources are combined into one population database. The methodology was devised over a period of

years in response to numerous local government and health authority concerns about potential population undercounting, the infrequency and high cost of the Census, two-year delays in the dissemination of results, and the inflexibility of Census outputs once they become available. In July 2010, the British government announced their intention to scrap the Census in its existing format, deeming it as 'an expensive and inaccurate way of measuring the number of people in Britain'. In December 2011, one of the authors appeared before the Government Science and Technology Committee to provide evidence on alternatives to the Census for use in research. In this paper we will give an overview of our methodology, focusing on the advantages it offers, highlighting the wealth of socio-economic variables available based on administrative sources at a person and household level, including ethnicity. In terms of consequences, although we firmly take a positive view of administrative alternatives, we acknowledge that it depends on users and their perspectives and that this methodology benefits local analysts and planners in particular; however, it also depends on the quality of data sources and continued access to them. We further show that administrative based population counts, although able to provide more detailed and comprehensive data, are not complete substitutes for a Census. A final section will consider the gains and losses of information that might result and how and whether these could be reconciled by exploring what other forms a post-Census world in the UK may take, including a hybrid of administrative data and surveys.

### The move to register-based census: Pro's and con's for migration statistics

*Anne Herm (Université de Louvain / Tallinn University), Luule Sakkeus (Tallinn University), Allan Puur (Tallinn University), Michel Poulain (Université de Louvain / Tallinn University)*

Obtaining reliable migration data may be challenging when moving from traditional population censuses to register-based censuses. Traditional censuses face increasing difficulties to collect complete and high quality data due to increasing cost, limitation in questions, higher mobility of person making contact difficult, and increasing proportion of no answer. The move from traditional to register-based census is unavoidable in Europe and 2021 round censuses will probably be register-based. Nearly half of European countries already used in 2011 census register data in various ways from a fully register-based census combining data from numerous administrative registers to register-assisted enumeration replacing door-to-door enumeration in traditional censuses. The register-based census has advantages and limitations. The main advantages are lower cost and easier operational conditions while it can be reproduced more often than traditional census. Our research in EU countries confirm that register-based data have less coverage problems than traditional censuses and surveys and provide equally reliable data except in countries where the centralised population system is still not fully operational. Register data may give even more detailed geographical disaggregation compared to traditional census. The limitations of administrative registers come from the applied administrative rules as variables and their definition are fixed by legislation and do

not necessarily fit with international census recommendations. Concerning migration statistics the traditional census has never been a rich data source for producing data on migration flows except for internal migrants by using information on the place of previous residence while international emigrants are by definition not enumerated. On another side, censuses are appropriate to characterize the population with foreign or migration background by considering variables such as country of birth, country of citizenship, country of previous residence and year of immigration and socio-economic characteristics. Concretely the register-based census could be more favourable for migration statistics as migration flows are continuously registered in population register except for emigrating nationals that often do not report their departure. In addition, the population register as well as other registers (like aliens register, social security register, education register, etc?) include on a continuous and exhaustive base most needed socio-demographic characteristics of the population with foreign background, as well as a unique personal identification code allowing linked data from several registers. We will present concrete experiences of countries in improving the availability of data on population groups with migration background by exploring the possibilities and potentiality of population registers data in the framework of the implementation of a register based census.

### Understanding and Validating Acxiom's Research Opinion Poll Data for Social Science Research in Post-census Britain

*Chris Thompson (University of Leeds), John Stillwell (University of Leeds), Paul Norman (University of Leeds), Martin Clarke (University of Leeds), Martin Clarke (University of Leeds)*

Historically, the decadal population censuses have produced the base for many of the population and socio-demographic statistics across the United Kingdom (UK), providing comparable information from the national to the local level on a range of topics, and acting as a benchmark for many other statistics. However, the 2011 Census may well be the last to be administered across the UK if Cabinet Office Minister Francis Maude and the Conservative/Liberal Coalition Government decide to scrap any future censuses in favour of alternative means of counting the population. Therefore, in April 2011, the Office for National Statistics (ONS) established the 'Beyond 2011' Programme to consider how to provide more cost-effective and frequent population statistics than a 2021 Census. As well as exploring a wide range of administrative and survey sources of demographic data, the ONS as part of 'Beyond 2011' is also investigating the potential of commercial data sets; simultaneously, social science researchers are beginning to investigate whether transactional data provide credible insights into societal behaviour. Consequently, this paper provides an independent review of a large commercial data set available annually from a company called Acxiom. Acxiom's Research Opinion Poll (ROP) is a private sector sample survey designed to capture detailed information about households across Great Britain (GB). To ensure an inclusive discussion, we combine a number of the questions

set in the literature for analysing secondary data sources with the criteria for assessing the statistical options of data from the 'Beyond 2011' Programme. This allows us to create a framework to validate the data recorded via the ROP on a number of factors such as the purpose of collection, the methodology, the frequency of collection, the geography, its content, accuracy, and its credibility. Furthermore, the paper also offers a comparative analysis against well-known datasets including the 2001 Census, the Living Costs and Food Survey (LCF), the Labour Force Survey (LFS), Understanding Society (US), the General Lifestyle Survey (GLF) and the English Housing survey (EHS). The paper reveals that the ROP survey generates over one million household responses a year, available for analysis at household address level. Additionally, when compared to other surveys, the ROP offers a good selection of core variables typically used in social science research, whilst also providing data that comparable surveys do not (income). The paper demonstrates through a combination of univariate comparisons, bivariate analysis and logistic regression modelling that the ROP data are reliable, robust and repeatable over time. To close, a summary of the main findings from the paper are given as criticisms and recommendations are provided on the suitability of Acxiom's ROP data for use within social science research.



## C08.31-06 - Population geography in a post-census world 2

*Chair: Allan Findlay, Etienne Piguet*

### Calling Time on the Census? Using surnames and telecoms for population geography

*James Cheshire (UCL Centre for Advanced Spatial Analysis), Jonathan Reades (UCL Centre for Advanced Spatial Analysis), Paul Longley (University College London)*

Rising rates of international migration have made the monitoring of increasingly complex population flows through traditional sources of fine-scale demographic data increasingly problematic. Combined with the spiralling costs of data collection by house-to-house visits and mass mailings - to say nothing of the processing costs - there is serious discussion as to whether the 2011 Census should be the last 'traditional' one undertaken in Britain. So as we move 'Beyond 2011', the search is on for proxy or replacement datasets capable of replicating some of the richness of data offered by a traditional long Census form, but at a fraction of the cost. The impetus for radical change comes at a time when a widespread shift to digitally-enabled transactions and interactions across a range of platforms has made it possible to conceive of data that might deliver similar coverage while offering far lower latencies in collection and reporting. It is in this context that we need to understand the interest in repurposing public or private sector datasets and analysing them using powerful public computing infrastructures. Such developments present an important opportunity to work towards a census solution that is both more cost effective and offers a higher temporal resolution without compromising detail. However, for data from the public (such as electoral rolls, medical registers, employment databases) and private (such as telecommunications records, storecard and credit card databases) sectors to be used in this way, urgent efforts are needed to combine and validate them. Accordingly, in this paper we will examine two 'big data' sources previously considered separately: surnames taken from the electoral roll, and international calling activity collected from a telecommunications network. We then propose to compare the results derived from these datasets with Britain's Census outputs to look for structural correspondences between, or biases in, one or more of the sources. Although these two datasets both have a higher temporal resolution, their spatial resolution is variable with respect to the current Census Output Areas for Britain and they are representative of fewer people. We present findings from an initial investigation into whether combining these two relatively novel data sources enables us to infer information conventionally offered by the national identity and ethnic grouping questions on the British Census. By using small-area statistics from alternate sources to examine international migration, we hope to help policy-makers and population researchers better understand the degree of cross-validation or mutual incompatibility

between widely varied, large-volume data sets. We will also consider the potential privacy issues involved in this type of 'big data' research and the challenge of identifying 'hard to reach' populations in the absence of more costly outreach efforts.

### Geodemographics: Creating a Classification at the Level of the Individual

*Luke Burns (University of Leeds), Mark Birkin (University of Leeds), Alison Heppenstall (University of Leeds), Linda See (International Institute for Applied Systems Analysis)*

Area-based geodemographic classification schemes are a popular means of population categorisation across a variety of fields spanning both public and private sector applications. This form of segmentation enables relatively efficient population targeting to be conducted in fields such as commercial marketing and at-risk population identification. This research aims to challenge the current geodemographics ethos by investigating the benefit to be gained by a move away from conventional areal unit categorisation to a system capable of classifying at the level of the person. A classification for Leeds, UK will be presented with a further overview of an ongoing national (UK) classification of individuals, something which remains untried in academia. Undoubtedly, any system with this level of discrimination will by far surpass existing schemes confined to spatial units. Furthermore, issues such as ecological fallacy, the Modifiable Area Unit problem, and generalisation are three aspects to be considered when interpreting any spatially aggregated data and hence a move away from such problems is one of the objectives of this research. Data variables from the 2001 Small Area Microdata file underpin this research. These variables undergo transformation from categorical/ordinal states into scale variables based on average gross monthly income data present in the British Household Panel Survey (BHPS) thus enabling effective hierarchical clustering. Micro-simulation is then employed to create a complete individual population. The initial system to be presented will comprise fifteen fundamental census variables including age, sex, ethnicity, and social-economic classification. Linkage to other datasets, including the BHPS, is also facilitated to validate the classification and draw upon more behavioral variables. The final classification will enable not only a highly discriminate system extending beyond current academic and private sector schemes but also a system through which household and neighborhood effects can be analysed. Such an assessment of drivers behind individual-level characteristics represents new ground within the domain of geodemographics. Furthermore, the final output will allow for informed policy decisions to be made across multiple social science areas, such as migration. The application of the complete classification to specific case studies will illustrate this.

### Synthesising data sources to produce migration estimates for the UK

*Nik Lomax (University of Leeds), John Stillwell (University of Leeds), Paul Norman (University of Leeds), Phil Rees (University of Leeds)*

Migration is the most significant contributor to population change in the UK. The most comprehensive source of migration data has been the decennial census, capturing information about the level, pattern and composition of migration from overseas, across the borders of the constituent countries of the UK and between areas within these countries. Whilst census migration statistics are produced by three national statistical agencies (NSAs) - the Office for National Statistics in England and Wales (ONS), the National Records of Scotland (NRS) and the Northern Ireland Statistics and Research Agency (NISRA) - the availability and level of detail of migration data for non-census years utilised by the NSAs varies considerably from country to country. This paper presents the results of an exercise in consolidating the data produced by the NSAs and constructing a time series of consistent migration flow estimates for the whole of the UK throughout the 2000s which can be carried forward beyond the 2011 Census. The database contains three migration components: (i) international flows to and from outside the UK; (ii) cross-border flows between the countries; and (iii) flows within each country. The flows are estimated for a number of geographic systems including local authority districts and European NUTS geographies. We first identify what data are available to estimate internal and international migration in the UK and assess the gaps that need to be filled. Second we synthesise the available data for mid-year 2000 to 2011 to take in to account inconsistencies and boundary changes during the decade. Finally we employ a modelling strategy to estimate flows for which the data are either insufficient or non-existent. A major gap in the database is the flows between regions that cross the national borders of the three countries of the UK and one of the key aims of this paper is to estimate this missing information at local authority districts level. Currently the only comprehensive source of data for cross-border flows is the National Health Service Central Register (NHSCR), which captures movements of doctor's patients between health areas: Former Health Authorities (FHA) in England and Wales, Health Boards in Scotland and Health and Social Service Boards Northern Ireland. These geographies are increasingly obsolete for the purpose of recording migration (especially in England and Wales where FHAs no longer play a role in resource provision). The estimation presented uses the NHSCR and additional data sources augmented with area information such as the presence of armed forces bases, prisons or higher education establishments to adjust initial estimates. By producing a consistent time series for mid-2000 to mid-2011, we are able to benchmark against the results of the 2001 and 2011 Censuses, giving the opportunity to test the methodology with a view to continuing the comprehensive UK migration database in the post-census world.

### Integrating Population Data for Development: The Case of Population Census, Vital Registration and Targeted Surveys in Nigeria

*Godwin Ikwuyatun (University of Ibadan)*

Population data is a major factor in national development planning; hence, the quest for accurate, current and acceptable population census data in Nigeria has remained a major challenge from its first attempt in national census taking in 1911 to the last exercise in 2006. If population data is conceptualized as a system of data, it implies that a comprehensive population data in Nigeria should involve the integration of population census, vital registration and targeted surveys. This is however not the case, as these population data sourcing structures tend to stand alone, leading to inadequacies, litigation and politicization of population data in Nigeria. It is in this light that the paper examines the challenges and prospects of the various population data sources; and that of integrating them for national development planning in Nigeria. The paper argued that for accurate, current and acceptable population data in Nigeria, the various sources of population data in Nigeria needs to be integrated on sustained basis for national development.

## C08.31-07 - Producing migration and 'representing' the migrant 1

*Chair: Allan Findlay*

### Producing Whiteness: The British in South Africa

*Pauline Leonard (University of Southampton), Daniel Conway (Loughborough University)*

This paper draws on new ethnographic research to interrogate the positions and experiences of white British residents in South Africa as the post-apartheid government approaches its twentieth year in office. South Africa's British-born community is the eighth largest British-born community in the world and South Africa itself is the seventh most popular destination for retired British migrants- and yet it has been long overlooked by the literature analysing British expatriates. This paper aims to remedy this gap in knowledge by looking at the everyday lives and attitudes of longstanding and short term British residents in Cape Town and Johannesburg to explore and conceptualise broader questions of expatriate migration, transnationalism, diasporic identities and whiteness. The paper focuses on the ways in which, at various moments throughout the twentieth century, the white British have been encouraged to migrate to South Africa with promises of upward economic and social mobility. Even before the apartheid regime, the white British, both male and female, conformed to notions of 'the 'good worker'. During apartheid, although relations with the Afrikaans regime were fragile and unstable, the British were encouraged to migrate through a range of assisted passage and recruitment schemes. For much of South Africa's recent history therefore, white British people were seen by those in power to possess the correct sort of social capital. However, the research also reveals a complexity and diversity of identities, positions and experiences within this broad community, with notions of belonging between its members towards South Africa and Britain often experienced as increasingly problematic. Historically seen as having divided loyalties between Britain and South Africa and residing in South Africa for benefits of lifestyle rather than committing to the nation as full citizens, an important question to emerge is the extent to which the transnational identities and relations of British people are changing in accordance with the new political climate.

### An island as a gated space: The case of Latvian migrant workers in Guernsey

*Aija Lulle (University of Latvia)*

Islands are both bounded geographical places and constantly changing social spaces and are particularly dense fieldwork sites for current migration research. Despite the fact that in popular perception islands are linked to localness, settled populations and the

preservation of culture, migrant populations do often constitute a part of the whole story of an island. In this paper I put temporary migrant agency at the centre of the analysis. The study is based on ethnographic research that I carried out in the Channel Island of Guernsey in 2010-11. Guernsey was among the first places where Latvians searched for employment abroad, starting in the mid-1990s, and currently Latvians form one of the biggest communities of migrant workers there. Inspired by ideas of time geography and relational space theory, I revise the concept of time-space punctuation in border studies, and develop an alternative relational concept of a gated space to interpret spaces of flows and migrant agency on the island. I suggest that a multi-scalar spatial analysis of flows enables the development of a deeper understanding of the frictions between bounded and fluid spaces that shape transnational migration practices. Firstly, I conduct a relational analysis of legal constructions, as laws in a limited natural space demand the constant rotation of migrants, but place-specific attachments encourage people to continuously move back and forth, creating a particular manifestation of the phenomenon of permanent temporariness. Secondly, I analyse the community level, where the saturation of Guernsey with Latvians creates gatedness of the internal dynamics of migration over time. The existing ethnic Latvian community can be an obstacle for new migrants, rather than facilitating access to jobs and housing permits. Finally, I examine micro relational gated spaces through the lens of individual mobility projects. In migrant stories, gated spaces of flows on the island signify the particular ways in which people sense the place and enact their agency in it, as a migrant him/herself goes through different migration- and life-stages. Subjective experiences of mobility and immobility form an island story, where 'a dream island', 'a refuge', and 'a place to escape' co-exist with the place that 'imprisons', where a person has been 'stuck' and kept in a strictly defined place, and where opportunities for social and physical mobility are quickly exhausted. Based on this analysis I suggest that the interpretation of complex relational modalities of openness and gatedness to migration flows helps to develop a more detailed understanding of space-mobility relations on the island. Furthermore, instead of being portrayed as insular and bounded spaces, the whole concept of islands could be reconceptualised as both open and gated spaces in which to both welcome and to hide from the winds of change.

### Images of the ideal migrant: Patterns of expectations towards British lifestyle migrants as new members of French rural communes

*Martina Kobras (WWU Münster)*

In the course of its political integration, the European Union has been producing migration which is granted by the Maastricht Treaty and the four freedoms of movement. Initially aiming at the adjustment of labour market mismatches (cf. Vandenbrande 2006: 3), more or less all union citizens have the right to long-term settlement in the other EU member states. This is a central structural condition for people who move not seeking for higher income but better quality of life. The so-called lifestyle migrants - among them many

British citizens - are incited to migrate by individual, structural, and spatial factors: individualisation of Western society; structural differences of national markets; a spirit of adventure and lifestyle; and romantic nostalgia attached to living in the countryside etc. (cf. Kobras 2007). In France, the phenomenon of British lifestyle migration has established since about 30 years in remarkable number; often, they are married couples aged 50+ in their (early) retirement but also younger families with children; prevalently, the chosen living environments are small, rural communes where they wish to enjoy a slower pace of life. The particularity of this migration phenomenon is the fact that, due to the legal situation, there is no way to control or even to prevent the British settlement and inclusion into the societal systems: notably the local population is directly confronted with their arrival; it finds itself in the unexpected role of a receiving society. The lack of influence does not hinder the locals - following the unwritten law of the privileges for the old-established - to closely observe the newcomers, who are classified as being different in spite of the rather minor difference in comparison to the largest migrant groups in France. These observations are matched with the social and cultural constructions of the 'typical good migrant' and translated into expectations and demands. A recent, quantitative study is focussing how the French local, autochthon population is judging the settlement of British lifestyle migrants and which expectations have emerged. Through an ample questionnaire, 300 French inhabitants of typical destination communes give evidence of their expectations in many respects: on the adaptation of the British migrants in the fields of language, culture and social contacts; on the inclusion into societal systems such as the job market and the social security system; on the will of participating in society resp. the wish for separation. Statistically significant, the study shows that the patterns of expectation are influenced not only by demographic data but individually experienced foreignness and personal contacts to British migrants. Patterns of expectations are visible which frame and shape the coexistence with the new British inhabitants after their move; these patterns are influencing the stay or further movements of the migrants, possible chain migration and other cumulative effects.

### **Moroccan migrants in Germany – structural influences on migration patterns and individual subjectivities**

*Maïke Didero (RWTH Aachen)*

This paper draws on the example of the German-Moroccan migration system to discuss to what extent different types of migration (work migration, student migration, family migration) are shaped by economic and political structuring influences. The case of the Moroccan-German migration system is of particular interest since - on the one hand - it confirms that political and economic actors and intra-national imbalances contributed to the establishment to a very selective migration pattern between the Moroccan North-East and two industrial regions in Germany (NRW and Rhein-Main). Established through the recruitment of Moroccan workers in the 1960s, this regional selectivity is traceable until today. Contrary to this first wave of work migration and family reunification however,

student migration from Morocco to Germany - which set off in the 1990s - has contributed to a regional diversification with regard of both provenance and settlement areas. Although triggered and facilitated a political decision, namely the bilateral agreement on cultural cooperation signed in 1987, the regional dimension of the following migration flow is much less channeled by external political and economic agencies and structures and depends more on individual decisions based on hearsay information and networks. What the German case equally well displays is how close discourses on the 'ideal migrant' and immigration policies are entangled. The common stance of Germany not being an immigration country, upheld until the turn of the millennium, meant that until this time a 'good migrant' was either an ethnic German 'coming back' to his/her home country, or else someone willing to return when no longer needed. Immigrants and their descendents were consequently represented and addressed as foreigners who don't belong. Integration policies didn't exist. Since the end of the 1990s a noticeable shift occurred: immigration was finally admitted as a fact, and novel immigration, integration and citizenship laws were initiated. At the same time, however, particularly in the wake of 9/11, the 'ideal migrant' has been increasingly defined in the negative as not being Muslim, and not coming from Turkey or the MENA region. Although this new discourse nexus on Islam and Migration has influenced and shaped a number of immigration policy measures, large scale impacts on migration flows to Germany have not yet materialized. What can be noted however, is that the negative image attributed to Muslims in Germany does play a role in the production of individual identities and subjectivities. Based on 40 interviews with Moroccan migrants in NRW, the author is able to show that the way in which respondents articulate themselves within these discourses differ according to their socially acquired dispositions and habitus.

## C08.31-08 - Producing migration and 'representing' the migrant 2

Chair: Allan Findlay

### Russian Population and Migrations in the 20th century: Role, Image and Discourse of the migration matters in the development of a country

*Pavel Polian (University of Freiburg), Zhanna Zajonchkovskaja (High School of Economics), Vitalij Belozerov (Stavropol University)*

The population in Russia increased twice in the century due to a huge natural mostly rural country's population growth (more than 85% at the beginning of the century), not common with the abortions, contraceptives and passing through "the social experiments" of the soviet authority. All those causes excluded, the population could have increased three times: demographic back-log at the beginning of the XX century turned to be not enough for the millennium and despite the immigration flows from the neighboring countries the population in Russia had been simply decreasing. In the XXth century Russia faced at least three demographic catastrophes- all of them at the first half of the century, each lasted 7-9 years and followed by one or two hunger bursts: 1) 1915-1922: the First World War and the Civil Wars; 2) 1930-1936: the Collectivization; 3) 1941-1948: The Great Patriotic war and postwar ruin. We may estimate demographic losses only nominally and only through the experiment or calculation with possible assumptions. The population losses on the current territory of the Russian Federation during catastrophes make: for the first period – 12 million people or 13% of the pre-crisis population rate; for the second period – 5 million people (or 5 %); for the third period – 21 million people (or 19%). If we take into account circumstantial losses, that means that the growth rate is preserved on the pre-catastrophe level, the estimated value for the first crises would have made – 18,6 million people, for the second – 6,5 million people and for the third – 24,5 million people. All three demographic catastrophes took place in the first half of the century. They had seriously knocked out the demographic potential of the country in terms of the common Russia's population evolution that deprived it of the demographic advantage, which proposed both to Russia and other countries demographic pass and temporal but rapid population growth caused by it. When Russia had overcome prolonged period of catastrophes and the balance between the death and birth rate had been redressed, it was late to catch up with the lost possibility of natural population growth in Russia. The first half of the century, especially 40 years between 1914 and 1953, had also faced mass and compulsory migrations. In soviet times during the internal migration more than 6 million people were deported, and during the international migration, including ostarbeiters deportation by Germans and forced repatriation- 9 million people. At least every second citizen of Russia was a migrant. The last decade of the century had at one moment locked the expansion centuries-long circle, having defined the shift to the compression of the developed space, its more effective usage,

opening the way to the next phase of modernization, which would unfold in the coming century. Migration had played the role of the bright marker in the current changes.

### Embodying the 'good' worker: The imagination and production of the ideal labour migrant

*Allan Findlay (University of St Andrews), David McCollum (University of St Andrews), Sergei Shubin (Swansea University), Zaiga Krisjane (University of Latvia), Elina Apsite (University of Latvia)*

The focus of this paper is representations of labour migrants and how they shape migrant recruitment and employment regimes. The recruitment and employment of labour migrants inevitably involves a range of knowledge practices which shape who is recruited, from where and for what purposes. However research often explores recruitment and employment practices and outcomes without paying attention to the normative judgements and understandings that underpin them. There is thus scope for research that examines the influence of idealised images of workers on migrant labour recruitment and employment regimes. This analysis seeks to advance the concept of embodied representations of migrant workers and their effects by investigating how perceptions influence practices in the case of labour migration flows from Latvia. The Latvian economy boomed in the years prior to the global economic recession but the country now has one of the highest unemployment and emigration rates in Europe. The research elicits labour provider, policymaker and employer conceptions of the ideal migrant worker and shows the demonstrable impact that these perceptions have on their practices, and thus the recruitment and employment regimes that shape the nature of labour migration flows. The analysis finds that various 'filtering' processes are enacted which serve to 'produce' the ideal migrant worker.

### Diasporic and post-colonial linkages in the current international migration trends. The cases of Spain and Japan.

*Rosalía Avila-Tapiés (Association of Spanish Geographers), Josefina Domínguez-Mujica (University of Las Palmas)*

Immigration policies are considered the single most important determinant of worldwide immigration flows. Throughout history, such policies have not only determined how many immigrants can arrive and in what circumstances, but also who can do so. Good examples of this are the countries of European Union and the post-industrial nations of eastern Asia, which impose barriers to international migration, excluding or favoring certain flows and producing 'new migration geographies'. Despite declaring themselves non-immigration countries, many of these states have adopted expansive immigration policies due to the needs of their industry, health-care system, service sector and other effects of ageing population societies. Within this context, some of these countries have revised their legislation to grant preferential treatment to the citizens of the former

colonies and their own overseas diaspora communities. There have been some actions that have precedents in certain treaties and agreements from the past and that rest on the conviction that these citizens can culturally or racially belong to the ancestral homeland ('ethnic belongers'), as in the case, particularly, of the Latin Americans and the Caribbeans for Spain; and Brazilian and Peruvian citizens of Japanese ancestry for Japan. It could be stated that the Spanish and Japanese governments have realized the growing economic importance of their networked diaspora and of their contribution to the countries' economic growth. Traditionally, the loyalties and commitments to Spanish and Japanese diasporas in the exterior have been driven by a range of motivations, which have been translated into grass-roots and state-sponsored transnational activities. From a comparative perspective, we present an overview of the migratory and nationalization legislation in Spain and Japan. The available statistical data allow us to analyze the effect of this regulation on the volume and profile of the migratory flows. In the recent years of economic crisis, first Spain (2008) and then Japan (2009) have reversed their open-door policies in a government-sponsored voluntary return program that has also selectively favored the return of these new immigrants to their native birthplaces. All this reveals that the links with the past and the legislation that protects them have reinforced certain current cross-national migratory processes or, in other words, that the colonial inheritance has led to greater flexibility, frequency, and facility of migratory contacts between certain spaces, which has contributed to strengthening 'old migration geographies'. In conclusion, the object of this paper is to demonstrate that the transnational networks of bi-national citizens, supported by the history and the legislation, link Spain and Japan with fast-growing Latin America, turning old migration geographies into new migration geographies in the 21st century.

### Agency-Led Migration, Individual Choice, Tensions and Outcomes: Refugees to the US

*Lawrence Brown (Ohio State University), Tamar Mott Forrest (Ohio University)*

Friedmann and Wulff (1976), said 'migration ... [is] merely a demographic adjustment to changes in the spatial structure of economic and social opportunities ... a derived phenomenon ... not the thing itself.' This premise is explored in x steps. After briefly setting out the traditional model of migration and citing several examples in US economic history wherein its assumptions have been contravened by the actions of intermediaries, attention first turns to Refugee Resettlement Agencies, in particular the Hebrew Immigrant Aid Society (HIAS), founded in 1881, as a case study of changing practices through the years in response to local situations, changing government regulations, etc. Second, we focus on the current-day refugee resettlement system in the US, including the US Office of Refugee Resettlement, voluntary agents with which it works (VOLAGS), and community-based organizations. Focusing primarily on African refugees, we show their place of original settlement, and their place of current residence, i.e., destination of secondary migration following resettlement (proprietary data). To obtain a deeper

understanding of the process, mail-surveys were done of State Refugee Coordinators and in-depth case studies of Columbus Ohio, Minneapolis Minnesota, and Lewiston Maine - all major recipients of secondary migration and two MSAs with the first and second largest Somali populations in the US. Case study procedures included in-depth key informant interviews, focus groups, and surveys, as well as secondary data. Finally, secondary data characterizing the 41 MSAs that were origin points for secondary migration to Columbus, Minneapolis, and Lewiston were subject to principal components analysis that enables identifying six urban profiles of 'sender' cities, several of which provide a contradiction between Somali actions and social science expectations. While Somali's are the focus of this study, similar patterns and processes have characterized, at least, Cuban, Hmong, Vietnam, Laotian, Chinese and many other US migrants brought as either refugees or labor. We conclude, then, that (i) Migration Theory has virtually neglected the derived nature of movements and the role of government and/or business entities in creating opportunities; (ii) That at certain historical moments, directed migrations and/or similar interventions have played a highly significant, if not dominant, role in population redistribution; but that (iii) Voluntary migration nevertheless has a role, albeit much less so than that suggested by abstract conceptual frameworks.



## C08.31-09 - Producing migration and 'representing' the migrant 3

*Chair: Allan Findlay*

### Transnational migrant communities in the context of changing recruitment and Omanisation policies in Muscat (Oman)

*Veronika Deffner (RWTH Aachen), Carmella Pfaffenbach (RWTH Aachen)*

As in all other GCC countries, the modernisation drive the Sultanate of Oman has experienced over the last 40 years was only made possible through systematically recruiting foreign labourers. Two types of migrants stand out: The low-skilled labour workers from Asia and the high skilled experts from the Global North. The 'ideal' labourers from an Omani perspective are young, dynamic, able to adapt to the hegemonial claims of Omani society and willing to work hard for very little salary. These labourers also return to their native countries after finishing their work contract. In the majority of the cases recruitment agencies at home arrange the jobs in Oman. They are supported both politically and institutionally by Overseas Employment Ministries; political bodies specifically established as outgoing labourers make for a very important 'economic sector' with high remittances. The transnational expatriates are mainly dispatched by international companies of which the majority works in the oil industry. Usually, they are more senior, receive the highest incomes and enjoy the most privileges amongst the foreigners. They share their expertise and contribute to modernising the country further. Such expatriates establish transnational trade relations and economic ties for Oman, too. They leave the country to pursue the next career opportunity elsewhere. However, a limited employment contract, which is terminable any time, also applies for these skilled transnationals. The labour market policies as well as the recruitment practices in Oman follow the main agenda of an open-market policy; i.e. the recruiting countries determine which migrant groups should be hired for which jobs and who can obtain a work permit. Two legal and administrative regulations are important in this regard: Firstly, the entry and residence permits for partners and children can only be obtained by the highly qualified and secondly, non-Omanis are not allowed to buy property with the exception of a few new real estate projects. The Omani citizenship is not granted to foreign employees either independent of their duration of stay. Over the last few years the political and social claims to hegemony have become especially explicit in the implementation of the so-called Omanisation policy. It entails that foreign employees in the public and increasingly also in the private sector should gradually be replaced by domestic work force. These political and economic transformations have led to social changes within the heterogeneous urban society of Muscat. Based on empirical results, this talk presents how these changes are perceived by the individual foreign migrants and how it influences everyday life and work of different migrant communities.

### Analysis of Interregional Migration Changes in China 1985-2000

*Jianfa Shen (University of Hong Kong)*

This paper uses a macro modeling approach to examine the causes of changing migration patterns in China. A migration model describes the relationship between explanatory variables with the migration flow with model parameters. Theoretically, the migration pattern and the migration flows will change due to changes in explanatory variables such as regional economic development or changes in model parameters, which is called system shift in migrants' response to migration determinants in this paper. No attempt has been made to systematically estimate the exact impact of a change in the value of independent variable or model parameter on the migration flow. This paper analyzes the effects of changing parameters in a migration model and the changing attributes in origin and destinations on migration flows. A decomposition approach is developed based on migration models and multilevel Poisson migration models are estimated for migration in China for the period 1985-1990 and 1995-2000 respectively using the same set of variables to make above decomposition. The models for 1985-1990 and 1995-2000 explained 41.6% and 54.1% of the variation of the number of migrants in all flows respectively. There were significant differences in model parameters between multilevel Poisson models for 1985-1990 and 1995-2000. For instances, absolute parameters of most variables become bigger to reflect the increasing scale of migration. The distance parameter becomes smaller in absolute value. How these changes affect the migration is revealed using the decomposition approach in this paper. Overall, the total inter-provincial migration was increased by 21 million in China from 1985-1990 to 1995-2000. The decomposition result shows that 68.46% of this increase was due to changes in the value of explanatory variables while 31.54% was due to changes in the value of model parameters. Thus the demographic, social and economic changes among various provinces play a greater role than the changes in the parameters of migration models in the dramatic rise of the inter-provincial migration in China.

### Likelihoods and realities of return migration to Latvia

*Elina Apsite (University of Latvia)*

International emigration from Latvia to other European countries started since 1 May 2004 along with opening of the EU labour market. English speaking destination countries the UK and Ireland have been one of the main destinations for Latvian labour migrants. Second out-flow from Latvia increased with the start of economic crisis around 2008 which can be characterised by slight change of destination countries and extent of returns. In this paper data from comprehensive web-based survey with Latvians residing in the UK is used in order to analyse likelihoods of return migration for different migrant groups. As well as semi-structured interviews with returnees who have returned to Latvia. Are they all gone for good? Are there still number of emigres who will return, are planning to return or have returned already? Overall, the findings indicate that large proportion of Latvians currently living in the UK is more likely to stay in the UK. Analysis distinguishes

only certain groups of people who would be in favor of return. However in context of economic conditions, uncertainty and unemployment in country of origin restrain from return. According to returnees economic conditions do not play important role in return decision making. Most of the returnees' stress the importance of emotional and family reasons.

### **Explaining urban migration from Mexico City to the U.S.: Social networks and territorial attachments**

*Cristóbal Mendoza (Universidad Iztapalapa)*

This paper focuses on international migration from Valle de Chalco-Solidaridad, a municipality which is part of the Mexico City Metropolitan Area. In this way, it fills a gap in the literature, since studies on international migration from urban settings, and particularly Mexico City, are still scarce. The paper has two related but separate goals, namely to examine what Mexican migration from Valle de Chalco-Solidaridad reveals about the functions and dynamics of social networks as compared to rural-based networks, and to test whether and to what extent territorial and place attachments affect the likelihood of migration to the U.S. Theoretically the article takes into account the social networks theoretical framework and sheds light from a different angle on a classical theory that has mainly been tested in rural settings in Mexico. Also the article takes an original geographical stance and explores the role of place attachment in understanding out-migration patterns. This perspective has barely been explored in migration studies, and when it has been, the approach has been qualitative. Methodology, the paper is based on the May 2007 Migration, Place and Employment in Valle de Chalco-Solidaridad (Estado de México). This is an original randomized representative survey of 759 households from the municipality of Valle de Chalco-Solidaridad representing information on 3,488 individuals (confidence interval 95%,  $2^{\circ}$ ,  $P = Q = 50$ , error 3.6%). Using probabilistic techniques, census blocks were randomly chosen from the cartography of the municipality by census tracts (AGEBS in Mexico; INEGI, 2007). The article explores the relevance of both social networks and place attachments for US migration. It demonstrates that the impact of socio-demographic variables on emigration is mediated by the household's past migration. By comparing households with and without migrants, several logistic regression models show that social networks make emigration more selective with respect 'education', but less selective regarding 'sex' and 'marital status'. As for territorial variables, the general impression is one of placelessness, apart from attachment to the municipality, but here again social networks act as an intervening variable.



## C08.31-10 - Producing migration and 'representing' the migrant 4

*Chair: Allan Findlay*

### Urban Land Use Planning and the Production of Retirement Migration Patterns in Cities: Evidence from Australia

*Amanda Davies (Curtin University)*

The world's population is ageing at a rate unprecedented in human history. This spatially pervasive trend has serious social, economic and environmental consequences. Importantly, population ageing is occurring in a spatially uneven manner with some countries and regions ageing at a much faster rate than others. This unevenness in population ageing also exists within cities and towns where older populations tend to cluster into specific localities. The unevenness in the distribution of older populations within towns and cities has implications for the design and delivery of social, healthcare and housing support for elderly people. To address the social and economic demands of older populations, many governments of advanced industrial societies have developed policies to support ageing in place. Ageing in place is where older people remain in their home and or community of choice as they grow old rather than move into institutional care. Ageing in place is often facilitated by a move on (or near) retirement into a locality or home that can meet the needs of the residents as they progress into older age. Elderly people who choose to age in place are not evenly distributed across space. Rather, distinct spatial patterns form whereby older people cluster in particular localities. These spatial patterns are shaped by the institutions and social networks that enable retirement migration (and non-migration) to occur. This paper examines the clustering trends of older people within cities and the relationship to urban land use planning. The paper argues that urban land use planning policy produces specific patterns of retirement migration (and non-migration) within cities. Evidence from the Australian city of Perth is used to support the argument. Perth is one of the most geographically remote advanced industrial cities in the world. It has a population ageing trend similar to many major cities in Europe and North America. It is also a relatively young city with an urban form that has been considerably shaped by successive urban land use strategies and plans. As such, Perth makes a useful case to examine how retirement migration (or non-migration) within the city has been influenced by successive urban land use plans.

### Economie des mobilités internationales de travail des Marocains en Plaine Orientale corse

*Josepha Milazzo (Aix-Marseille Université / Université de Barcelone)*

Nombreuses sont les populations qui ont foulé de leurs pieds la Corse, "terre d'immigration". La présence de populations ressortissantes du Maghreb n'apparaît pourtant que très tardivement, au début des années 1960, le rapatriement des Pieds noirs des grands domaines agricoles d'Afrique du Nord et leur installation en Plaine Orientale donnant lieu à la venue conjointe de leurs ouvriers marocains, suivie d'un phénomène d'immigration bientôt relayé par l'institutionnalisation au niveau national de ces circulations étrangères de travail. Selon une approche systémique, nous proposons une analyse des modalités actuelles de sélection des migrations internationales marocaines de travail liées au secteur agricole de la Plaine Orientale corse. Nous démontrerons que ces processus sont d'autant plus complexes à étudier qu'ils interviennent à des échelles géographiques variables et interconnectées et qu'ils s'inscrivent dans la genèse continue des territoires mis en contact par les histoires migratoires croisées de leurs populations: ces mobilités s'appuient sur un passé migratoire pour mieux faire face aux nouveaux enjeux de la mondialisation. Nous ferons ainsi la lumière sur les ferments à l'origine du champ migratoire corso-marocain et sur ceux responsables de ses inerties comme de ses mutations, nous appuyant pour cela sur une soixantaine d'entretiens réalisés en 2008 et en 2009 auprès des exploitants, des travailleurs migrants marocains de la Plaine Orientale et des responsables des antennes locales des services publics de l'emploi et sur l'exploitation des données statistiques de l'Office Français de l'Immigration et de l'Intégration. Les modalités spatiales et professionnelles actuelles des migrations marocaines, notamment en termes de recrutement, soulignent que ces circulations de travail désormais réglementées s'appuient sur des filières migratoires historiques, les migrants étant généralement originaires des mêmes régions marocaines, voire issus des mêmes familles. Cependant, si ces processus structurants sont d'une importance indéniable, ceux intervenant aux échelles méso et micro exercent une influence prépondérante dans la sélection de ces migrants. Celle-ci est l'objet d'incessantes négociations et de rivalités entre les services déconcentrés de l'Etat, les exploitants agricoles et les migrants et ne manque pas de susciter un recours aux réseaux familiaux, amicaux et professionnels, constitutifs d'un espace migratoire corso-marocain ainsi mis en place au début des années 1960.

### Post-accession migration of Poles to European Union countries

*Dariusz Nowotnik (University of Cracow)*

Dariusz Nowotnik Pedagogical University National Education Commission in Cracow Post-accession migration of Poles to European Union countries In 2004, the European Union has made the biggest enlargement in its history. Along with this event, most of the "old Union" countries have introduced a transitional period for opening their labor markets for the people of the new ones. This was to protect them from sudden increases in

unemployment and as a consequence of social discontent. EU countries afraid of low-cost and well-educated workforce that would be competitive for the local community. At this step not only decided to Great Britain, Ireland and Sweden have not adopted any restrictions on access to their labour markets. The two-year transitional period to opening labour markets occurred in Finland, Italy, Greece, Spain and Portugal. Next, the Netherlands and Luxembourg opened their labour markets in 2007, France in 2008, Belgium and Denmark in 2009, and finally Germany and Austria in 2011. Not the simultaneous opening of labour markets in European Union countries contributed to the impact of these decisions on the direction and volume of foreign migration from new Member States to other countries of the European Union. The aim of the article is to present the evolution and spatial patterns of emigration of Polish people since 2004 with particular reference to the composition of Polish emigrants by sex and age as well as to show the magnitude and direction of emigration to the countries of the European Union. Article also shows the impact of the gradual abolition of restrictions on access to labour markets on Polish foreign migration trends and changes in the level of unemployment in European Union countries in the studied years. The data for this research were taken from Eurostat database, Central Statistical Office in Warsaw, and the national statistical offices of the Member States of the European Union.

### **Spatial Selectivity and Demographic Impact of German Immigrants in the Swiss regions**

*Ilka Steiner (University of Geneva)*

Since 1997, Germans are the largest immigrant group in Switzerland. 8'200 new arrivals were registered in 1998, a number that reached 46'300 in 2008. The major reason for this increase is the ratification of the Agreement on the free movement of persons between Switzerland and the European Union in June 2002 and the economic growth encountered by Switzerland at the turn of the XXIth century. Little is known about the socio-demographic and professional profile of German immigrants to Switzerland and even less about their distribution within the region. However, the repartition and not least the resulting demographic impact of German immigrants within the Swiss territory underlie a spatial selectivity. In this context, our paper raises the question of "How does the spatial selectivity of German Immigrants in Switzerland influence demographic evolution in the regions"? In a first step, we describe the regional socio-demographic and professional characteristics of German immigrants arrived after 2002 in Switzerland, in order to illustrate spatial selectivity of immigration in the regions. Furthermore, we assess the factors underlying the observed regional disparities. In a second step, the demographic impact in the regions is measured, by means of an analysis of the migrant turnover and net migration, the main factors of demographic dynamics of the German immigrant group in Switzerland. All our analyses rely on the Swiss Central Aliens Register (SCAR) and the Population and Households Statistics (STATPOP) for 2010 as well as on the Swiss Labor Force Survey (SLFS). The analyses cover the period from June 2002 to

December 2010. Immigrant's characteristics are compared between the sixteen job market regions of the country. Analyses show that job market regions that are situated in the Swiss-German speaking part or in the borderland to Germany account for the highest numbers of immigrants. The migrant's profile and the turnover however depend on different factors such as the type of municipalities - the turnover is much smaller in commuter and suburban communes than in touristic regions - on the qualification level and the occupation held - qualified persons, and above all, scientists present a high disposition to re-migrate - and finally age and life course, since retirees or married couples and families present a lower probability to leave the country than other "more independent" migrants. Our paper demonstrates the importance of considering different regions while trying to understand immigration and its impacts in a country like Switzerland. By various reasons, such as the federalist political organization, the linguistic particularities, a variety of economic structures and fields of activity as well as the positions on the center-periphery scale of the Swiss regions, analyses on the aggregated level remain insufficient.



C08.32

# Sustainability of Rural Systems

## C08.32-01 - Sustainability of Rural Systems in Global Economic and Environmental Issues

*Chair: Doo-Chul Kim, Scott Hoefle*

### **Terraced paddy expansion by ethnic minorities in Sapa, Vietnam: Identifying locations and measuring productivity**

*Yuzuru Isoda (Tohoku University), Ngu Nguyen Huu (Hue University), Tatsuya Kanda (Okayama University), Yukio Yotsumoto (Ritsumeikan Asia Pacific University), Thinh Nguyen An (Vietnam University), Huong Hoang Thi Thu (Vietnam University), Doo-Chul KIM (Okayama University)*

H'Mong and Dao ethnic minorities have expanded their terraced paddy fields to steep slopes in Sapa, Lao Cai in northern Vietnam, but local farmers and officials alike say that the development of terraced paddies are relatively recent, since the 1980s after Agricultural Cooperatives are dismantled, and are still expanding. Such parole evidence seem to suggest a shift in agricultural intensity from the traditional swidden cultivation to wet rice production, driven by rapid population growth supported by ban on swidden cultivation and opium production. Albeit being montagnards, they are not secluded from the forces of Globalization; using Chinese hybrid rice seeds; heavily dependent on chemical fertilizers; selling black cardamom to Chinese market; supplementing their income from international tourism, from activities such as craft production and guiding. The region appears to be an ideal case to study the social conditions of the sustainability of largely subsistent farming under exposure to cash economy and the global market, however, quantitative data were lacking. The paper reports findings from remote sensing and field survey. First, terraced paddy expansion in the last 40 years is identified with the use of archived of satellite images. Because of the lack of ground data for the past, we employed robust logistic regression to use the recent land use map as training data to classify the past satellite images. The paddy fields identified independently for each period are compared post hoc to estimate the period of terrace paddy development. Second, we have done interviews to individual farmers to ask about the location and development year of each plots of terraced field. This data is used to assess the accuracy of the estimated terraced paddy development from the remote sensing mentioned above. The survey is still underway but we have collected data for 89 farms and 205 plots to date. Finally, alongside the interviews above, we have collected items associated with productivity of each plot, such as yield and fertilizer use. These enable analysis of productivity difference by geographical location and development year, to discuss how productivity changed through expansion of terraced paddies and forecasting how much more terraced paddies can be developed.

### **South American Integration and Impacts on the Population Living in Forested Areas of the State of Acre in the Brazilian Amazon**

*Ana Maria Bicalho (Universidade do Rio de Janeiro)*

New policy of integrating South America through the construction of highways connecting neighbouring countries will cause profound impacts in remote areas of difficult access situated along the national borders of Brazil, Bolivia and Peru in the Amazon. The state of Acre is located in the extreme northwest of Brazil and has extensive forested areas and follows policy focussed on environmental preservation as a means of controlling the frontier expansion of cattle raising and hard wood extraction as well as the historic population resident in forest areas in Extractive Reserves (Resex). This state thus constitutes a focal point of concern about the impact of the new highways. Are the mechanisms which arose over the last decades for regulating land use in Acre enough to guarantee socio-environmental sustainability? Will new mechanisms of state and municipal governance be capable of preserving the forest against the expanding frontier and conciliate conflicting interests between different business groups and the resident population of forested areas? At the centre of new policy is a system of socio-environmental zoning, which involves different forms of intensity and kinds of land use. A major aim is to recuperate forested areas on larger cattle raising and timber extraction units as well as on small farms. A programme of productive certification is being used to reduce deforestation, the use of fire and to increase forested areas to legally mandated levels so legalizing holdings with relation to the Brazilian environmental legislation. In addition a joint state-municipal programme of community development embraces extensive areas of Acre and the greater part of the rural population. The programme provides social assistance and productive assistance to poor small farmers in order to increase commercial production. The unit of action is the community and the first point of connectivity is the local school, which articulates networks of families and government services to municipal and state policy. These are the preventative policy measures meant to minimize the negative impacts of the new highways and the new national and multinational economic interests emerging in the region. Productive inclusion of the poor population is meant to guarantee food security, to help with the shift to a more commercial economy and to maintain it as a local vigilante of forested areas. However, it remains to be seen whether this policy will prove to be effective in face of the rapid expansion of the frontier and the arrival of new economic interest groups in the region and at the same time empower local people to the point of becoming major players in the process and not just cheap labour helping business interests to reap the benefits of logistical integration.

## **Biofuels or Grazing Lands: Heterogeneous Interests in Tana Delta, Kenya – A Youth Perspective**

*Ulrich Pickmeier (University Nijmegen), Marcel Rutten (African Studies Centre)*

Kenya's Tana Delta imposes extensive wetlands accounting for a total of 1300 km<sup>2</sup> with high potential for agricultural activities. Located on the edge of Kenya's arid Northeastern Province, it has provided an important fallback area for nomadic pastoralists for generations, next to being home to communities engaging in small scale subsistence farming. The local coexistence between farming and pastoralist communities has been uneasy for a long time involving outbreaks of violence on irregular basis but in recent years the situation calmed down and the communities came to terms with each other. While an increased frequency of droughts and the establishment of hydroelectric power dams upstream have put significant pressure on the area's traditional livelihoods, growing interests of investors mainly originating from the biofuel-sector in the delta's wetlands are about to impose an additional burden for these livelihood strategies. Several domestic and international investors have proposed projects involving the alienation of tens of thousands of hectares from customary use for establishing large scale biofuel-plantations. Opinions differ strongly concerning the impacts large scale land acquisitions in general, and investments for biofuel-productions in particular, could have on local development processes in developing countries. However, regardless if an optimistic or a negative point of view is taken, discussants seem to assume a homogenous stand within the local community. Employing a youth perspective and taking a conflict focus, this paper, however, highlights the heterogeneity of local interests and various attitudes towards large scale land acquisitions in the Tana Delta. Reasons to oppose or welcome these initiatives show a wide range of complex and sometimes even surprising motives. Still, these different opinions concerning the proposed investments embody an inherent potential to induce renewed conflicts between farming and pastoralist communities as well as between varying herding groups in the area. Keywords: biofuels; conflict; youths; Kenya; pastoralism; subsistence farming

## **Concepts Matter: Emergence of Urban Farmers' Markets and Making of Places in Japanese Cities**

*Taro Futamura (Doshisha University)*

This paper examines emergence of farmers' markets in Japanese cities and the meaning of these places in the context of constructed local food movement. Unlike countries in the United States and others where opportunities of accessing to locally-produced food (such as farmers' markets, farm stands, and Community-Supported Agriculture (CSA)) grew tremendously over the last few decades, there have been very little markets in major Japanese cities. Specifically, the local food movement that encourage production of "locally grown food" and its direct sales by farmers to consumers has been gaining rapidly in rural areas but has struggled to become well-known in Japanese cities. In

Tokyo, for example, there are very few producers-oriented produce markets. Although some periodic farmers' markets were run by non-profit organizations (NPOs), because of lack of capital and resources, they could not operate on a large enough scale and frequencies to have much of an impact on consumer behavior. Thus, so-called "local food movement" that have gradually appeared in many Anglophone countries as an alternative to neoliberal global food system was yet to be seen in Japan. In May 2009, however, the Ministry of Agriculture, Forestry, and Fishery (MAFF) started a program called "Marche Japon Project" to expand direct sales of food products at Japanese cities by funding launching and development of urban markets. Although "Marche" (originally French) gradually became a familiar word in Japan, what was critically problematic about the program was that, for whatever invisible processes, MAFF decided to rely on big corporations rather than organizations that had already been in the field. Because the program was developed by national government, not only did it established top-down power relations, but it also created a completely different model and concepts of markets from those that are led by communities, producer-groups or third parties. Therefore, based on author's ongoing field research at several Marche as well as a comparative case study of NPO-led market in Tokyo, this paper critically looks into changes that these Marches have brought in Japanese urban landscapes in terms of food supply, and argues how the concepts of each markets ultimately develop meanings of places. Data for this study is based on several research methods: 1) multi-site participatory observation at various Marches and other farmers' markets, with the emphasis at monthly NPO-led market in Tokyo, 2) observation and informal communication with vendors, organizers, and consumers at markets; 3) analysis of media reports and documents, and 4) semi-structural interviews with managers. In addition to findings and issues that will be presented, this paper concludes with potential solutions that make the emergence of Japanese urban farmers' markets more fair and successful.

## C08.32-02 - Consumer markets, quality products, aggregated value and rural sustainability

*Chair: Ana Maria Firmino, Ana Maria Bicalho*

### Organic Farming in Germany and Portugal: A comparative study

*Ana Maria Firmino (University of Lisbon)*

Organic Farming in Germany is a very dynamic sector which benefits from the fact that the German consumer has progressively got aware of the importance that this mode of production may represent either to the Nature (balanced ecosystems, biodiversity, landscape, quality of water, soils and air) or to the quality of production and to the health itself, as a result of marketing programs and material for the schools specially in the last decade. This concern with the quality of the food and local self-reliance (short circuits) conjugated with a relative high income contributes to the predominant place occupied by the German retail sector as one of the most important markets for organic products in the world. Even conventional retailers, as REWE, started exploring the organic retail sector, making these products available at a cheaper price for a larger number of consumers. In Portugal, although the organic sector had been expanding until three years ago, lack of information of the population in general in what concerns the characteristics of this mode of production, associated to a low income aggravated by the recent economic crisis, condemns the sector to a marginal relevance, in spite of the opportunity that it constitutes to the Portuguese farmers, since the offer does not match the demand of the internal market and for the added value that it represents, namely in terms of export. Indeed most of the transformed organic products sold in Portugal are imported from Germany, France and Spain, except wines, olive oil, preserves and salt, for instance, although the country has the tradition and the capacity to produce with high quality (circa of 15% of all the products with denomination of origin in the European Union are Portuguese, although not all of them are certified as organic). A survey launched by us in the Land of Hessen, in December 2010, shows some characteristics of the local organic farmers and their farms that will be compared with a similar approach carried out in Portugal. According to this study the German organic farmers in Hessen present an entrepreneurial profile, positive in the way they face the market and the challenges that this represents. Contrarily the Portuguese organic farmers are much more dependent on the subsidies and are not willing to risk, as a result of the small dimension of the internal market and the difficulties to secure a constant supply for export due to the low production and lack of association. Finally this comparative study will point out what the Portuguese organic sector can learn with the German experience, namely in terms of organization and marketing and will present some examples of well succeeded Portuguese initiatives in this sector.

### Alternative Food Networks. Patterns of organisation from a territorial perspective.

*Matteo Puttilli (University of Torino), Egidio Dansero (University of Torino)*

Originally defined and conceived as practices of resistance in front of a globalizing food market, Alternative Food Networks (AFN) have recently gained a growing international scientific attention and policy support in the field of rural development. This growing interest is built upon the assumption that AFN would perform better than conventional markets in many fields, such as quality, transparency, local specificity, consumers' trust and, last but not least, sustainability and revitalization of rural areas. Though, the international debate shows that AFN are a heterogeneous reality, may assume very differentiated forms and follow very different paths, both from the point of view of their objective (as they can be either alternative or competitive with conventional food markets) and from the point of view of spatial organization (as they can be differently embedded in local/global supply chains and markets). In the same place, multiple AFN may coexist and concur to re-define the food regime and the relationships between food production, distribution and consumption. Thus, the performance of AFN has to be valued from very different perspectives and avoiding generalizations. The objective of this contribution is to propose a critical reflection upon the relation between territorial organization and AFN, aiming at systematizing the complex reality of AFN identifying and describing the main pattern of organisation moving from a territorial perspective. The first part briefly presents the general debate upon AFN, then focusing on their relationship with territorial organization. Thus, AFN are described making reference to four different 'territorial' aspects: embeddedness in locality; scales of organisation; typologies of actors involved in the network; hierarchical organizational pattern. Moving from the multiple description derived from the first part, the second part applies the territorial typologies of AFN in the case of Piedmont region, Italy. Maybe more than in other European countries, Italian food culture is deeply founded on highly regionalized productions, with a long-lasting tradition in quality and direct selling. In this context, Piedmont is nationally recognized as a territory with a plurality of cultural-food sub-regions strongly embedded in typical production systems. In the last years, Piedmont has been widely interested by the diffusion of different typologies of AFN, from the worldwide known initiative of Slow Food (born in the cultural region of Langhe at the end of the Eighties and focused on the valorization of the cultural value of food) to many micro-experiences of farmers markets, direct selling, and other short supply chains in mixed urban and rural contexts.

### City and agriculture: urban-rural links, farmers' representations and rationales in Pisa plain (Tuscany)

*Salma Loudiyi (UMR Metafort), Elisa Marraccini (INRA-AgroParisTech ENGREF / UMR Metafort), Mariassunta Galli (Scuola Superiore di studi universitari e di perfezionamento S.Anna), Sylvie Lardon (INRA-AgroParisTech ENGREF / UMR Metafort)*

For many decades, strong urban expansion has produced equally loss of agricultural lands in periurban areas, disconnecting major cities from their resource-bases and production systems that were historically associated with. Thus, urban-rural links have been weakened and for some cities, have completely disappeared. Nevertheless, developed countries are now facing new challenges in term of climate change, environmental stakes and food security that keep raising debates about agriculture and its contribution to the sustainability of rural - urban systems. Many cities are nowadays developing actions to re-design food procurement as well as some farmers (located near the city) are taking initiatives in relation with agri-food systems. Agriculture food function is thus rising with urban demand asking for local and secure foods. Yet, when city planners tackle open spaces, farmers' rationales and representations are not often integrated to the processes. In this research we aimed at understanding how farmers are integrating these issues. We wondered how individual and collective actions of farmers contribute to reinforce urban-rural links? What were the different city representations that lead such initiatives? Were there special adaptations to the urban opportunity and how these initiatives contribute to the sustainability of territorial systems? To answer to these questions, we studied the periurban area of Pisa (Tuscany, Italy), where numerous experiences in terms of alternative food networks have been reported and which presents still a large part of agricultural land use. By conducting interviews with farmers and other actors of the local food-supply chain, we investigated agricultural production systems diversity and how farmers represent and assess their related evolutions with the city. In particular, because our goal was to characterize and explain agriculture-city links through the food function following a sustainable perspective, from the farmers' points of view, we assumed that urban planners have to integrate farmers' individual and collective rationales to insure urban-rural sustainability.

### The contested and congested spaces of local food supply

*Lex Chalmers (University of Waikato)*

The contested and congested spaces of local food supply Lex Chalmers, University of Waikato, Hamilton, New Zealand Markets for agricultural produce have long been a feature of human settlements, but the branding and commercial promotion associated with contemporary farmers' markets is a relatively new phenomenon in many countries. In the early literature commenting on the emergence of the farmers' market 'brand' they were presented in positive and largely unproblematic terms. The linkages to local farming,

circuits in the local economy and assertions of alterity or 'otherness' in relation to the commercial food retail sector characterise this literature. More recently, farmers' markets have become sites of contestation in both the public domain and academic discourse. One of the most frequent questions addressed in the discourse has been around the regulation of the farmers' market brand, with assertions that the success of the brand is dependent upon clarity and conformity in these areas. The first section of this paper explores the space of contestation in New Zealand, noting the roles of a variety of different actors interested in the governance of farmers markets. In the second section, the important role of Farmer' Markets New Zealand in local food supply is documented and used as a backdrop in a review of the congested space of local food retailing. Regulation issues in the Farmers' Markets of New Zealand has encouraged a variety of alternatives, from country markets, through local collectives organising food production and sale on a seasonal basis to the wholesaling of international produce. Congestion in the local food supply is examined through a study in which several forms of food production and marketing competed for custom in an area of less than 50,000 consumers. The concluding section of the paper argues that without effective governance and effective promotion of the brand nationally, the future of local farmers' markets is not secure.



## C08.32-03 - Multi-functionality and socio-economic opportunity in the countryside 1

*Chair: Ana Maria Firmino, Ana Maria Bicalho*

### Linking urban and rural territories: The meaning of agrarian landscapes. Some contributions from Catalonia (Spain, EU)

*Alexis Sancho-Reinoso (Universitat de Barcelona), Joan Tort (University de Barcelona)*

The concept of landscape (not just understood as the landforms of a certain area but also as the manner that such landforms are perceived by the population -Ojeda 2005) has arisen as a powerful tool to foster interdisciplinarity. At the same time, it also represents a challenge within Geography, in order to overcome the gap between the material and the non-material aspects that shape such concept. This paper is based on the solid tradition of landscape studies in Geography (Ortega Cantero 1987) and particularly focuses on the concept of 'agrarian landscape'. These 'agrarian landscapes' where strongly linked to rural landscape and thus to rural Geography (especially in French Geography -Meynier 1959); however, the fact that nowadays they correspond to two independent dimensions is self-evident (Paül et al 2011). The paper takes part of a wider six-year R+D project (divided into two periods, namely 2007-2009 and 2010-2012) aiming to identify, classify and assess Spanish agrarian landscapes. Such project is being financed by the Spanish Ministry of Science and its first partial results were recently published (Molinero et al 2011). The two authors of the paper are active members of it. The paper aims to present some results derived from the research undertaken in the self-governed nationality of Catalonia. Four case studies were selected in order to focus on the diversity of landscapes of Catalonia, especially in terms of their historical, geographical, economic and social significance. Three examples are devoted to marginal mid-mountain areas (i.e. the Pyrenees and the Catalan Coastal Ranges), while the fourth example is located in the metropolitan region of Barcelona (RMB), where the urban development is the main driving force affecting such landscapes. The results show, first, the dynamics that affect the landscape diversity and their spatial consequences (including changes in land-use pattern, a progressive dismantling of cultural landscapes and a loss of individual and collective identity related to certain places). Secondly, the research suggests the idea that the assessment of agricultural landscapes becomes an important indicator to evaluate (at least qualitatively) the connection between the local population and a certain place. These links lead to a certain degree of recognition of the existing agricultural landscape, not only from the point of view of the material reality, but also the intangible aspects (Roger 1997, Berque 2009). In some cases (i.e. the case study located in the RMB), such recognition could be exploited to overcome the blurred borderline between urban and rural societies.

### Integrated Heritage Landscapes in Rural Areas as opposed to Open Space in National and Regional Planning: The Case of Communal Settlements in Israel

*Irit Amit-Cohen (Bar Ilan University)*

In recent years we have witnessed a tendency in many countries to include rural areas in the definition of open space: settlements and agricultural utilization of land, fields and orchards. Two reasons underscore this tendency: First is the massive pressure for development manifested in these countries with mounting apprehension of losing open spaces and damaging rural areas. The second stems from the similar characteristics of the two spaces (open spaces characterized by low building density, planted areas integrated in the natural landscape and low utilization variety), which underscore their contrast with the intensively developed urban texture. The debate on including rural areas in open spaces in Israel differs from that in other countries in several aspects: - The intensity of demographic changes, due to the intensive immigration within a short time span (950,000 immigrants in the years 1990-2000, ultimately constituting 15% of Israel's total population in 2000), as well as a very high natural growth rate. - Limited and restricted space - leading to mounting competition for every patch of land. - The powerful impact of the 'American Dream' of a ground level private home, due both to the competition for the land, as well as a social and political ideology that assigns social and cultural importance to land. - The uniqueness, from the social-cultural as well as planning aspects, of rural settlement in Israel, of which is the cooperative settlement form is most prominent. The purpose of this research is to examine the methods of preservation of rural textures (the rural grid, the agricultural land and agricultural infrastructures) and their unique cultural assets: their physical planning, built cultural heritage and agricultural landscape, and the manner of integrating it in the regional and national outline plans for open spaces. Such integration will make it easier to proclaim this entire area for preservation. The proclamation will be adjusted to the needs of the rural population as well as to Israeli population in general, and its economic, recreational, ecological and social needs. The adjustment will be made by creating a complex of rural heritage textures integrated with open spaces, so designated due to their high ecological value. The methods used in this research are based on field research, documentation and G.I.S. mapping of the historical findings. Integrating the historical findings with the national and regional outline plans for open spaces might help identify a continuum of landscapes defined and united by their common historical, economic, ecological and social values.

### Searching for the village of tomorrow – Scenarios on the functionality of Bavarian villages in 2020

*Anne Ritzinger (Akademie für Raumforschung und Landesplanung)*

Rural settlements in Bavaria are undergoing fundamental transformations due to demographical change and structural changes in economy and agriculture. Predicting



future consequences arising at local level is complex and depends on various influences. The scenario technique is one way to support policy development under these uncertain circumstances. This paper presents four scenarios depicting the future of Bavarian villages in 2020 under different preconditions regarding spatial context and the range of functions and services villages provide for their residents. The scenarios illustrate possible future paths both in economically weak peripheral regions and in prospering agglomerations and outline how the functionality of settlements varies. Contrasting the multifunctional best-case scenarios with the monofunctional scenarios helps to set out strategies for successful village development: The provision of attractive living conditions in rural areas will depend on the consistent adaptation of planning instruments to new challenges and different spatial contexts, regional cooperation in municipal networks, anticipatory and community-based development of local strategies and a fundamental debate on lifestyle and values in relation to public services in rural contexts. Capacity-building measures for all actors and the encouragement of innovation prove to be essential success factors. The scenarios were developed in the course of a research project that examined the changes Bavarian villages will potentially undergo in future. The project resulted in suggestions for the adaptation of the Bavarian Village Development Program how to best support rural livelihoods under changing conditions. As the results of the study outline essential requirements for sustainable development of rural areas, they can be transferred to other regions with comparable situations. As the process of village renewal in Bavaria is based on a bottom-up approach, it assists rural regions to develop a culture of shared responsibility contributing to a de-centralized provision of public services and the achievement of quality of life in rural areas. The comprehensive planning process is an important basis for understanding correlations and for building up cooperation schemes with neighbouring municipalities as well as between different policy sectors.

### **Remarkable Villages: Local combinations of backwardness and development in small border villages in Western-Flanders**

*Frans Thissen (Universiteit van Amsterdam)*

Villages near borders (language borders and national borders) face dual influences from their geographical position. They are coping with a peripheral position with respect to employment and service centers within their own territory. But at the same time they show sometimes specific local developments that are related to their boundary position. The Westhoek, the most rural part of Flanders (Belgium), is faced with persistent stagnation in small villages along the language border with Wallony and the national border with France. However, some of these villages show at the same time new local developments that are related to their border position. The national border between Western Flanders (Belgium) and the Côte d'Opale (Nord - Pas-de-Calais, France) exists 300 years in 2013. The language border with Wallony is of more recent date (1963). In this paper evidence is presented about the meaning of these two borders for the rural

border population in the Westhoek villages. The meaning of these boundaries for everyday life is described by the perceptions of the borders, the cross-border networks, and cross-border activities.

## C08.32-04 - Multi-functionality and socio-economic opportunity in the countryside 2

*Chair: Ana Maria Firmino, Ana Maria Bicalho*

### Das Gehoeft. Place/House: Living In (and with) History

*Esther Hagenlocher (University of Oregon)*

This paper concerns the Gehoeft, an archetypal Southwest German house. Gehoeft are built in clusters of one or more principal houses and other buildings, usually on a farm. I observed these Gehoeft, and if one part is more important than the others it is the courtyard, which provides access to all the structures in the complex. The entrance from the street to the yard is through the gate. The barn and stable are set back at right angles to the farmhouse, with other smaller buildings grouped loosely along the perimeter wall. The courtyard is effectively enclosed, providing the requisite workplace and storage room. The front section of the yard is semi-public and the rear/inside section is semi-private. This spatial organization reflected the lives and customs of generations of farmers and craftsmen. Unfortunately, these houses are now being neglected and are in danger of being lost. These observations have lead me to further questions about how the use of these spaces has changed over time, over the course of a day and how the fragmentary organization of the buildings relates to the growth of a family over time. How did the visual aspects, as described, correspond to the evolution of the families? How did the users change, the number of residents and the families? The purpose of this research was to look at the building type to understand both its current and future usefulness. The maximization and use of transitional space in the Gehoeft stands in contrast to the wasted space of much contemporary semi-private areas, and this is one reason for further study. This research has extended the basic knowledge of the Gehoeft. The methodology for this investigation entailed

### Vicissitudes of Gentrification and Sustainability of Rural Areas in Japan: The Case of Hotaka District, Azumino City, Nagano Prefecture

*Ryo Iizuka (Tokyo University)*

Today, rural areas are changing due to globalization. The majority of rural areas are suffering from various problems and difficulties. On the other hand, positive tendencies have occurred in some rural areas. In those areas, farmers continue to reside and manage their farms, in-migration flow exists and rural environment, such as infrastructure, services and landscape, is improved. These positive movements are captured as rural gentrification and to reveal the nature of that phenomenon is essential for rural planning and sustainable rural development. Rural gentrification is the phenomenon by which rural landscape is changed due to the inflow of middle-class people from urban areas. In this context 'landscape' not only means the superstructure of landscape which is visible,

superficial scenery, but also includes the structure under-laying it, comprising invisible factors, such as population, society, economy and culture. The purpose of this research is to reveal the phenomenon of rural gentrification from the perspective of the interaction between the superstructure and under-laying structure of landscape in Hotaka District, Azumino city, Nagano prefecture, a Japanese rural area. To capture the superstructure of landscape, architectural style and roof style of buildings in the area were investigated. Furthermore, the under-lying structure of landscape was identified, using statistics analysis and interview data analysed by applying Q-methodology approach. We found that the inflow of population from urban areas affected factors which composed the rural area and as a result the improvement of the rural landscape occurred. Such landscape change and beautification became local resources which kept attracting people from urban areas. These interactions between the superstructure and under-lying structure of the landscape explain the process of rural gentrification. However, from late 1990's due to the decrease in land prices, new residential development disregarding of landscape value has occurred, and rural gentrification in the area has declined. Therefore, this research defines the development and decline of this area within the framework of rural gentrification cycle.

### The Manor Douro house and its agricultural estate: A heritage to enhance while conserving and innovating

*Maria Helena Mesquita Pina (University of Porto)*

**Keywords:** Tourism, Rural Development, Sustainability, Landscape Heritage The emblematic Demarcated Douro Region is not only a privileged area where high-quality wines are produced, among which Port naturally stands out, but it is also an extended landscape that is home to a superb heritage reflecting centuries of history. Indeed, throughout its 250000 hectares, we find countless terraces laden with vines rising up the slopes of the Douro River and its main tributaries, as well as a valuable architectural heritage, which includes manor houses in agricultural estates or within the towns and villages. They are part of a breathtaking and distinctive landscape which was classified as "Evolving Living Landscape, World Heritage" by UNESCO in December 2001. Despite the region's heritage value and clear appeal, there is an acute diversity within the landscape in terms of the problems certain areas have to face, among which the stagnation/decline of the social and economic fabric is paramount, particularly within the wine sector. A sector which is, nevertheless, the region's economic backbone. In this setting, which urgently needs to be reverted, and at a time when the role of tourism is increasingly highlighted in regional dynamics, quite besides issues such as the restructuring of the vineyards and training of landowners and workers, how can spatial planning be developed without underestimating or defacing the region's many potentialities, particularly its architectural heritage? How can regional competitiveness be boosted and, at the same time, the sustainability of these landscapes and their heritage be enhanced? A strategy we can mention is centred on the manor houses and their respective

vineyards. In this paper, we present four examples of wine estates with a manor house and a wealth of history, that have overcome the stagnation with which they were afflicted, by following a strategy of combining winegrowing with tourism. The effects of these dynamics can be felt not only locally, but throughout the region as a whole. These four distinctive yet complementary examples include family-based approaches, under the coordination of landowners, who are over sixty years old in some cases, but quite young in others, as well as a holding which is currently integrated in a business group. In all the cases presented here, conservation has been combined with the sustainability of the investment and innovation, since what is at stake is an area that has been classified as a World Heritage site. To achieve this goal, we have followed a methodology which combines documental and bibliographical research which extensive fieldwork, including interviews in the selected units and the consequent processing of the information.

### **Development of Rurality-based on Tourism through the Commodification of Rurality in the Jike Area, Yokohama City, the Tokyo Metropolitan Fringe**

*Toshio Kikuchi (Tokyo University)*

In this paper the author focuses on rurality as an option of urbanity in the Jike area, Yokohama city, the Tokyo metropolitan fringe, and discusses the sustainable commodification of rural space in the area. The traditional rurality consisted of farms, their community, their ecological bases such as farmlands and rural forests (satoyama), and economic activities such as farming and produce selling. This rurality was based on the interrelationship among these elements. Following his discussion, the author identifies some conditions that supported the commodification of rurality and their interaction in the outer fringe of the metropolitan area. In the Jike area, the decrease in area of rural forests has led to the decline of rural landscape; the development of affordable housing lots in the outer fringe and the continuous inflow of urban residents into the newly developed areas have led to serious conflicts between rural and urban land uses. Recently however, activities that aim at recreating rurality, such as conservation of rural forests, have been promoted as a means to mitigate such conflicts, and to develop these areas as nodes of rurality and urbanity. Thus, the perpetuation of rurality has been assured by the sustainable relationships between rurality and urbanity. With the recreation of rurality, rural landscape plays an important role in the commodification of rural space. Rural landscape in the Tokyo metropolitan suburbs is generally suitable for leisure and health-enhancing activities, because it is easily accessible for urban residents. Visitors are enjoying the rurality through walks, rural landscape observation, shopping for agricultural products and friendly exchanges with farmers. In spite of their advanced age, rural residents continue to cultivate crops such as 'hama-yasai (Yokohama grown vegetables)' and 'hama-nashi (Yokohama grown Japanese pear)' for visitors, and to preserve rural land use and landscape for themselves as well as visitors. In the process of recreating rurality, rural residents preserve their traditions and identity, their religion of rural life and the spirituality of the rural space. Urban residents, on the other hand, enjoy rural recreation, the

understanding of natural environment, and satisfy their inner yearning for a sense of belonging. Although some plots of rural forests in the Jike area were on sale (either by farmers under tax pressure or for the construction of a large scale housing complex), most forests were managed for the conservation of natural and rural environment by the association of conservation activities. Because these activities have become the node of rurality and urbanity, the conservation of rurality has been assured with the sustainable relationships between rurality and urbanity. The conservation of rurality leads to its commodification in rural spaces, which has played an important role in developing rurality-based tourism.

## C08.32-05 - Rural-urban interaction and competition for land and resources 1

*Chair: Ana Maria Firmino, Ana Maria Bicalho*

### Cultivation abandonment and its regional characteristics and factors in Japan in the 2000s

*Takehiro Morimoto (University of Tsukuba)*

This study aims to examine the expansion of abandonment of cultivation in Japan, regional difference of abandonment, and regional characteristics of processes of abandonment. The author mapped the ratio and area of cultivation abandonment and investigated the relationship between abandonment and regional indices from the geographical point of view. He used agricultural census statistics of various scales and other sources on land use and regional characteristics. The results are described as follows: 1) abandonment of cultivation has advanced not only in less favoured areas but also plain areas, 2) the ratio of abandonment was higher in hilly or mountainous areas where population aging had progressed, 3) area of abandonment was larger in plain areas where extensive farming are minor, and 4) the policy measures against abandonment had been introduced but their effects were limited. Cultivation abandonment is strongly connected to contemporary economy, policy, and society in Japanese rural area. Societal factors such as aging, emigration and depopulation in remote rural area are major factors. Off-farm employment of farm family members has been a strong factor in wider area. Price decline of agricultural products has caused shrinkage of farming. Reductions of consumption and increasing in import of agricultural products through tariff policy change have resulted in a decrease of product price.

### Change and management in peri-urban landscapes

*Elin Slätmo (Department of Human and Economic Geography)*

Topic 3: Rural-urban interaction and competition for land and resources  
Change and management in peri-urban landscapes  
Elin Slätmo In order to manage the rural landscape we must acknowledge what is changing it. Rural landscapes of Europe today are not only influenced by strictly agricultural activities. In addition to producing food and fiber, management of natural and cultural values along with opportunities for recreation and outdoor activities constitute an increasingly important role in goals and strategies of rural development. Acknowledging the range of activities taking place in rural landscapes of today, and that influential processes are working on different temporal and spatial scales, this paper aims to create a wider understanding about what is changing peri-urban land use and which possibilities spatial planning has to manage these landscapes. Land use change is primarily caused by human actions. To understand why land use is changing it is therefore necessary to investigate the drivers for human actions in the physical

landscape. In order to grasp the complex web of factors causing land use change it appears to be favorable to connect the concept of driving forces to a relational arena perspective, as it accentuates actions and events in the physical landscape. By the arena perspective's inherent emphasis on spatial proximity, the range of activities taken place in the rural landscape can be more carefully considered in the analysis of why land use change. The complexity of land use changes are here investigated by a case study methodology focusing on peri-urban agricultural lands, using interviews among stakeholders on several spatial levels and a document study of municipal and regional plans. Two case areas, the municipalities of Sarpsborg and Sandnes, characterised by a fast urbanization and high valued agricultural land in Norway are chosen. The results of the study show that maintenance of agricultural land in the peri-urban areas is strongly connected to political decisions in spatial planning. Even though regulations about maintaining an active agricultural land use is working as a strong friction in the Norwegian context, high prices for the land in the peri-urban areas creates a strong pressure to sell land for development. The selling is in turn strongly regulated by development decisions in the spatial planning. The strong influence of spatial planning on land use in the peri-urban landscapes implies that planning processes should be further scrutinized. Issues of specific interests are: which knowledge and data are used as decision basis in the planning processes? What synergies exist between different land use interests? How do power relations between sectors and institutional levels affect change and management of land? Key words: Land use change, driving forces, management, peri-urban, spatial planning

### Regional Identity and Rural Livelihoods on the Eastern and Western Brazilian Frontier

*Scott Hoefle (Universidade do Rio de Janeiro)*

This presentation treats the relationship between regional origin and identity and different kinds of rural livelihood undertaken by settlers along the two major logistic axes of the BR-230/BR-163 and BR-230/BR-319 highways of northern Brazil. These axes now constitute the main eastern and western frontiers of the Amazon region and have attracted a diversity of settlers who practice very different kinds of agriculture with specific environmental and social impacts. Along the advancing eastern frontier in western Pará State small farmers who have settled along road heads of the BR-163 (Cuiabá-Santarém) and BR-230 (Transamazonian) highways are almost all from impoverished rural areas of the Northeast region and passed through years of gold prospecting before becoming semi-subsistence frontier farmers. Ranchers are usually of local urban origin or from North-eastern cities and after becoming successful merchants in the cities of Santarém and Itaituba later took up medium to large-scale commercial cattle raising in areas located up to 100km from these cities. Soybean farmers are almost all southerners with high levels of formal education and with a tradition of moving along the commodity frontiers of the Central-West region before establishing themselves near the Cargill export

port in Santarém. Along the advancing western frontier in southern Amazonas state Small frontier farmers who hail from all over Brazil have settled forested zones to the north, east and west of the city of Humaitá, located at the crossroads of the BR-230 (Transamazonian) and BR-319 (Porto Velho-Manaus) highways. Ranchers have settled in the same area and are usually southerners who arrive with capital and take up medium-scale cattle raising. Soybean and rice farmers are also from the South and South-east of Brazil and have moved along the commodity frontiers of the Central-West region before establishing themselves in a zone of savannah south of Humaitá.

### **Colonist evasion among agricultural settlements in Roraima State, Brazil: The latest Amazonian frontier**

*Alexandre Diniz (PUC-Minas), Felipe Borges (PUC-Minas), Elisangela Lacerda (PUC-Minas)*

Brazil is notorious for its deep social inequalities, especially when it comes to its huge asymmetries in land distribution. Successive governments have consistently neglected this historical debt, dealing with the land concentration problem with policies limited in scope postponing the much needed agrarian reform. The traditional response has been the expansion of agriculture frontiers and directed or spontaneous colonization, which have led to tremendous environmental and social impacts, let alone the recurrent armed conflicts over land ownership. These processes acquire bitter implications in the Amazon region, which since the military governments (1964-1985) has been the subject of a series of development plans which called for the economic and demographic exploration of the region. Nonetheless, the colonization and settlement projects undertaken by federal and state governments in the region display low migrant retention rates. In the process, directed or spontaneous colonists are faced with all sorts of impediments to their subsistence in the agricultural settlements, besides being neglected technical and financial support by the state. As a result, colonists are forced to seek livelihood in the emerging urban regional centers, or new colonization areas, reproducing the vicious circle, recasting all social and environmental problems associated with it. This process has been organized by some authors on a series of linear stages models, in which time plays a significant role. As time progresses, agricultural settlements gradually move from pre-capitalist to capitalist modes of production, undergoing a series of landscape and social transformations, including the evasion of colonists. This paper examines the relationship between the age of agricultural settlements and the categories of settlers typified by the National Institute of Colonization and Agrarian Reform (INCRA), the Brazilian federal land granting agency. We explore various categories of colonists (seated, evaded, deceased, titled and transferred), seeking to analyze the process of colonist evasion in the Amazon region. To this end, we work with the records of the 66 official settlement projects led by INCRA in Roraima State, the northernmost Brazilian territory. We apply a series of ANOVA and correlation tests to explore the interplay between the proportions associated with each colonist category and the age of agricultural

settlements. Results confirm strong and positive relationships between age of settlements and the proportions of evaded, deceased, titled and transferred colonists; while holding a negative association with the proportion of settled ones. These findings suggest that processes observed in the Amazon during the 1970s and 1980s are still in course in the latest agricultural frontier areas of Roraima state, fact that demands urgent attention given its environmental and social repercussions.

## C08.32-06 - Rural-urban interaction and competition for land and resources 2

*Chair: Ana Maria Firmino, Ana Maria Bicalho*

### Conflicts over land and natural resources at Madlangala Village, Eastern Cape

*Musa Khanyile (University of KwaZulu-Natal)*

Conflicts over land and natural resources at Madlangala Village, Eastern Cape Musa Khanyile University of KwaZulu-Natal South Africa The question of who accesses and controls land and natural resources is politically loaded and contested. The above situation increasingly becomes critical as the resource base diminishes. The majority of the communities in Eastern Cape depend on subsistence agricultural production, remittances and access to natural resources. There is awareness among these communities that a growing number of rural families have to share decreasing resources. Furthermore, deteriorating living conditions which reflect the lack of income generating opportunities and the inability to implement viable agricultural projects mean that community households also become reliant on natural resources. Failure to benefit from land and natural resource management practices or gain access to natural resources leads to inter-/intra-community tensions and conflicts. This paper examines the capacities and constraints related to the management of natural resources in marginalized communities. It also assesses issues related to governance, rural poverty, power structures and social differentiation.

### Entreprise et développement durable en amazonie brésilienne: Le projet Vale Forestier de l'entreprise Vale

*Jodival da Costa (Université de São Paulo/Paris Sorbonne)*

En Amazonie brésilienne, la dernière décennie a été marquée par l'idée d'une « Amazonie durable ». Le discours de durabilité et de préservation de l'Amazonie est fortement inscrit dans l'orientation politique de l'état brésilien et des grandes entreprises. Dans ce contexte, ce travail analyse le « Vale Forestier » : projet de monoculture d'eucalyptus initié par la compagnie minière Vale en 2007. Créé par le gouvernement brésilien en 1942. La Vale, rapidement, devient l'une des principales entreprises brésiliennes. Durant les années 1960, début ses actions en Amazonie, à laquelle des gouvernements militaires mettent en œuvre plusieurs politiques territoriales dans la région. En 1997, la compagnie est privatisée. Dès lors, elle intensifie son action dans le domaine de l'exploration minérale. Dans les années 2000, investit d'une part, dans la monoculture d'eucalyptus, destinée à la production de papier et, d'autre part, dans la plantation d'autres espèces dans le but de créer des forêts de réserve pour les projets de Mécanisme de

Développement Propre (MDP). Aujourd'hui, la Vale possède plus de 30 millions d'arbres d'eucalyptus plantées, en 62 fermes, l'équivalent de 100.000 ha, la plupart est d'eucalyptus. Dans cette étude, nous proposons de discuter les impacts de ce projet à partir d'analyse des actions de la compagnie et, de ses alliances avec l'État brésilien, les grands propriétaires de terre et les mouvements sociaux. Pour cela, nous adoptons la méthodologie de l'échelle, pour étudier des plusieurs échelles d'action des acteurs. Tout d'abord, nous discutons le concept de développement durable et son appropriation en tant que discours par les grandes entreprises, mais aussi en tant qu'idéologie instrumentalisée par ces dernières pour qualifier leurs actions comme « environnemental corrects ». Ensuite, nous aborderons le projet Vale Forestier à travers ses impacts territoriaux, environnementaux et sociaux. Le Vale Forestier ne modifie pas la forme de l'utilisation de terre. Même avec actions environnementales importants, parce qu'elle dégrade moins le sol, le projet conserve l'ancienne structure de concentration de propriété foncière à la monoculture, l'utilisation de terre contenu dans les grosses détenues et contrôlée par des mécanismes du marché.

### Impacts of the human activities on the fisheries resources of the Venezuelan Western plains

*Luis Alfonso Sandia Rondón (Universidad de Chile)*

The fishery resource of the rivers located on the Venezuelan western plains has constituted for many decades one of the most important base of economic development for this region. Its exploitation represents both the direct source of alimentation of the many towns and communities, and the source of incomes for the families, by means of the commercialization of the fishery production in the local and regional markets. Despite the importance of the fishery resource and its related economical activities, today there are many factors which affect its sustainability. In this paper, based on literature reviews and consultations with experts and local fishermen, some of the most important threats to the survival of the fish fauna with commercial interest in the area, are discussed. The deforestation of the high watershed, that impact negatively on the quality and the quantity of the water resource; the contamination of the natural water by the pesticides and domestic and industrial uses; the loss of the natural habitats along of the rivers; the overexploitation of the fishery resource; the inadequate fish methods; the poor observance of the legal normative; and the construction of the high and low dams on the rivers of the region; are some of the most threats for the fish communities and, consequently, for the daily work and the life of the fisheries communities of the Venezuelan western plains.

## Geographies of local arrangements between farmers and other stakeholders for a sustainable urban agriculture. A case study in Western Africa

*Ophélie Robineau (CIRAD/INRA UMR Innovation), Christophe Soulard, Patrick Dugué*

In Sub-Saharan African cities, agriculture remains a key activity for many families and plays a crucial role in the supply of food to urban centers. However, urban agriculture is often marginalized. Thus, in countries where public policies are weak, informal modes of governance can often be observed to maintain it. Through the investigation of modes of governance (that we also call formal or informal arrangements), our contribution questions the socio-spatial integration of agriculture into an urban environment in a medium sized african city : Bobo-Dioulasso (Burkina Faso). Based on surveys, we have have built a typology of urban farmers according to their anchorage into the urban territory and connection to the urban market. Two main types were identified: 1) small-scale urban farmers highly anchored into the urban space (selling to the local market and depending on urban resources), and 2) specialized and speculative urban farmers little anchored into the urban space (they aspire to move their production to the hinterland and are oriented to the export market). When considering exogenous sustainability of both (that is to say, the contribution of agriculture to the sustainability of urban territories and the vision urban planners and citizens have about agriculture) we found that investigating informal modes of governance developed by small-scale urban farmers is relevant regarding the sustainability of their farms and their integration at local levels (in the neighbourhood). We are thus investigating informal arrangements to understand how small-scale agriculture participates to the urban life and which modes of governance allow it to maintain itself and be anchored into the local urban territory. From three cases study, we underline the interest to detect local and informal arrangements - which emanate from a poor category of dwellers and of urban farmers who maintain local forms of agriculture - to question the sustainability of urban agriculture and its scale of urban integration. This investigation, through a "geography of arrangements", questions the interest of 1) these local informal modes of governance to develop an integrated agri-urban strategy and 2) linking local solutions to institutional programs.



## C08.32-07 - Social networks, scales of connectivity and governance

*Chair: Ana Maria Firmino, Ana Maria Bicalho*

### Demographic Dynamics and Livelihoods in the Forest: A Longitudinal Study for Machadinho, Brazilian Amazon, 1985 to 2010

*Gilvan Guedes (Vale do Rio Doce University), Alisson Barbieri (University of Minas Gerais)*

The main purpose of this paper is to discuss how the changing nature of household livelihoods in the Brazilian Amazonia over time may be explained by the changing demographic composition, their access and diversification of sources of income and welfare, and stages and evolution of frontier settlements the changing composition of their sources of income and welfare and stages and evolution of frontier settlements. In particular, we focus on the impacts, on livelihoods in the Amazon, of population mobility, intergenerational and government transfers, management of land, forests and natural resources, changes in household composition and contextual changes related to urbanization, and infrastructure development in the frontier. We use as case study a colonization project in the municipality of Machadinho. Colonist settlers have occupied this region since 1984, leading to important socioeconomic, demographic and environmental changes in the following decades. We build on two theories that place key individual and collective decisions at the household level: "household life cycle", and "livelihood approaches". These theories are particularly useful in understanding the many components of colonist's decision-making, individual aspirations of income and welfare, collective needs of familiar group(s) in rural settings, and the context (community, region, nation) in which these decisions are made. We use an unique longitudinal panel of plots and their related households based on field surveys carried out in Machadinho in 1985/1986 and 1995 (1,742 farm households); and 2010 (a sample of 259 farm households), allowing for a dynamic analysis of how a colonization area evolves through time. To our knowledge, it is the longest panel of farm plots in the Amazon, and the only one which follows colonists since the very beginning of the colonists' occupation.

### Understanding the vulnerability of African farmers living with uncertainty

*Shuhei Shimada (Tokyo University)*

African farmers face increased vulnerability but at the same time they possess remarkable ability to respond to and cope with risks and uncertainty. Social relationships, among other factors, play an important role in the management of their vulnerability. This paper highlights changes in social institutions, from 1991 onward, within a village located in Central Zambia and discusses their effect on farmers' vulnerability. The following events

and changes were observed: 1) destruction of the Forest Reserve, 2) land dispute, 3) an eviction issue, 4) a weakening of group farming, 5) failure of the first savings and credit (S&C) program, 6) a growth in small-scale S&C groups, and 7) increases in the practice of lending cow and plow sets ('set') for cultivation and weeding. These events and changes can be explained happened in a process of modernization that evolved since 1990 in Zambia. However, from a vulnerability point of view, they should be interpreted prudently: the first five events and changes resulted in an increase in the vulnerability of farmers and the latter two had mitigation effects. The destruction of the Forest Reserve had direct effect on the access to common natural resources. The failure of the first S&C program had a negative impact on those who had intended to benefit from it. Land dispute and an eviction issue created a heightened feeling of mistrust among the farmers and shook the power of village head. The decline of group farming increased the vulnerability of ill-equipped farmers. In contrast, the growing of small S&C groups strengthened social relations by opening new channels with which to access resources and a proliferation of 'set' lending also helped to reduce the vulnerability of ill-equipped farming families. The increase in new S&C groups began in 2007 after the failure of the first S&C program which was initiated by a NGO in 2000. The practice of 'set' lending increased alongside the weakening practice of group farming. These findings suggest that institutional changes have both increasing and reducing effects on farmers' vulnerability. The vulnerability of farmers cannot be defined using a single index to reflect changes within an institution; instead, multiple indices should be employed. To cope with the difficulties related to uncertainty, farmers dispense with, invent, or restructure institutions in daily life, which may or may not increase the vulnerability of farmers. Therefore, to understand farmers' vulnerability we need to identify the nature of vulnerabilities influenced by institutional changes and then determine how to judge integrated vulnerability by synthesizing them.

### Necessity and opportunity entrepreneurship in rural Vietnam – characteristics and performance

*Jürgen Brünjes (Universität Hannover), Javier Revilla Diez (Universität Hannover)*

In this paper we apply the concept of necessity and opportunity entrepreneurship to rural Vietnam. Our results show that, also in a rural developing context, necessity is not the most important motivation for starting a business. When comparing opportunity and necessity entrepreneurs, it becomes clear that rural opportunity entrepreneurs less often have an agricultural background and are better educated and skilled. In addition, they are more successful in terms of profits, even after controlling for general business and locational characteristics. Nonetheless, businesses started out of necessity are only less successful if they did not perceive an opportunity at the same time. Finally, only opportunity entrepreneurship significantly reduces the perceived vulnerability to natural shocks while necessity entrepreneurship appears to coincide with higher vulnerability to natural shocks. The results show that, although the concept has so far been primarily



applied to developed countries, distinguishing opportunity and necessity entrepreneurship is very suitable in a rural developing context if some contextual specifics of the rural environment are taken into account.

### **India's White Revolution & Cooperative Dairying in the Global South**

*Bruce Scholten (Durham University)*

The United Nations declares 2012 the International Year of Cooperatives. Coops led India's White Revolution (Scholten 2010), by monetising European milk lakes into infrastructure that helped double per capita milk consumption and pass USA as top world producer. The UN Food & Agricultural Organisation (Dugdill, Phelan, Bennett & Scholten 2012) notes there is rising demand for dairy products in the Global South, and therefore: (a) Smallholders and women can earn more from 1-or-2 cows than crops, or contract labour, keeping children in school (FAO/IDF 2007); (b) Smallholder dairying stimulates more off-farm jobs than crops (Stahl, et al. 2008); (c) Lactose-intolerance may be a myth. Milk provides rare micronutrients. North Korean and Thai children quickly adjust to pasteurized liquid milk, and adults enjoy yogurt and cheese pizza (Bender, 1992; Ahmed et al., 2000; Dugdill, 2004; Dugdill & Morgan 2008a:p.11); (d) In livestock-fish-crops systems, cattle eat crop residues and provide energy, traction and fertilizer. Yet, while the East Africa Dairy Development project, launched 2008 by the Bill & Melinda Gates Foundation and Heifer International, is linked to cooperatives, India's National Dairy Development Board downplays coops. This paper analyses such policies vis-à-vis Ban Ki-moon's observation that: 'Cooperatives are a reminder that it is possible to pursue both economic viability and social responsibility.' (United Nations, <http://social.un.org/coopsyear/index.html>)



C08.33

Urban

Commission:

Emerging Urban  
Transformations

## C08.33-01 - Recent urban developments in China

*Chair: Werner Breitung, Chaolin GU*

### Transformation of Urban Spatial Structure under Service Economy: The Case of Beijing

*Chaolin GU (Tsinghua University)*

Urban spatial structure is the space projection of urban economic structure and urban social structure. Urban economic restructure must promote the transformation of urban spatial structure. Since 1949, almost all the Chinese cities have experienced their transformation from the service center to the production center. Since China launched the reform and opening up policy, especially after of the urban reform in the 1990s, city's role as the center of the region has been consolidated, and some cities have changed their urban functions from the production center to the service center. These cities have had rapid growth of service economy and also experienced urban spatial restructure and function shifting. This paper applies the data of added value in all sections of tertiary industry in Beijing between 1949 and 2010, and the data of land-use and layout in key periods. Special attention goes to the urban spatial structure transformation led by the development of service economy sections such as financial industry, wholesale and retail trade, information industry, real estate, renting and business services, science and technology, etc., since 1995, a year of which the output value of tertiary industry accounted for more than 50% of GDP. The paper analyzes four service economic models which are the industrial chain, industrial support, industrial integration as well as service outsourcing. It also interprets the internal mechanism and trends of service economy as transformation of urban spatial structure in Beijing. Key Words: Service economy, Transformation of Urban Spatial Structure, Beijing

### Space of Creative Industries: a Case Study of Spatial Characteristics of Creative Clusters in Shanghai

*Jinliao He (Geographisches Institut)*

The rapidly emerging creative or cultural industries not only contribute to the growth of economy, but also to a revised spatial model of urban structure, helping in redeveloping old town spaces. However, the spatial characteristics of creative clusters, especially at the micro-city level, have not been fully examined. This study attempts to characterize the spatiality of creative clusters on the basis of literature review and empirical study of Shanghai. It finds that creative clusters are primarily distributed in inner-city, preferably located in districts of old factories/buildings and universities, embedded deeply in urban context and often boundary-blurred. These conclusions were thereafter proved by the evidence of Shanghai. The results showed that Shanghai is a particularly interesting case study for researching creative industries because of its special history and urban culture

which is distinct within Chinese cities. For instance, the old colonial zones play an important role in the clustering of creative industries. Moreover this case indicates that before the old inner-city in megacities of China really deteriorated, newly emerging creative industries re-occupied these abandoned urban spaces; meanwhile, to a certain extent, it enriches the classic models of urban structures. Additionally, a categorical differentiation of creative clusters in Shanghai was also noticed by this study.

### Strategic choices in the regional planning of the Pearl River Delta mega urban region

*Werner Breitung (Sun Yatsen University)*

The Chinese Pearl River Delta Region is one of the major megaurban areas in China and indeed the world. It has developed into the current polycentric agglomeration of over 50 Million inhabitants largely without any regional plan under a regime of intraregional competition and disintegrated planning. Only recently, the Chinese Central Government has stepped in to outline directives for future coordinated and integrated planning. This step is relevant not only for the Pearl River Delta Region, but it is also meant to serve as a model for other Chinese megaurban regions. An additional significance lies in the inclusion of Hong Kong and Macau into regional planning considerations, which requires coordination across more than just municipal borders. This paper analyses the specific conditions for integrated planning in this particular region and presents then an overview over the recently developed planning outline. It highlights a new emphasis on major urban centres such as especially Guangzhou and Hong Kong and the related tension between coordination and competition of these centers. This points to the need for strategic choices first between polarisation and equal distribution of resources and second of the degree of competition desired. Further strategic choices concern the levels and institutional set-up of cross-boundary decision-making. The discussion will focus on these key questions, which are fundamental for regional planning in metropolitan regions in general.

### Study on the Urbanization in Rural Area of the Mega City Tianjin

*Guangwen Meng (Tianjin University)*

The suburban areas in metropolis of China now often face the challenge of the shortage of construction funds and land in the process of urbanization. Hua-MingTown, based on the new model of land consolidation 'House Exchange with Homestead', not only provides a large number of urban construction land for the central city, but also provides the funds for rural urbanization. In this case analysis, this paper analyzes the background of the 'Model of House Exchange with Homestead' of Hua-Ming Town, describes the key contents and operational process of 'Hua-Ming's Model', and discusses the practical and theoretical significance of 'Hua-Ming's Model', such as the transfer of agricultural land, the standard of land compensation, intensive use of land, optimization of the industrial



structure, the urban planning and the integration between the urban and rural area, and reveal some still existence practical and theoretical issues .Finally, the paper summarizes a conclusion that 'Hua-Ming Model' is one of available solution for land and funds shortage in the urbanization progress in the suburbs of the big cities of China. Key words: land consolidation; House Exchange with Homestead; urbanization'Hua-Ming Town'Tianjin

## C08.33-03 - More complex urban systems 1

*Chair: Christian Matthiessen, Céline Rozenblat*

### Recent urbanization trends in Hungary. Suburbanization, desurbanization and/or re-urbanization?

*Péter Bajmócy (University of Szeged)*

The decades before 1990 were the years of the mass-urbanization (mass migration from rural areas to the large towns) in Hungary. After the change of political and economic system in 1990, new urbanization trends had been started. The population of the large towns started to decline, while population of the nearby villages and small towns started to grow because of the suburbanization process. The population of the rural areas stagnated on the same level in these years due to the out-migration of mainly poor urban people back to the countryside. In the last five years these trends changed again. The population of the large towns, especially Budapest started to grow again, because of the larger amount of the in-migrants from the rural areas. Large migration and population can be observed again in the rural areas, and also the increasing population and migration trends of the suburban areas started to decline. Nowadays the suburbanization, desurbanization and re-urbanization are concurrent phenomena in Hungary. In roughly 200 suburban and desurban municipalities almost 400 households surveys were queried. Using empirical and statistical data this paper aims to explore the motivations and behaviours of the migrating people. Suburbanization became the field of interest of migration issues in the last two decades in Hungary. In contrast desurbanization, which is a well known phenomenon in the developed part of the world, has been a rather neglected topic. The present paper examines the nature of desurbanization in Hungary comparing with suburbanization. It also gives a general view of regional differences of different urbanization trends in Hungary in an Eastern-European context.

### Innovation nodes in collapse: Between competitive cities and exclusive areas

*Helga Scarwell (Lab. TVES, School of Geography and Planning), Divya Leducq (University of Lille)*

Everyone can read, here and there, that metropolitan areas have to aim for excellence, considering global competition and expected trickle-down effects for the bigger ones. This new context blatantly modifies planning and management of cities. Within this framework, implementation of spatial policies, as for instance, the ones based on knowledge economy, are introduced as innovative planning. Then, reshaping policies which affect urban space disclose social divisions, because the land-revaluing sometimes encourage gentrification of working-class areas. We can argue that it justifies the subordination of « innovative » city to economic imperatives and its conversion into a

tradable object of consumption. Benchmarking studies largely contribute to this phenomenon of « city branding ». Their communication systems use misapplications of notions and concepts, as for example « diversity » and « sociability », or extend new organic metaphor as « revitalization » and « renewal », which sound legitimate facing « urban shrinkage » rhetoric. Indeed, looking for more spatial justice will lead to take into account spatial inequalities, and more generally environmental inequalities. However, excellence investments bring technology and growth in a tricky issue, which creates recurring inequalities between human beings. Those innovative cluster policies also express unequal nature of urban and facilities planning at the environmental level and regressive nature of environmental policies at the social level. This paper aims to discuss about spatial justice concept from the role of knowledge economy within socio-spatial organization of city. We will focus on how planning tools, land control instruments and finance mechanisms produce urban spaces. To sum up, we will illustrate the debate networks/ territories thought a deep presentation of digital mega-projects in two different cities. The first field located within an ancient industrialized country, in the metropolitan area of Lille (Nord-Pas de Calais Region, France). The second field located in an emerging country's tier-two city named Pune (State of Maharashtra). The purpose is absolutely not to compare both, rather than highlight the common and different key issues within planning process of knowledge economy. In fact, and maybe more than anywhere else, observed gaps and geographical disparities on environmental level within these territories, prompt us to know better and bring in question some aspects of collective reality, even if it's strongly linked to resources issue. To what extent urban planning based on knowledge sufficiently consider gentrification phenomenon noticed on our cases studied?

### Urban capacities to foster inter-organizational relations: Firms' board of directories linkages into Swiss cities

*Olivier Di Lello (University of Lausanne)*

Switzerland, and more precisely Swiss cities, can be considered as a relative attractive place for multinational firms in the world. The location of some big multinational firms and subsidiaries in this place can only witness of the attractiveness of Swiss cities. At a time when processes like globalization and financialization are always more leading the economy, the Swiss case analysis shows that finance and taxes are a decisive factor that could explain location of firms. Somehow, we suggest that processes acting at urban scale can also have an important effect on the global processes and should as well be taken into account as a major factor explaining multinational firm's location. From a worldwide database, containing information on multinational firms networks of subsidiaries (ORBIS, 2010 IGUL, 2011), we built additional information on board of directory of firms located in Switzerland (Orell Füssli, 2011). This kind of data brings a new network of firms that is not based on "classical" financial firms' ownership networks. Firms sharing together a common member in the firm's board could mean exchanging



different kind of knowledge. Thus, we built links between firms sharing common members. In fact, we suppose here that firms are not only exchanging between several unities belonging to the same multinational group, but that multinational groups are exchanging between themselves and exchanging with local firms, without having formal financial relationships. At this point, the role of location in a city or a region should be seen as an opportunity and a willingness to cooperate and exchange information with other firms. It results some intra and interurban linkages that one can analyse and interpret as the capacities of cities to generate agglomeration economies (intra urban links) or networks economies (inter-urban links). In this presentation, focused on such networks in Swiss cities, we figure out that some strategic and specific economic sectors are in the middle of these processes. Finally, to add a pure spatial dimension, we illustrate that some Swiss cities seem to be more central than others thanks to nodes of specific firms' networks and that they are playing a relevant role in the embedding process of firms at the local scale.

## C08.33-04 - More complex urban systems 2

*Chair: Christian Matthiessen, Céline Rozenblat*

### The Creation of the Metropolis in Post-Socialist Space: The 'Metropolis Silesia' in Poland

*Jacek Petryszyn (University of Silesia), Alicja Szajnowska-Wysocka (University of Silesia), El'bieta Zuzaska-yko (University of Silesia)*

When conducting geographical studies in the areas with increased concentration of population, which are mainly large city agglomerations or conurbations, it is essential to remember about proper evaluation of the urbanisation processes in this area. One of the symptoms of intensive urbanisation is metropolisation. It is a process of concentration of metropolitan functions in the growing centre of the metropolis. As for Middle Europe a post-socialist city (conurbation) should meet the following criteria to be recognised as a metropolis: the size of at least 500,000 inhabitants, significant economic potential, well developed high-level services sector, large innovative potential, presence of scientific as well as research and development units. The studies emphasise that not only a large mono-centric place can be a metropolis, but also several nearby cities may form one, creating potential development opportunities in the area of a vast technical conurbation of a metropolis with few centres. Selected functions occurring in 14 cities, that together with the surrounding municipalities form an area of the Upper Silesian conurbation in Poland, are the subject of the analysis in this paper. The main purpose of the study is the need to determine precisely the centres of the currently forming Upper Silesia metropolis, quite frequently called Metropolis Silesia. According to the given terms a metropolis should be characterised by metropolitan functions occurring in its territory. Among the institutions representing the high-order functions, colleges and various institutions engaged in education, research and development activity are frequently mentioned. All kind of high standard services for very demanding clientele, in other words, those defined as luxurious and costly are important as far as development of the metropolis is concerned. Finally high prices of flats, offered on the real estate market, are frequently treated as the evidence of a high degree of development of the urban centre. The Metropolis Silesia is an indispensable subject integrating a group of cities and urbanised housing estates in the centre of the Upper Silesia due to their post-socialist industrial genesis and poly-centric character. Due to a complex analysis of five selected factors determining development of the metropolis, a few potential centres which altogether form metropolitan centres have been chosen out of several dozens of cities. First of all the centre of Metropolis Silesia is very distinctly formed in Katowice. As the second metropolis centre, although with lesser significance and in some part complementary to Katowice, Gliwice at the western end of the Metropolis Silesia could be appointed. Sosnowiec, Zabrze, and Tychy also appear as auxiliary and developing centres of the vast metropolis.

### Metropolitanization processes in Spain: from the traditional city to the "city of cities"

*Rubén Camilo Lois-González (Universidade de Santiago de Compostela), Maria-Jose Piñeira (Universidade de Santiago de Compostela)*

Since mid-1980 in Spain have been observed metropolitanization processes that have been favored by factors such as improvements in transport and communications, a favorable economic situation, the urge investment of the population and a neoliberal philosophy of urban growth that promoted the massive construction of new residential areas. In this context, the idea of traditional city that concentrates population, activities and services lost its meaning, and takes hold the concept "city of cities." Madrid, Barcelona, Seville, saw its population moved progressively to municipalities within its area of influence either because in them housing are cheaper either because they have a higher quality of life to live. The end result is that today we can see the Spanish urban system within a set of large urban agglomerations in which meanwhile the central city still has some weight, other smaller cities have gained a leading role and have a specific role within the set. Throughout this paper, we will establish a classification of the Spanish urban system, we will discuss the main urban areas, analyze what factors determined its development, study how are they articulated and what are the advantages and disadvantages we observe in them.

### Metropolitan areas in Europe

*Peter Schön (BBSR)*

The new BBSR study focuses on redefining metropolitan functions beyond classical explanatory models. For that purpose, theories and patterns from the fields of social science and regional economics have been analyzed. Secondly, metropolitan functions and their spatial distribution in Europe have been analyzed. The result is an analytically and theoretically substantiated, comprehensive view of European metropolitan areas. In order to find appropriate indicators to give a quantitative description of metropolitan functions, a theory-based classification of clearly defined subfunctions is required. Based on the principle of the functional differentiation of social systems and on the findings of regional-economic theories, five areas of metropolitan functions were defined: "politics" including international relations of national governments and supranational organisations, "economy" including global production, trade and financial relations, "science" including globally significant universities, research networks and innovations, "transport" and its role in the worldwide networking of persons, goods and information and "culture" including arts and sports events being of worldwide importance. To operationalise the theoretical concept of metropolitan functions, 38 indicators were analyzed, meeting the following requirements: cover the whole investigated territory of Europe; defined for all countries according to standard criteria; high qualitative standard and reliable unofficial statistical data; exact geocoding of data on the level of local administrative units or based on exact

local coordinates; highly specified indicator value to depict the European and global context.

### **European cities' system: Between hierarchies and specialization**

*Céline Rozenblat (University of Lausanne)*

The globalization processes developing during the second half of the XXth century were mainly supported by city regions that in turn encountered visible economic and social transformations since the 1980's summed up in a process called metropolization. Concomitantly, Europe built an economic and social space, strengthening interdependencies between countries, and integrating all together national urban systems. The European cities' developments are becoming more and more interdependent. Their specialization in a variety of urban functions is the result of their integration and their active role into multi-scalar networks of capital, enterprises, people, innovations and culture. In order to evaluate the role and position of each city in this European urban system, a multi-criteria analysis was conducted in 2011 on the European system of cities, following previous studies in 1989 (Brunet) and 2003 (Rozenblat, Cicille: presented in IGU Urban commission of Glasgow, 2004). To detect the metropolization dynamics, we collected for the 357 European Functional Urban Areas with more than 200,000 inhab., on a comparative way, more than 70 mixed urban indicators of stocks and flows, including criteria concerning 5 thematic: - Transport and communication, - Research and Innovation, - Economic functions, - Culture and tourism, - Political power. A multivariate analysis on 25 main criteria highlights the strong hierarchical differentiation as well as the diversity of specializations among European cities. If the diversity of urban activities is often linked with their size, there are specialities that follow other spatial organizations, selecting cities that appear as exceptions. The interpretation of these phenomena is made in terms of innovation waves and their diffusion, as well as network integration processes. This combines the two intrinsic dimensions of cities being both places of space and places of flows.



## C08.33-05 - More complex urban systems 3

*Chair: Christian Matthiessen, Céline Rozenblat*

### Villes et ports dans la globalisation: Le cas de l'Italie

*Sebastien Antoine (Université de Bourgogne)*

La position de la ville portuaire dans les différentes chaînes et réseaux de production, ainsi que la manière dont ces derniers s'inscrivent dans la "ville globale", comprise, suivant Peter Taylor, comme un ensemble de villes inter-reliées par des firmes de services avancés aux entreprises, n'est pas bien connue. Si l'Italie dispose de deux villes globales importantes, Milan et Rome, les deux grandes villes portuaires, Gênes et Naples, sont dans les profondeurs du classement des villes globales du GaWC. Si les villes portuaires cherchent en général à développer des services avancés reliés au transport maritime, du point de vue de la ville globale, les services avancés de très haut niveau sont associés à une économie d'urbanisation et non pas de spécialisation. Autrement dit, une grande ville a vocation à être reliée à une autre grande ville plutôt qu'à un port ou une industrie particulière. En se concentrant sur Gênes et Naples, ainsi que sur Milan et Rome, ce travail propose d'évaluer la diversité, ou, au contraire, la spécialisation dans le transport et la logistique, du secteur des services avancés aux entreprises dans ces quatre villes. Une méthode, développée par le laboratoire GaWC, basée sur la localisation des transactions entre les producteurs de services avancés et les industries clientes de ces services, permet d'attacher les échanges internationaux (commerce, industrie, transport) à la ville globale, et de cartographier des réseaux de villes à différentes échelles (régionale, nationale, européenne et mondiale). Les résultats préliminaires, qui se préoccupent seulement de l'échelle italienne, font apparaître la faible connectivité générale de Gênes, mais montrent la forte spécialisation de cette ville dans l'économie du transport maritime et de la logistique, de manière complémentaire avec Milan. Naples, quant à elle, dispose d'une connectivité nationale qui s'accroît. La ville se trouve en concurrence avec Rome à propos des services logistiques en relation avec Milan, tandis que les services maritimes proposés par le grand port du sud sont étroitement associés à Gênes. Enfin Milan et Rome apparaissent comme complémentaires, mais aussi concurrents sur certaines offres de services.

### Strategic Development of Moscow as a Global City

*Vladimir Klimanov (Institute for Public Finance Reform)*

Moscow as the largest city in Russia and in the Eastern Europe needs to adopt a totally new kind model of its development. The city's economy has radically changed during the post-Soviet period. Moscow, which was the biggest industrial city in the former Soviet Union, has lost a substantial share of its manufacturing during last twenty years. Different service industries, including real estate and finances, have increased rapidly at the same

period. So, Moscow stands among other leading global post-industrial megalopolises now. Manufacturing accounts about 20 per cent of the composition of the Moscow's gross regional product including about 4 per cent for production and distribution of electric power, gas and water. The most of city's economy is therefore due to the service industries. In fact, the official statistics does not give real figures of them because of some specific methods of accounting. For example, banking and other finance sector production are in the so called non-regional portion of the Russian gross domestic product. So, the role of such sector in Moscow is higher in fact than according to formal figures. But concentration of finance capital has not decided many of current problems in the city's development of Moscow. These strategic problems include a low quality of life of citizens, lack or low quality of many public goods and social services, transport collapse and other negative elements of city's spatial structure. The latter is really a key limiting factor in the Moscow's development. According to different estimations, the pendulum migration to Moscow and back has increased to one and a half or even two million persons. But any united governance in the Moscow's agglomeration included the city itself and its region is absent totally. The expansion of the city's boundaries made formally in the beginning of 2012 is clearly unable to solve this problem. Moscow is also marked by high air and water pollution, reduction of green areas and quality of landscaped areas. There is a very low effectiveness of public goods in Moscow which were mostly inherited from the Soviet era. These problems are major hindrances to the development of Moscow as an international finance centre, a global city specialized in high-tech industry, knowledge production and one of the educational and cultural capital in Eurasia. Besides, to develop Moscow as a global city, it is necessary to aim the economic policy provided by the city's government to promote specialization in sectors those are typical for post-industrial megalopolises. To solve different problems in the Moscow's development is possible with realization of the draft city's strategy till 2020 prepared at the Russian Presidential Academy of National Economy and Public Administration and about twenty new city's target programs covered all industries and sectors.

### Cities in multi-scale and multi-dimensional processes of globalization

*Céline Rozenblat (University of Lausanne)*

This study of multinational firms networks aim to explore the "duality" between world urban integration and firms' networks extensions, focusing on the imbrication of multi-scale advantages and on differences between economic sectors. An empirical study is developed on the network of the 1 million ownership links between direct and indirect 800'000 subsidiaries of the 3'000 first multinational firms of the world. All units have been located at the scale of cities (delineated in a comparative way). The multi-scale approach and the multi-dimensional one (by activity sector) show the remaining coherence of national and continental territories that interplay with cities in order to support and create these global links. A very new approach showing the intra-urban links has revealed the



importance of local linkages in the production of global networks. The main activities in the core of the whole networks are finance and information and communication, while the more growing sector seems to be the ones whose hierarchize more the cities: research and information-communication. In this respect, German cities and capital cities, which are specialized in these sectors, seem to have future advantage.

## C08.33-06 - Urban social transformations: Contested social spaces 1

*Chair: Ludger Basten, Lienhard Lötscher*

### Busting Neighbourhoods in a Booming City: The Spatial Side Effects of Entrepreneurial Urban Politics in Tokyo

*Ralph Lützel (University of Bonn)*

Until a decade or so, Japanese cities were usually portrayed as displaying no social disparities or residential segregation of any relevant proportions. This was attributed to the effectiveness of a "state-centered political-bureaucratic" or "developmental capitalist" (Hill and Kim 2000) tradition of governance. From the enactment of the "Urban Revitalisation Law" in 2002, however, a new era of Japanese urban politics was ushered in that has been labelled "entrepreneurial" or "led by capital" (Jacobs 2005; Waley 2007). Spatially, and in Tokyo in particular, totally opposite trends unfolded: Whereas the city centre and part of the waterfront area were stylishly redeveloped to cater to the needs of foreign expatriates and the domestic upper middle class triggering a massive reurbanisation process in the core city area as a whole, many inner city areas and sections of the industrial north east of the Japanese capital were left in visible decline. While these transformations have been covered frequently already by either relating to isolated cases or macro-scale disparities between wards, so far no western-language papers and only a few Japanese studies have examined the topic of growing socio-spatial disparities at the small-area district level (each containing about 2,000 to 6,000 inhabitants on average). Furthermore, in regard to Tokyo deprived neighbourhoods have as yet attracted much less attention in the literature than reurbanised and gentrified areas. This paper will examine (1) to what degree urban politics in Tokyo have turned "entrepreneurial" in the sense of the eponymous concept evolved by David Harvey (1989), (2) what features deprived small-area districts are showing in the Tokyo core city area, and (3) which causes have led to their current state, i.e., can decline in fact be related to the entrepreneurial turn in urban politics? Since demographic change and growing socioeconomic inequality are currently the most heavily debated social problems in the Japanese media and academic discourse alike, the level of decline will be determined by using census data on population decrease and ageing, unemployment levels, and occupational status. By employing hierarchical cluster analysis, all districts of four selected wards are first classified into internally homogeneous groups according to these four variables. As a result, it becomes evident that there are three different types of deprived neighbourhoods in Tokyo. These types are then further characterised by including other variables what will add a diachronic dimension to my arguments as well as pointing at the causes responsible for deprivation. The findings of this study lend support to the hypothesis that entrepreneurial urban politics, in whatever cultural context they are

established, tend to worsen social conditions in certain neighbourhoods even amidst urban prosperity.

### La gentrification, une stratégie municipale conflictuelle à Harlem

*Charlotte Recoquillon (French Institute of Geopolitics)*

La gentrification de Harlem est le produit d'une intervention publique massive et très volontariste qui a transformé le quartier par étapes depuis les années 1980 avec une accélération très forte depuis le début des années 2000. Cependant, la reconquête de ce territoire historique et symbolique, capitale des Africains-Américains par excellence, provoque de nombreuses tensions tant les intérêts sont contradictoires. Ainsi, des projets urbains comme la requalification de la 125ème Rue (le zonage étant devenu l'instrument préféré de Michael Bloomberg pour favoriser le développement économique) ou l'expansion de l'université Columbia ont donné lieu à plusieurs années de mobilisation, de conflits et de négociations. Les processus de consultation publique qui ont encadré ces projets se sont montrés inefficaces à désamorcer les conflits et n'ont pas permis d'aboutir à un consensus tant les rapports de force étaient inégaux. À la lumière de ces exemples concrets, cette intervention, basée sur un travail de thèse, explore aussi la question du droit à la ville et de la production de l'espace urbain dans un contexte de compétitivité entre les territoires accrue et où l'objectif de développement économique impose une quasi-dictature aux habitants. Pourtant, comment nous habitons la ville et comment nous y organisons nos sociétés est une préoccupation partagée par de plus en plus de citoyens et est, à ce titre, un enjeu démocratique et politique majeur. Ainsi, les débats sur le droit à la ville et la justice spatiale ont connu un vif regain d'intérêt. Cette intervention évoque donc à la fois les conflits engendrés par la politique municipale de revitalisation qui, de fait, gentrifie Harlem ainsi qu'aux tentatives de résistances citoyennes et les raisons de leur relatif échec.

### Economic restructuring, 'counter-conduct' and local political representation – The struggle around big-box shopping in Vancouver, Canada

*Marit Rosol (Universität Bremen / Universität Frankfurt)*

In November 2007 Vancouver City Council decided to approve a rezoning application for a new 'big-box' store, submitted by a major Canadian retail and service chain. This decision had been preceded by an intensive public debate and a failed first application in 2005. The controversial rezoning application, expression of the expansive strategy of the chain, and the support by Vancouver City Council also led to a conflict around political representation of the adjacent neighbourhoods. Specifically, it started a conflict around the political mandate of a group watching over the implementation of a neighbourhood planning process, which had previously decided against such developments. Hence the group did not fight against the rezoning application only but had to fight for their political mandate as well. In my presentation I will focus on this struggle for a political mandate as

a form of local resistance. Particularly, I will present, how the concept of governmentality by Michel Foucault and his notion of governing as the 'conduct of conduct', of resistance and 'counter-conduct', is instrumental for analyzing the different strategies of resistance by opposing neighbourhood groups. The case is instructive because it shows how economically driven land use decisions are intertwined with questions of political representation.

### **Producing space for cosmopolis, urban development in Olympic cities in Europe: Lessons from Barcelona, Athens and London**

*Petros Petsimeris (Université Paris)*

This paper analyses the production of extensive development sites within European cities occasioned by the attribution of Olympic city status, in order to examine the role that Olympic game mega events play inlevering contradictory urban developments on the host city-region. Planning policy responses to global and local investment-development trends are found to be reflected in the symbolic value of a number of urban projects. The focus is on three European metropolises that have been chosen to organize the Olympics: Barcelona, Athens and London. These are examined in terms of the location of new infrastructure and the social topography of the city, and the relationship between the rhetorics of urban development and the outcomes. Attention is paid to the social and functional transformation of the city in terms of shifting centralities, the production of new centralities, and deconcentration and urban sprawl in a context of Pax Urbanistica. The analysis suggests a number of cautionary tales for the dozen or so cities trying to compete for Olympic or other mega events.

## C08.33-07 - Urban social transformations: Contested social spaces 2

*Chair: Ludger Basten, Lienhard Lötscher*

### **Closing the City: Extinguishment of Rights of Way in Urban Ireland**

*Denis Linehan (University College Cork)*

No national record exists of the extinguishment of rights of way in urban Ireland, in spite of the very significant consequences this phenomena has had on the social sustainability of neighbourhoods, and the implications it may have in reducing the mobility of people in local communities. This paper, based on collection and analysis of almost 600 closures in the last decade, provides unique insight into the contested politics of urban community building in Ireland, due to the intersection of the extinguishment of rights of way with issues around the geographies of youth, anti-social behaviour and urban design and planning

### **Changing urban living environments in the context of megaurbanization – perspectives from Pune, India**

*Mareike Kroll (University of Cologne)*

The rapid urbanization process in India has a strong impact on living environments in cities. Especially since the liberalization of the Indian economy in the early 1990s, rapid economic and population growth in cities have induced fundamental changes in the physical and social environment, leading for example to land use changes and pollution problems on the hand and changing occupational structures and consumption patterns on the other hand. In the emerging megacity of Pune, the population has doubled in the last 20 years from 2.6 to 5 million inhabitants overstressing massively the existing infrastructure. Economic growth is giving rise to an emerging middle class and at the same time to a growing number of slum dwellers through immigration. The heterogeneity of the urban society and the steep socioeconomic gradient among different socioeconomic population groups are leading to an increasing fragmentation in Pune. Target of the paper is to present different living environments of distinct socioeconomic groups in Pune. Research is based on a household survey in six different areas in Pune: two urban middle class neighbourhoods with semi-gated housing societies and one traditional middle class neighbourhood in the old city centre, as well as three slum areas which are located close to the middle class neighbourhoods. Material factors such as housing conditions and income, social factors (occupational structures, education, social networks) and behavioural factors in the six research areas will be addressed. Further, changes in the living environments over the last decade will be brought up as well in order to understand the impact of urbanization and neo-liberalization in different socioeconomic

groups. The study exemplifies the process of fragmentation in a rapidly changing society as well as risks which occur with increasing socioeconomic disparities.

### **Internally Displaced Persons (IDPs) in the cities of post-Soviet Georgia: Coping with marginality and exclusion**

*Joseph Salukvadze (Tbilisi University), David Sichinava (Tbilisi University), David Gogishvili (Tbilisi University)*

After the collapse of the Soviet Union, citizen's alienation and marginalization became a serious problem in all post-Soviet cities, as a significant part of the population has struggled to adjust to the new economic conditions. In Georgia this overall problem has been aggravated by an inflow of internally displaced people (IDP), fleeing from ethno-political conflicts and wars. In fact, IDPs have formed a distinctive group in today's Georgian urban society, which differs from the 'mainstream' social groups in terms of its identity, networking, mobility, residential and place-making patterns and which may be considered as one of the most socially and spatially excluded and vulnerable strata of the Georgian population. Can refugees/IDP communities successfully integrate into mainstream urban societies in Georgia? This is the main scientific question of the paper. The paper intends to explore social and spatial barriers for the inclusion of the IDPs groups into the 'mainstream' urban societies, based on the experience of a variety of urban contexts across Georgia. In particular, it reveals the role of social networks, informal and formal institutions, and spatial practices for either assisting or impeding the coping strategies that IDPs undertake in order to adapt to the challenging circumstances of their everyday life and to integrate into the mainstream societies. We analyze these issues in the context of adopted legislation and policies, strategies and practices of responsible public institutions, local governments, and planning authorities that are in charge of improving physical environment and housing conditions. As a result of the research we try to assess the correspondence of governmental policies with the real necessities and demands of IDP population, including provision of decent living and employment conditions and mitigation of barriers for their integration in respective urban societies. The scientific approach of the research is determined by the application of, and contribution to, a number of theoretical insights and underpinnings: theories of social capital, social networks and social mobility; conceptual developments on social resilience, including those on 'persistent resilience'; 'Multiple economies'; 'Right to the city' and post-socialist city. The empirical part of the research is based on data collection, and analysis from case study areas - mostly including the city of Tbilisi with the largest IDP population and one newly-formed IDP settlement. The research methods include: semi-structured interviews and focus groups with IDP communities and government officials; social network analysis; analysis of media and official documents (including statistical data); field observations; GIS (spatial) analysis of residence locations, including time series.

## Socio-Spatial Integration in Late Modern Societies: The Case of Arabs in Israel

*Izhak Schnell (Tel Aviv University)*

Research on ethnic relations frequently adopts quantitative description of groups\' residential distribution and segregation and structural approaches focusing on the analysis of exclusionary forces. I study the more concrete everyday life practices claiming that parallel to the exclusionary forces, many Arabs in Israel seek socio-spatial integration. I aim at exposing Arabs\' routes of integration in Israel. I introduce a novel concept \'socio-spatial lifestyle\' as a tangible methodological tool that focuses on analyzing Arabs routes of integration and separation in Israeli everyday life. It is based on the assumptions that socio-spatial lifestyle capture both choices and structural aspects according to the Weberian model, it views individuals as active agents who participate in forming their social spaces and spaces are analyzed as networked spaces that may transcend local boundaries. Growing number of young Arabs seek to leave their traditional binding lifestyles seeking more complex individualistic repertoires of identities open to the broader society as part of the globalizing late modern world. In this context we ask two interrelated questions: To what extent and what forms of socio-spatial lifestyles are emerging among Arabs and how do they represent different levels and forms of exclusion vs. inclusion in the broader society? The research is based on a questionnaire that relates to five aspects of socio-spatial lifestyles: residential location; corporeal daily activity patterns; social networks; the structures of sense of attachment to places and communities; Attitudes toward self affiliation like gender, family, career, ethnicity leisure etc.



C08.34

# Water Sustainability

## C08.34-01 - GIS in water research (Hydro GIS)

*Chair: Frank Winde*

### Synoptic visualization of dynamic changes in water flow and quality using GIS capabilities and slide animation

*Emile Hoffmann (North-West University), Frank Winde (North-West University)*

This paper relates to a DWAF-funded project aimed at the characterisation of impacts associated with the extraction of peat on water flow and quality of an affected wetland system downstream of the Gerhard Minnebron Eye (North West Province, South Africa). The focus of this paper is on the development of a methodology that assists with the synoptic interpretation of a range of inter-dependent hydrologically relevant parameters through a combination of GIS-generated data (ESRI's ArcGIS?) and animation capabilities of presentation software (Microsoft's PowerPoint?). The motivation for developing such a tool of visualisation, arise from the difficulties frequently associated with the interpretation of large data sets. In this case it comprises point data for parameters very different in nature (such as water level, rainfall, pH, electrical conductivity, water temperature, vegetation cover etc.) in their horizontal and vertical distribution (e.g. boreholes measured at different sites and at different depths) as well as their changes over time. While GIS components are used to transform the point data derived from weekly field measurements in different boreholes first into areal (2D) and later 3D information, animation techniques are subsequently employed to incorporate non-hydrological information such as observed changes in vegetation cover and meteorological data (rainfall, sunshine) and finally illustrate associated temporal changes at discrete (in this case weekly) intervals. Adding the time dimension to a 3D-reflection of the spatial distribution of measured parameters effectively creates a 3.5D model which allows for the simultaneous display of (quasi-continuous) changes of each measured parameter for all measuring points over a period of a full hydrological year. Combining the visualisation of the spatial distribution of water quality parameters and accompanying changes in rainfall and vegetation as main governing factors in wetland hydrology with a quasi-continuous display of their temporal changes assist with the synoptic interpretation of a very complex system of interdependent time series of several. Despite remaining on a semi-quantitative level (at best) the method was found to add to our understanding of interactions between factors in multi-parameter systems which otherwise appear dauntingly complex.

### GIS applications as a tool for wetland research – generating high-resolution 3D-elevation models using free satellite imagery

*Emile Hoffmann (North-West University), Frank Winde (North-West University)*

This paper is on results of a DWAF-funded research project on characterizing the impacts of peat mining operations at the Gerhard Minnebron peatland (North-West Province,

South Africa) on the associated aquatic environment currently conducted at the North-West University, Potchefstroom Campus. The main focus is on using GIS capabilities and more specifically digital elevation models (DEM) as tools in hydrological research. 3D DEMs can be useful for a number of hydrological aspects of the project such as the delineation of surface water catchment boundaries associated with the wetland, the determination of potential inflow areas into the wetland during floods of adjacent streams and helping to find potentially exfiltrating or infiltrating conditions in certain reaches of streams and wetland areas. In order to generate a reliable DEM an accurate reflection of topographic features is essential. Using the standard SA 1:50000 topographic map series as a data source had a number of shortcomings. Apart from a lack of up to date data and the misinterpretation of some of the crucial hydrographical features, the contour intervals of 20m are too coarse to allow for an adequate reflection of the especially for comparably flat areas such as wetlands. Using contours, at 5m intervals, derived from 1:10000 orthophotos (from the then Chief Directorate Survey and Mapping) considerably improved the accuracy of the DEM. The DEM was still did not reflect relief changes of the study area at the needed level of detail. In order to overcome these problems freely available satellite imagery and collated elevation data provided by Google Earth was used. For the study area this imagery was updated three times since the project commenced. The imagery allowed for the detailed mapping of the recent hydrography and the retrieval of elevation data at 1m intervals. This paper describes a method through which point elevation data were converted into contours from a generated high-resolution DEM. Misfits between the different datasets were compared to each other and found that the highest deviations occurred in flattest areas. Recently contour data generated through an airborne radar survey were acquired that contained elevation data at 50cm intervals. From these contours a benchmark DEM was generated and used to assess the accuracy of the DEMs produced from different sources. It is concluded that in the absence of alternatives to often outdated and coarse 1:50000 maps, Google Earth imagery for sites covered at sufficient resolution constitutes a viable and inexpensive option to update maps and to generate high resolution DEMs. Generated DEMs based on the latter are useful tools to assist with certain aspects of hydrological research in flat areas such as wetlands and peatlands. However one must take into account that errors and uncertainties increase with decreasing relief energy and are therefore particular pronounced in flat terrain, where they are most needed.

### Selection of Suitable sites for Water Harvesting Structures using Remote Sensing and GIS-A Case study of Solani Watershed, Uttarkhand, India

*B.C. Jat (Govt. College, Neemkathana)*

Site suitability studies for rainwater harvesting structures are an integral part of watershed management. The most important component of watershed management is the soil and water conservation. To deal with these aggravating problems different types of structures have been evolved which facilitate the rainwater harvesting. The structures are designed



based on a set of geographical factors. The major challenges are to find a suitable location for construction of these structures. Remote sensing and GIS application is needed, which is to be based on a set of geographical parameters for locating the suitable sites for the structures. The main aim of the study is to GIS application for the location of suitable sites for construction of different water harvesting structures. Selection of suitable sites for construction of farm pond and check dam was based on IMSD guidelines for water resources development and analysed using remote sensing and GIS technology. For construction of farm pond the suitable site were selected in agriculture, agriculture-plantation and barren land. In Solani watershed those areas were selected for construction of farm pond where flat topography with less than 5 percentage of slope and location having low soil permeability. In this watershed 1587.59 hectare area was selected for construction of farm pond. Results are displayed on the map, as the sites where the farm ponds are to be constructed for water harvesting. Selection of suitable site for construction of check dams was also based on IMSD guidelines. The parameters to be considered are slope(in percentage),HSG,lulc and stream order. Those areas were selected for construction of check dams where slope was 5 percent to 15 percent(moderately sloping to steep)and location having low soil permeability(HSG-D) on first to third order streams. In Solani watershed there were five sites selected for constructing check dams, from which two sites situated on second order stream and three sites situated on first order stream. Results are displayed on the map, as the sites where the check dams are to be constructed for water harvesting.In this study area, out of total area of the watershed 1687.59 hectare area is found suitable for construction of farm ponds and five locations are identified for construction of check dams.

## C08.34-02 - Hydrological Process and Watershed Management in Arid Regions

*Chair: Chansheng He*

### The anthropogenic influences on water resources ecosystem (case study of lake sevan catchment basin)

*Vahram Vardanyan (Yerevan University)*

In nature, surface and ground waters and their basins are subjected to anthropogenic influences; therefore, their water ecosystem is frequently disturbed. Lake Sevan catchment basin can serve as a typical example of this phenomenon. The rates of economic development, especially agriculture and mineral resource industry, promoted the growth of anthropogenic load that had a significant impact on water ecosystem. In Sevan catchment basin there are a few small towns and two-three dozens of villages, where several plant facilities have been constructed and exploited. Agricultural, industrial and domestic waste, mixed with regional surface and ground waters, flow into Lake Sevan and have an effect on its ecosystem. The rivers and streamlets, that flow into Sevan passing through the settlements and subjected to anthropogenic influences, greatly affect the lake's water ecosystem. The most significant influence on the basin ecosystem has been caused by the artificial decrease of the water level of the lake that has been realized in 1930s. The decrease of the lake's water level by about 18 meters (for elimination of irrigation and energy crisis) posed great hazard to the flora and fauna of the lake. This anthropogenic influence had negative effect on the lake's normal (regular) balance. The damages caused to Lake Sevan ecosystem forced to take a decision to stop decreasing and create conditions for raising the water level. In 1961, the construction of Arpa-Sevan large underground canal (48,3km) had begun, which was completed in 1981. On the one side, the water of the Arpa river flowing into Sevan yielded positive results, the level of the lake increased by several meters. On the other side, it had negative influence on the lake's ecosystem. Flowing through different types of rocks and passing about 48,3km, the water of the Arpa river, dissolves large amount of toxic chemical elements and heavy metals and carries it to lake Sevan; with relation to ecology, it has a negative influence on the lake's flora and fauna. Hence, humans must be consecutive in their activities in different spheres, so as not to violate the balance of nature or negatively influence the ecosystem of geographical mantle.

### RCM-HM, Coupling Regional Climate Model and Hydrological Model for Watershed Modeling

*Zhang lanhui (Lanzhou University), He Chansheng (Lanzhou University, Western Michigan University)*

Simulation models are powerful tools in support of watershed analysis under climate change. This paper presents RCM-HM, an interface that links regional climate model (RCM) and hydrological models (HM) on a GIS platform to facilitate watershed modeling. The interface consists of seven modules: (1) a RCM input processor which processes input files and sets up parameters of regional climate model; (2) a RCM executor which automatically runs regional climate model; (3) a RCM output processor which converts output of regional climate model to appropriate input format of hydrological model; (4) a HM input processor which processes input variables of hydrological model; (5) a HM executor that runs hydrological model automatically; (6) an output visualizer which displays outputs of regional climate model and hydrological model in tables, graphs, and animations; and (7) a statistical analyzer which analyses simulation results of both climate model and hydrological model. Currently, the interface links the ICTP (International Centre for Theoretical Physics) regional climate model (RegCM3) and a distributed- large basin runoff model (DLBRM) for watershed modeling in Northwestern China. Databases required for the interface include climate, soil, digital elevation, land use/cover, hydrology, and management practices. Application of the RCM-HM to the study watershed indicates that it is user friendly, flexible, and robust, and significantly improves the efficiency of modeling process in hydrological response to climate change. keywords: Climate change; hydrological modeling; RCM-HM; GIS-interface; watershed analysis

### Assessment of sediment transport processes on hillslope scale in semi-arid environments of Northern Tanzania

*Geraldine Quénéhervé (Heidelberg Academy of Sciences and Humanities), Michael Märker (Heidelberg Academy of Sciences and Humanities)*

Semi-arid environments such as in Northern Tanzania are characterized by a variety of degradation processes due to long dry periods and short but intensive rainfall events. Especially at the end of dry periods the landscape is characterized by a poor vegetation cover and low infiltration rates. Thus, first precipitation events generate high surface runoff rates.. To assess the terrain hydrological characteristics and overland flow generation dynamics we conducted hydrological measurements with Permeameters as well as Hood Infiltrimeters. Moreover, we tested a new minimal-invasive automatic Surface Runoff Detector (aSRD) for the measurement of surface runoff height on different slopes positions. The precipitation input to the slope system was measured with high temporal resolution from a close by digital weather station. Soil surface information was derived along a catena including grain size, organic content and shear strength. According to the pedo-hydrological conditions on the hillslope, a connectivity index driven sediment routing

was applied to transport the sediments down the river network and to quantify the sediment transport capacity. The study shows that with minimal invasive techniques also in difficult environments such as in Northern Tanzania detailed results on runoff generation dynamics and related sediment transport can be derived.

### **Effects of Precipitation Uncertainty on Modeling of the Heihe River Watershed Hydrology, Northwest China**

*Chansheng He (Western Michigan University)*

The Heihe (or Black) River in Northwest China is the second largest inland river in China, with a drainage area of over 128,000 km<sup>2</sup>. From the headwaters in the south to the lower reach in the north, it physically consists of the Qilian Mountain (upstream), the Hexi Corridor (middle reach), and the Alashan Highland (lower reach). The Qilian Mountain is situated at the south of the watershed, with a peak elevation of 5,584 m. Precipitation and snow and glacial melt in the Qilian Mountain is the main source of water supply for the middle reach oasis and lower reach desert. However, absence of weather stations in the high altitude (above 3300 m) often leads to uncertainties in precipitation estimates, which in turn causes errors in modeling of the watershed hydrology. This paper adapts the Distributed Large Basin Runoff Model to the Heihe River Watershed for assessing the effects of uncertainty in precipitation on the distribution of glacial/snow melt, groundwater, surface runoff, and evapotranspiration in the upper reach of the watershed. The simulated daily river flows of the 1990-2008 results show that Qilian mountain in the upper reach area produces most runoff in the Heihe River watershed. Errors in precipitation estimates have a large impact on modeling the watershed hydrology. Different efforts (e.g. multiple interpolation methods and installation of ground radar stations) are needed to improve accuracy in precipitation estimates and in turn the hydrological processes of the watershed.

## C08.34-03 - Water and mining (Water pollution)

*Chair: Frank Winde, Detlef Rieger*

### **Flooding of abandoned deep-level gold mines in South Africa: Risks vs. risk perceptions and proposed vs. alternative solutions**

*Frank Winde (North-West University)*

Some 125 years after gold mining triggered the development of Johannesburg as one of the largest metropolitan areas in Africa, an increasing number of deep level gold mines across the Witwatersrand basin is no longer operational and associated underground void systems ('basins') are being gradually filled with infiltrating (ingress) water. Owing to the oxidation of sulphides contained in the mined gold ore and the resulting tailings much of the water is acidic and contaminated with a range of heavy metals including uranium. Experiences from the Western Basin that overflowed in September 2002 suggest that the uncontrolled decant of acidic water poses a serious threat to the receiving environment. Currently two more goldfields in and around Johannesburg are in the process of being flooded, namely the Central and Eastern Basin with predicted decant dates of mid 2012 and end 2014 respectively. Apart from polluting rivers and shallow aquifers in highly urbanised areas the decanting acid mine drainage (AMD) is assumed to cause geotechnical instability of high-rise buildings in downtown Johannesburg through the rapid dissolution of basement structures. Moreover, AMD is predicted to lead to the formation of sinkholes and increased seismicity. A report on AMD compiled by a Team of Experts for the Inter-Ministerial Commission recommends to prevent the rising mine water from reaching the surface through continuous pumping and the subsequent neutralisation and discharge into local streams. Cost estimates for implementing the pump-and-treat approach rose significantly over the past few months currently exceeding R1.3bn (> 130m). Based on a desk-top study which the Mine Water Research Group (MWRG) compiled for two major banking groups located in the Central Business District (CBD) of Johannesburg this paper presents findings that differ significantly in a range of important aspects from the official report including the rate of rise, sources and pathways of ingress and ways to manage it and, perhaps most significant, a different spectrum and appraisal of resulting risks. Regarding the latter it was found that the risk of water pollution, flooding and destabilisation of basement structures as well as the formation of sinkholes in the city centre were frequently overstated and sensationalized in the media which may have possibly unduly impacted on political decision making. Opposing the pump-and-treat-approach currently favoured by Government a number of low-cost, low-energy alternatives are presented aiming at arriving at significantly less energy- and cost intensive and thus more sustainable solutions.

### **Suspended sediment load below open-cast mines for ungauged river basin**

*Ludmila Kuksina (Moscow University)*

Placer mines are located in river valleys along river benches or river ancient channels. Frequently the existing mining sites are characterized by low contribution of the environmental technologies. Therefore open-pit mining alters stream hydrology and sediment processes and enhances sediment transport. The most serious environmental consequences of the sediment yield increase occur in the rivers populated by salmon fish community because salmon species prefer clean water with low turbidity. For instance, placer mining located in Kamchatka peninsula (Far East of Russia) which is regarded to be the last global gene pool of wild salmon *Oncorhynchus* threatens rivers ecosystems significantly. Impact assessment is limited by the hydrological observations scarcity. Gauging network is rare and in many cases whole basins up to 200 km length miss any hydrological data. The main purpose of the work is elaboration of methods for sediment yield estimation in rivers under mining impact and implementation of corresponding calculations. Subjects of the study are rivers of the Vivenka river basin where open-cast platinum mine is situated. It's one of the largest platinum mines in Russian Federation and in the world. This mine is the most well-studied in Kamchatka (research covers a period from 2003 to 2011). Empirical - analytical model of suspended sediment yield estimation was elaborated for rivers draining mine's territories. Sediment delivery at the open-cast mine happens due to the following sediment processes: erosion in the channel diversions; soil erosion on the exposed hillsides; effluent from settling ponds; mine waste water inflow; accident mine waste water escape into rivers. Sediment washout caused by erosion was estimated by repeated measurements of the channel profiles in 2003, 2006 and 2008. Estimation of bank erosion rates was carried out on the basis of erosion dependence on water discharge rates, slopes and composition of sediments. Soil erosion on the exposed hillsides was estimated taking into account precipitation of various intensity and solid material washout during this period. Effluent from settling ponds was calculated on the basis of minimum anthropogenic turbidity. Its value is difference in background turbidity and minimal turbidity caused by effluent and waste water overflow. Mine waste water inflow was estimated due to actual data on water balance of purification system. Accident mine waste water escape into rivers was estimated by duration and material washout during accidents data measured during observation period. Total sediment supply from mining site is 24.7 % from the Vivenka sediment yield. Polluted placer-mined rivers contribute about 35.4 % of the whole sediment yield of the Vivenka river. At the same time the catchment area of these rivers is less than 0.2 % from the whole Vivenka catchment area.

### Water management concepts in the coal mining areas “Ruhrgebiet” (Germany) and Xuzhou (PR of China)

*Detlef Rieger (Emscher/Lippe Gesellsch. f. Wassertechnik), Johannes Meßer (Emscher/Lippe Gesellsch. f. Wassertechnik), Britta Kettelför (Emscher/Lippe Gesellsch. f. Wassertechnik)*

For about 150 years, coal mining activities have effected the environment, economy and social development in the German coal mining area 'Ruhrgebiet', Northrhine-Westfalia. The mine working management has to consider the consequences of impacts and the necessity of measuring concepts. Operating concepts to restore ground water level, water courses, lakes and biotopes are necessary. The area of coal mining influence covers about 2.500 km<sup>2</sup> in six areas of mining activity. Mining subsidences cause depressions on the surface and ground water filtration spring. During the mining process, deeper ground water bodies are drained, the direction of flow can be diverted, the depths of ground water level is changed and regulated by wells and drainage systems. The quality of ground- and surface water bodies may be influenced by mining manufacturing plants and reactions in the subsurface. Inclines of water courses are disturbed; the properties of flow and ecology are modified. Intending to prevent degradation of protective goods, the environmental impact assessment became obligatory. For approval, expert reports including an environment impact assessment and measuring concepts have to be delivered to the mining authorities. They subject the results of monitoring and status/prognosis of maximum/average runoff rates, quality of ground- and surface water bodies, water level and flood plains, ground water level and changing geometry of lakes. The results are estimated applying criteria of water management and ecology. Measuring concepts intend reduction and compensation of negative effects, as for instance vertical filtering well systems descending ground water level, descending the bottom of water courses to recreate the properties of flow and ecological development. The target is to keep up the properties of ground-/surface water bodies and biotope areas. Interdisciplinary teams are engaged with the expert reports. Creating a master plan about sustainable water management for the coal mining area 'Jiuli' near the city of Xuzhou (PR of China), similarities and differences to the 'Ruhrgebiet' are noticed. Similarities are the conflict about mining activities and their influence to ground- and surface water bodies on one hand and the intended land use and ecological objectives on the other hand. In both areas, a sustainable development of the landscape is intended. Differences are ascertained in the legal obligations about mining, water management, ecology and the data base. The measures to be applied regulating ground water level, water courses, lake water levels and water pollution are similar in both regions. Key words: coal mining, measuring concepts, ground water level, surface waters, monitoring, recultivation, environmental impact assessment, sustainable development

### Predicting hydraulic effects of mine closure on spring flow in dewatered karst aquifers of the Far West Rand goldfield (South Africa)

*Aljoscha Schrader (North-West University), Ewald Erasmus (Geotechnical Environmental Specialists), Frank Winde (North-West University)*

Mined ore deposits in the Far West Rand southwest of Johannesburg, South Africa, are overlain by an up to 1.200 m thick karstified dolomite aquifer storing great volumes of groundwater. Intrusive southeast to northwest striking syenite dykes subdivide the karst aquifer into single groundwater compartments showing water table differences across dykes of up to approx. 50 m. To reduce leakage of dolomitic groundwater from the aquifer to the underlying mine void in order to secure safe and economic mining three of the compartments were to some extent dewatered from the 1940ies onwards. Lowering of the water table of up to 1.000 m in places had profound environmental consequences such as extensive sinkhole formation and the drying-up of three high yield karst springs feeding irrigation farming as well as municipal water supply. After cessation of mining the compartments are expected to fill up again with naturally infiltrating water. Uncertainty exists, however, as to what the final elevation of the water table will be which, in turn, will determine whether or not the dried-up springs may ever flow again. The reason for this uncertainty are non-reversible changes in the hydrological system such as mining through dykes and hydraulically linking the previously disconnected compartments as well as increased groundwater recharge rates through the formation of over 1000 sinkholes since dewatering commenced. With ground stability, water availability and water quality being highly depended on the elevation of the final groundwater table, its reliable prediction for the post-mining period is of crucial importance for future economic and ecologic considerations. In this context the inter-compartmental groundwater flow through the pierced dykes is of particular importance as it will determine whether pre-mining water level differences between the compartments will be re-established or a single large so called 'mega-compartment' be formed instead. To predict the inter-compartmental groundwater flow long-term water level drawdown time series, in a sense resembling the results of an ultra-large pump test, are used employing different methodical approaches. Several aquifer parameters such as transmissivity and storativity are derived and used to predict the likely leakage to the mine void under fully re-watered aquifer conditions. Furthermore, comparing results of the different methodical approaches allows to assess the validity of applying Darcy's law to a karst aquifer.

## C08.34-04 - Water in urban environments 1

*Chair: Frank Winde, Kazuki Mori*

### Seasonal Change in the Water Quality around the Angkor Park, Cambodia

*Hideo Oyagi (Nihon University)*

A development of the Siem Reap basin has been recently planned in Cambodia. In addition, tropical lowland is a fragile area where global climatic change has a great effect on its physical environment. From such point of view, fundamental data on physical as well as human conditions should be collected and scientifically analyzed. The water environment research group investigated water quality such as chemical constitutions, turbidity and so on in the water at certain station around the Siem Reap city and some water areas of the Angkor monument area such as the moat of Angkor Vat and Angkor Thom to clarify their seasonal fluctuations as the basic information of the water environment. The purpose of the present study is to evaluate the flowing and physicochemical properties of Siem Reap River as affected by human activity. It is important to make clear the hydrological characteristics and their factor in Siem Reap River as a basic study in order to advance the environmental preservation in the Angkor monument area. According to the investigation on water quality along the river, the characteristic of river water quality is the type of Na/Ca-HCO<sub>3</sub>. The type of Na-HCO<sub>3</sub> was mainly recognized through the city area. On the contrary, the dominant composition of water quality in the rainy season was the type of Na/Ca-HCO<sub>3</sub>. Especially, Na<sup>+</sup> and Cl<sup>-</sup>, it becomes the index of the human activity, are increased greatly around the city area. Of particular interest according to the flowing city is the increase of ratio of Cl<sup>-</sup> to the total dissolved substances. The water quality of river during the rainy season does not appear to be affected by man activity. By comparing water quality from dry season to rainy season, difference is mainly recognized in the ownstream of the river. In dry season, the concentration of chloride ion ranged from 1.2 to 7.0 mg L<sup>-1</sup> in the Siem Reap River basin, whereas the concentration of chloride ion ranged from 1.4 to 2.0 mg L<sup>-1</sup> in rainy season. Especially, the phenomenon of high concentration of chloride ion was admitted after the flowing of the city area. Furthermore, the situation is worsened in the dry season when reduced water volumes increase the concentrations of dissolved substances in the water. It is considered that the phenomenon of the increase in chloride ion is caused by anthropogenic contamination.

### Sustainable Lake Basin Management in Turkey

*Muhammet Kaçmaz (Sakarya University)*

Lakes are key components of our planet's hydrological cycle. They provide important social and ecological functions because much of the earth's available fresh water is contained in lakes. Despite their crucial importance, most lakes are undervalued and

therefore face stresses resulting from inappropriate management. These problems occur in developed as well as developing countries. Also Lakes are intimately connected to their drainage basins. For most lakes, the majority of water inflow comes from the surface catchment; a smaller amount enters the lake directly from precipitation, and some lakes have groundwater inflows. In this paper we examined the importance and the problems of lake drainage basins in case of the lakes of Turkey. Key Words: Lake Basins, Sustainable Lake Basin Management, Turkey

### Urban water and sanitation under arid conditions in developing countries.

#### Case study Bahawalpur, Pakistan

*Daniel Wurster (University of Salzburg), Juergen Breuste (University of Salzburg)*

Urban water and sanitation are a great concern especially in developing countries. In this case study in Bahawalpur, Pakistan, problems, people and local authorities are facing in a city located in a desert area, are investigated. Due to the meager regenerative properties of the groundwater caused by a precipitation less than 250 mm per year, along with a constantly growing population with rates up to 5% per year, it has become clear that without changing the water consumption behavior, this city will run out of water within the next decades. A survey with 2000 private households (randomly sampled within chosen representatives of urban structural units) and interviews with local authorities and experts have shown a severe lack of awareness about this issue. The water demand of 600,000 (est. for 2008) people is covered by an uncontrolled withdrawal by electrical pumps by the inhabitants from the fossil groundwater while the official water and sanitation is insufficient and constantly going worse. Due to this double tracked production system, the uncontrolled extraction, and the missing awareness of both people and administration, the groundwater table shrank by 4 meters within the last 5 years. Missing administrative awareness and control is expressed by a very low and arbitrary pricing and coverage. The responsible institutions are missing internal cooperation and are characterized by factionalism. The study shows up the governmental plans to solve the problems and discusses the chances of demand management and implementing appropriate technologies like decentralized sanitation, regeneration of groundwater by infiltration of processed sewage water or rainwater harvesting. Additionally a set of multiple scenarios has been developed to show up the expected advantages and disadvantages of several methods to incorporate a sustainable use. Keywords: Water and sanitation, Bahawalpur, Pakistan, arid climate, integrated water resources management, demand management

### Domestic water management in the Ga West Municipality of Ghana

*Yvonne Ami Adjakloe (University of Cape Coast)*

The rising needs of water such as water for industrial and agricultural use have led to inadequate supply of freshwater for domestic use. Many homes now have to find ways of



managing water made available to them to ensure continuous supply. Domestic water in the Ga West Municipality in the Greater Accra Region of Ghana is accessed from groundwater, harvested rainwater, imported tap water, rivers and streams sources. Water from these sources is either expensive or unwholesome. This paper examines the coping strategies adapted for managing this domestic water supply in the Ga West Municipality in the Greater Accra Region of Ghana. Questionnaires were administered to 246 households and 29 stakeholders from the water sector were interviewed. The results of the study show that some homes re-use waste water to reduce the per capita intake of water by households. Others use traditional methods of purifying unwholesome water, while some households accessed water from more than one source to cut down the cost of accessing domestic water from a single source. It is therefore recommended that households adapt cost effective technologies that would allow purification of unwholesome water in large quantities and harvest rainwater in larger quantities.

## C08.34-05 - Water in urban environments 2

*Chair: Frank Winde, Kazuki Mori*

### Water demand in Windhoek, Namibia: Quo vadis?

*Thomas Uhlendahl (Universität Freiburg)*

Water supply is one of the major challenges in urban water management of Windhoek. It has reached its limits due to the arid climate and high variability in annual rainfall. The increasing water stress is mainly reinforced by the city's fast growing population, caused by migration from the north of Namibia to the informal settlements in northern Windhoek with rates up to 18% per year. Furthermore Windhoek is a city of local disparities reflected by the highest Gini coefficient in the world (HDR 2010, UNDP). These disparities are mirrored in the patterns of water consumption on household level. On the one hand, the rich people in the southern parts of the town waste water for irrigation of the lawn and filling up their pools. On the other hand, the poor in the north living in the informal settlements usually do not have access to water on their ground at all. At the moment, an approximate number of more than 100.000 people live in informal settlements with a low density or no communal water supply services in the area. A higher household income influences the water demand by the ability to have own domestic appliances needing water. In the informal settlements the water consumption depends mainly on water access. Households with access on the ground have a 3.5 times higher consumption per person and day rising with the household income. Rich people consume in average about 10 times of the poorest per person and day. The presentation results from a research conducted in 2010 on household level in Windhoek showing the disparities within the city. About 1000 households all over the city were interviewed on their water related situations and habits (Uhlendahl et al. 2010). The transdisciplinary survey was carried out in close cooperation with official and non-governmental organisations in Windhoek. Besides the actual status of urban water management and water pricing system in Windhoek and the challenge to supply the fast growing and developing population the paper presents latest detailed information on the daily water consumption at household level. This information is gained from different parts of Windhoek related to household income. In addition, it focuses on the purpose of water use in households as well as on the unequal access to water. Findings on the challenges in the field of sanitation, especially in the informal settlements, are also presented. Furthermore, the impacts of Windhoek's urban water management system on the Swakop River Basin are illustrated including the conflicts between the capital and rural areas. Finally, the presentation closes with Windhoek's strategies and activities to cope with mentioned challenges of fast population growth and aridity for a sustainable urban water management. Keywords: Urban water management, water supply, Water Demand, Household Level, Windhoek, Namibia, Disparities

### Hydrochemical characteristics of inland waters in the Southern Carpathians with special reference to the influence of human activity

*Kazuki Mori (Nihon University), Kazuko Urushibara-Yoshino (Hosei University), Dan Balteanu (Romanian Academy)*

Quality and discharge of river water, spring water and lake water were investigated in September 2003 and August 2011 on the northern slope of the Southern Carpathians, central Romania. The main purpose of the present paper is to clarify the actual circumstance of spatial changes in water quality due to human activity. The study area has a mean annual precipitation of approximately 600 mm, and its land use is predominated by grazing land. A distinctive feature of spatial change in water quality was found in the headwater basin of tributary of the Danube drainage system. The concentration of dissolved substances in river water is at maximum value at the uppermost observation point, and decreases downstream by the effect of dilution. It should be emphasized that such a peculiarity in river water quality is closely related with the location of settlement. The settlement is located on mountain ridge in order to put sheep to pasture. For this reason, pollutant loads as derived from untreated household effluent and livestock excrement have significant effects upon water quality at the uppermost site on the river. It is pointed out that the effect of dilution by the confluence of tributaries is relatively high. Pollution by animal waste is also recognized in spring water in grasslands with comparatively high nitrate concentration. On the contrary, the concentration of dissolved substances for spring water, river water and lake water under no human activity shows lower value as compared with that in settlement, whose recharge source comes from only precipitation. It is concluded that the distinguishing features on water quality in the study area are consistent with both human activity and the nature of land use.

### Impact of urban cemeteries on groundwater chemistry

*József 'Zychowski (University of Cracow)*

No comprehensive research has been carried out near cemeteries worldwide. The published results pertain to studies undertaken in different geographical and climatic settings, in various types of cemeteries, and the like. The contamination of groundwater in the surroundings of cemeteries results from the presence of increased levels of various ions, including: - chloride, nitrate, bicarbonate, sodium, calcium, iron, aluminium, lead, and zinc near graves e.g. at the Cemetery of Vila Nova Cachoeirinha, Sao Paulo, - nitrate and phosphate as well as ammonium, nitrate, orthophosphate, chloride, bicarbonate, iron, sodium, magnesium, zinc, and potassium, near new internments in a cemetery in Sydney, - nitrate, nitrite, chloride in Melbourne as well as phosphate ions in Sydney and in Perth, with small amounts of precipitation, - the total nitrogen, organic carbon, and increased 5-day biological oxygen demand of water as well as ammonia below a cemetery in Adelaide - orthophosphate and carbon dioxide found in other studies carried



out in Adelaide - chloride, sulphate, sodium and calcium in the lower part of a cemetery in Wolverhampton, while in the middle part of the cemetery, nitrate, sulphate, hydrogencarbonate, carbonate, potassium and magnesium ions were abundant. - phosphate (associated with the impact of cemeteries) and iron (typical of alluvial formations) at the Rakowice Cemetery in Cracow. The highest indices of contamination are found in those cemeteries situated in warm and humid climates, e.g. in RSA and Brazil. The majority of researchers believe that the highest risk from cemeteries comes from ions containing nitrogen and phosphorus, and also from bacteria and viruses. Markedly increased concentrations of contamination indicators, for example, ions containing phosphorus, nitrogen, as well as sulphate, chloride, and sodium ions, were found in shallow water, particularly in loose sands near burial sites. This issue has been highlighted in RSA, England, and Poland. In these water conditions, for example, in Wolverhampton, temporary high concentrations of copper, manganese and zinc ions, and the like, have also occurred. Additionally, the contamination indicators obtained under these conditions show considerable variability over time. Excessively high contamination of underground water is facilitated by a sandy and gravel substrate underlain by impermeable Miocene clays. The reason for a lower contamination of underground waters is a thick aeration layer below the burials (e.g. in cemeteries in Cracow). The issue of the adverse impact of cemeteries must be solved first in large cities where cemeteries are large, there is often a shortage of space for burials and additional land is in short supply. Implementing the idea of sustainable development also requires interment arrangements which take account of environmental concerns.

### GIS-based modeling of the small rivers watersheds for the landscape planning of urbanized area (on the example of Tomsk agglomeration)

*Alexander Erofeev (Tomsk University)*

There are 509 small rivers with sum length 21317 km in the subject of Russian Federation - Tomsk oblast (Information bulletin', 2002). A lot of small rivers watersheds correspond the places of town foundation are located today in the huge urbanized areas. Typical example is Tomsk agglomeration where are situated the basins of Usaika and Samuska rivers, which are the subjects matter of the current research. The methodology of landscape planning in Russian takes into account of watersheds importance and surface run-off in insufficient volume. Many actual tasks of the flows generation did not research at the small rivers watersheds, especially for the specific physical geography condition and economical activity on Russian area. Current article investigates the problem-solving of synthesis of functional and structural landscape approach on the basis of theoretical model of small rivers watershed geosystems and physico-mathematical modeling of surface flow. Such synthesis opens opportunity of landscape ecology prediction and monitoring of geosystem state on antecedent data with minimum measurements. This research conduct with using of the analytical tools - modern GIS-software (SAGA, ArcGIS and others) which allows to compute a lot of geosystems parameters and modeling

functioning and dynamic processes. The processes of water flow are one of the main factors which are determined the structure and functioning of small range geosystem in humidic condition. The modeling of such processes is possible with the help of representation of hierarchy small range watershed on the topographic attributes which are described redistribution water by relief in gravitational field. The theoretical model of watershed geosystem structure was introduced for more correctly mapping of Ushaika and Samuska watershed elementary geosystems. Geosystems, which were created with such method used as polygon of landscape ecology monitoring for waterprotection zoning. Numerical simulation permits to determine the ultimate topographic attribute which is defined the small range geosystem differentiation more authentic. Such parameter is 'catchment area' (Syssuev, Sadkov, Erofeev, 2011). It defines area draining to catchment outlet and it is the basis for calculation of waterprotection zoning keyword rates 'time out' (meter per hour) and 'speed' (meter per second) of the surface flows. Summarize, waterprotection zoning of Ushaika and Samuska watersheds was perform on the basis of the multiparametric modeling. Offered approach can be used for the estimation of the potential pollution is associated with lateral migration of the water-soluble pollutant, such as maximum permissible level of pollution, potential damages estimation and modeling risk of emergency situation.

## C08.34-06 - Climate change impacts on large scale areas 1

*Chair: J.A.A. Jones, Claudio Cassardo*

### Water Resources and Climate Change in Israel

*Nurit Kliot (University of Haifa)*

Israel, together with almost all the Middle-Eastern Countries is classified as a country which suffer from absolute water scarcity due to the combined effects of high demand as a result of population growth and climate changes. The current water deficit in the water storages of Israel is below the Red Lines which point to a long process of unsustainable utilization of water resources in Israel. Israel is already experiencing a constant annual rise in temperature, increase in evapotranspiration, and a reduction in precipitation of about 5-15%. Climatic uncertainty and variability is expanding and it is anticipated that it will increase in the future. Examination of Israel's policies in the water sector reveals a contradicting sustainable and non-sustainable policies for coping with water scarcity. On the one hand, though Israel is a heavy user of irrigation water, water savings are very high due to technological innovations, utilization of marginal water-resources such as treated wastewater, storm water and saline water resources - all of which are considered as sustainable methods. On the other hand, Israel's major adaptation method to water scarcity is desalination of sea water (though saline water resources have been treated too). Israel is in the process of major development of desalination plants, currently producing 370 million/m<sup>3</sup> per year which will expand to 750 million/m<sup>3</sup> of water in 2020, a production which is not sustainable because of its environmental impacts mainly exacerbating emission of GHG. Israel is also criticized for very weak policy concerning water saving in the domestic sector - the most sustainable method to produce "new" water.

### Assessing daily rates of evapotranspiration in the Jordan river basin: Simulations with the TRAIN model versus estimates from satellite data (Landsat TM)

*Oliver Schmidt (University of Leipzig), Tobias Törnros (Heidelberg University), Michael Vohland (University of Leipzig), Lucas Menzel (Heidelberg University)*

Water scarcity has been one of the most severe limitations in the Jordan River basin during the last decades, but the situation may even change for the worse dramatically by the impact of climate change and regional land use changes. Within the GLOWA Jordan River project, the spatially distributed TRAIN model has been used for a detailed analysis of water balance terms; special focus was on the evapotranspiration process at the soil-vegetation-atmosphere interface (actual evapotranspiration, ETa). TRAIN simulation runs

were carried out for the period from 1961 to 2005 with a grid size of 1x1 km. Thermal satellite imagery - in our study provided by Landsat TM - allows for the assessment of spatial variations of surface temperature and therefore provides a key for evaluating heat flux partitioning. Thus, when combined with ancillary data (e.g. a digital elevation model to simulate global radiation or measured air temperatures), remote sensing data can be used to assess daily rates of the latent heat flux (ETa) on pixel scale, and retrieved spatial patterns of ETa allows the ETa outputs of TRAIN to be evaluated. In our study, we used two different remote sensing approaches that both may be categorized as residual method, which is to calculate sensible heat flux (H) first and then obtain the daily latent heat flux as the residual of the energy balance equation. The first approach we applied was based on the gradient between the maximum surface temperature and the maximum air temperature to obtain H. As an alternative, a modified SEBAL (Surface Energy Balance Algorithm for Land) approach was implemented, which calculates H not from a gradient of temperatures but by contrasting two points, a wet and a hot pixel. For our presentation, a comparison between all ETa methods (TRAIN versus satellite data) is done by a set of selected areas that represent different land use types and a rather wide range of climatic situations; differences between the ETa retrievals are analysed and finally discussed.

### The Impacts of Climate Change on River Regimes in Croatia

*Ivan Canjevac (University of Zagreb)*

Global climate change/variability in the last 30 years has been manifested mainly through average annual temperature rise, resulting in evapotranspiration and precipitation pattern change. Those changes have spatially different impact on river (discharge) regimes. An analyze of changes in river (discharge) regimes in Croatia was made for 53 hydrological stations for the period 1961-2009. To assess the trend, Kendall-Theil (Sen) non-parametric trend test was carried for the yearly and seasonal values of discharge. In addition, comparison of module (Pardé) coefficients between the standard thirty years time period (1961-1990) and the last twenty years period (1990-2009) was done. The results show changes on all analyzed rivers and stations. There is an evidence of redistribution of discharge throughout the year, increase of Autumn and Winter discharge (especially on rivers dominantly fed by snowmelt) and decrease of Summer values of discharge. In addition, we detected the change in the month of the appearance of discharge maxima and minima. Changes can be described through changes in regime of climate elements (temperature, precipitation, evapotranspiration). We also found evidence of intensification of the processes in the last 20 years.

**Ice and water regime of the rivers of European Russia under climate change**

*Natalia Frolova (Moscow University), Nikolay Alexeevsky (Moscow University),  
Victor Zhuk (Moscow University)*

Specific features of water and ice regime of the rivers of European Russia as well as their spatial and temporal variability were studied using the up-to-date hydrometeorological data. Variations in the characteristics of water and ice river regime over the last 125 years are analyzed. For the some rivers potential changes in the dates of the appearance of floating ice and the breakup due to expected changes in the air temperature and the rate of streamflow in rivers are assessed. Special attention is paid to the factors that affect the formation of ice jams and their spatial and temporal variability for the northern rivers. It was found that under low flow conditions, autumn ice and slashed ice drifts became longer, ice jams more frequent, and freeze-up periods shorter. More frequent thawing spells resulted in decreasing ice thickness and snow storage in river basins. Winter break-ups were accompanied by ice jams and floods. High water levels during further freezing-up, as well as large amounts of slashed ice in river channels increased the risk of catastrophic ice jams. It is shown that changes of ice regime are mainly defined by features of water regime. The basic feature of modern changes of rivers' water regime on a prevailing part of the country is significant increase of low flow, especially in winter. Within the European territory of Russia for the majority of considered rivers significant positive trends of winter and summer-autumn low flow are marked. There is an increase of natural regulation of rivers' drainage. New maps of different characteristics of ice and water regime are presented.

## C08.34-07 - Climate change impacts on mesoscale regions 2

*Chair: J.A.A. Jones, Claudio Cassardo*

### Low flow on rivers of European part of Russia under the impact of climate change

*Maria Kireeva (Moscow University), Ekaterina Rets (Moscow University)*

Two periods of low flow can be emitted for the Russian rivers. The first is connected with cold season, and the second - with dry summer season. In terms of water management, several typical time ranges can be allocated within hydrological year, which started from seasonal flood. First of all the whole year is divided into unlimitative and limitative period. The latter endures approximately 3-6 month. Limitative period in its turn is divided into unlimitative and limitative season. Inside limitative season there is a one month with the lowest flow - limitative month. In terms of hydrological prognoses and standard studies such characteristics of a low flow as 3-6 monthly, 30-days, 10-days, 1 day average discharge and absolutely minimum discharge are used. The growth in water demand for industry and agriculture, as well as the population rise demonstrate increasingly urgent susceptibility of human society to low-flow period and droughts. That's why the questions, connected with low flow, annual distribution of flow and its variability become more and more acute. Such studies build up the basis for sustainable development. Low flow in case of social - economic damage can be classified as dangerous hydrological process. The spatiotemporal variability of low flow characteristics at different scales is discussed in this study. Specific review of small intermittent rivers low flow as the most sensible to climate changes was done. In general, an increase of low flow is identified for the most part of Russian rivers, that is connected with redistribution of flow within the year. Significant positive trends in winter and summer-autumn low-flow period runoff is observed for the most of rivers of European territory of Russia. The biggest change of low flow - more then 75% - is characteristic for the upstream of Oka and Ural rivers. The significant change in low flow occurred on the rivers of southern part of forest belt, eastern part of forest steppe zone and in the most part of Ural River basin. The winter period low flow has increased by 45-70% in Volga and Don River basins, excepting Kama River. The mean low flow value has shown a statistically insignificant decrease or rise in the North of European part of Russia and also to the South of Tsimlyanskoe reservoir. The increase in low flow is connected with the rise in air temperature during the cold year period, which leads to growth in snowbreak amount and length, decrease in duration winter season. Low flow is the most sensitive to anthropogenic pressure phase of the water regime. Economic activity has a great influence on the distribution and variability of all low flow characteristics. Rivers' response to the climate change varies depending on anthropogenic stress rate.

### Expectations of water resources in the future climate in Alpine area

*Claudio Cassardo (University of Torino), Naima Vela (Department of Physics), Marco Galli (Department of Physics)*

The projections for the future Alpine climate show an increase of temperatures by 2.6'3.9 °C above the 1990 level by 2100, and a decrease in summer precipitation, accompanied, in most regions, by an increase in spring and winter. In addition, winter precipitations will increasingly fall as rain rather than snow, leading to fewer days with snow cover. The warming and associated reductions in snow and glacier cover could have grave impacts on water resources, influencing the hydrological cycle in the Alps, leading to more droughts in summer, floods and landslides in winter and higher inter-annual variability. Our study has analyzed in detail the hydrological budget by running a land surface model (UTOPIA) driven by the output of a regional climate model (RegCM3), in turn driven by a global climate model. The simulations have been carried out over a time span of 30 years for the control run (1961-1990) and for the A2 future climate scenario (2071-2100). The simulations show that, in the future climate, evapotranspiration will increase during summer, causing a decrease of the soil moisture that, in most plain areas, will go beyond the wilting point. In mountainous areas, the snow cover will almost completely disappear during summertime, and the period of the year in which the soil is not covered by snow will generally extend by about one month. During winter, the precipitation will be slightly larger than in the control run, causing a small increment of the soil moisture, that will approach the field capacity. Occasionally, convective systems during autumn, winter and spring can produce large precipitations falling as rain also at high elevations, increasing the risk of floods. Thus, the most important characteristic of the future climate is not only the increment of the mean temperature but the depletion of soil moisture, observed both in the Po valley and in mountainous areas. Taking into account the large interannual variability of hydrological variables registered in the PC in those areas, it is expected to have longer dry spells and hence drought conditions and heat waves. As most plants that produce food (e.g., wheat, rice, maize and grapevine, just to mention some of the main products in the Po valley) intensively grow in summer, the elongated drought conditions will exert significant effects on the agricultural production. Other activities related to water supply (e.g., industry, hydroelectric power production, etc.) could suffer serious problems, which could reflect harmful impact on economy and human health in local regions. On the contrary, during winter in the future climate, precipitation will generally increase and, in spring, snow melting will occur earlier by about one month, thus resulting in increase of surface runoff in spring. Again, taking into account the large interannual variability of the precipitation, this will bring about increase in the probability of floods in the future climate, especially in spring.

### Hydrological Dynamic of the Bocono River Basin – North Venezuelan Andes using the J2000g model

*Joel Mejia (Universität Tübingen), Volker Hochschild (Universität Tübingen)*

The tropical river basins are going under growing pressure due the population increase, and the effects derived from the Land Use / Land Cover (LULC) dynamic and the climate change at regional scale. The aim of this still ongoing project is to assess the hydrological dynamic of the Bocono river basin, located at the north part of the Venezuelan Andes, and the possible impacts derived from LULC change and climate change on the hydrological response. For this purpose the hydrological balance under different conditions were simulated using the model J2000g, which is a modular, process-oriented and distributed hydrological modeling system, that implements encapsulated process modules for the simulation of hydrological processes. A methodological approach combining remote sensing and GIS was implemented in order to process the spatial-temporal raw data required for the modeling system, and the model with the various scenarios was built using the JAMS modeling framework. The first simulation results shows that the hydrological response could be reasonable modeled, despite of the relatively scarce raw data basis referred to the hydrometeorological variables. However, a calibration process will be necessary in order to get more realistic results. Hopefully, the results can be a useful basis to promote more effective area-oriented policies within the watershed management. Key words: hydrological dynamic, tropical river basin, J2000g model, watershed management.

## C08.34-09 - Water resources and management, hydrological budget and hydraulic emergencies 1

*Chair: Olga Eugenia Scarpata, Chansheng He*

### Hydrological budget verification in present climate in the Alpine area and Po valley (Italy)

*Claudio Cassardo (University of Torino), Marco Galli (Department of Physics), Naima Vela (Department of Physics)*

The typical way of examining the future climate characteristics is to compare the simulation results relative to the last years of this century (for instance the period 2071-2100) with a similar period belonging to the past century (for instance, the period 1961-1990, or 1971-2000, or 1981-2010). The use of such kind of methodology will allow the comparison of simulations results obtained using the same methodology and model for present and future climate simulations, in order to exclude any possible source of anomaly in the result analysis, which may be caused by the use of different input data, or grid irregularity, or missing observation interpolation. However, one of the basic questions at the basis of this methodology is the ability in reproducing the most relevant characteristics of the present climate. To give a quantitative answer at this question, an intercomparison project has been planned. The best way should be to compare the simulation results in the surface layer with the observations. Similar works have already been carried out by using as target variables the screen level temperature and the precipitation, which are the most widely observed variables in the surface layer. However, we are interested in analyzing also other variables, as the components of the energy and hydrological budgets in the surface layer, or the soil temperature and moisture, that do not are currently measured extensively on a mesoscale area and for a sufficiently long time to carry climatological analyses. For this reason, we have considered the use of the CLIPS (Climatology of Parameters at the Surface) methodology, ideated with the aim to create an archive of parameters in the surface layer (as well as in the soil and vegetation) in areas where real observations of land surface variables are lacking. The idea of estimating the above mentioned values by using a trusted numerical model could alleviate this kind of problems. Fundamentally, the CLIPS is based on the output of a Soil-Vegetation-Atmosphere Transfer (SVAT) scheme, driven by meteorological observations gathered at some meteorological stations. The application of such approach for a long period (e.g., several years) may create a climatological archive of land surface data over some selected areas. Thus, in our study we have used the same land surface scheme (UTOPIA) for two kind of simulations. In the first one, UTOPIA was driven by the output of a regional climate model over a time span of 10 years (2001-2010). In the second one, by the meteorological observations carried out in a mesoscale area in the same period. Then, the two databases have been analyzed from a statistical point of view in order to infer the main climatic characteristics. At the moment of the abstract preparation, the

work is still in progress. During the talk, the main results of the intercomparison will be presented.

### How to avoid global water crises – conservation, innovation or what?

*J.A.A. Jones (Aberystwyth University)*

The world's per capita water resources have diminished dramatically over the past half-century and the projected explosion in the global population is likely to halve them again over the next 25 years. The UN Millennium Goals aimed at halving the number of people without access to safe drinking water and improved sewage between 2000 and 2015 are badly off-course. Population growth is a major factor, but lack of funds and political issues are also playing a part. The global recession is set to aggravate the problems, as will global warming. Growing regional disparities in wealth and resources could foster conflicts and hinder progress. Past approaches to water resource management have relied too heavily on 'one solution fits all'. Future solutions will need to pay more regard to geographical differences and to develop a variety of sources, perhaps relying less on large dams and centralised sewage. The paper discusses the potentials of a range of new technologies, including desalination, weather modification, rainwater harvesting, snow reservoirs and icebergs, the direct use of seawater and submarine freshwater sources, and human-scale waste disposal and purification systems. Above all, future solutions will need to pay more regard to more integrated management of water resources and the wider environment and the national and local needs of people.

### Turbidity for monitoring of sediment transport in rivers

*Sergey Chalov (Moscow University), Ekaterina Belozeroва (Moscow University)*

The total suspended sediment concentration SSC is a major parameter in fluvial processes. The procedure of measuring SSC is regarded to be time-consuming leading to development new techniques of fast and simple measurement. Turbidity T measuring is alternative way to determine sediment load. The main issue is to estimate turbidity units (NTU) through SSC units (mg/l) via special calibration curves for each stream and water stage. We synthesized results of simultaneous SSC and T measurements in order to understand geographical effects in  $SSC=f(T)$  relationships. In our field experiments samples were filtered through preweighed membrane with a filtration system "Millipore". The samples then were oven-dried and reweighed. Turbidity was measured by "HACH" 2100P device. The SSC and turbidity empirical relationships were conducted from rivers draining various environments in different seasons (from high-water to low-water periods). Water samples were collected in rivers of the European part of Russia (Sukhona, Mezen, Pechora, Moscow, Oka, Protva, Sylva, Bol. Kokshaga, Sok), in the mountain rivers of Koryak plateau (Vyvenka and tributaries) and western slope Caucasus (Mzymta and others), in rivers of the south Eastern Siberia and south Mongolia (Selenga river basin). According our results the best-fit SSC and turbidity relationships were linear:  $SSC$

$= a + bT$ , where  $a$  and  $b$  were regional empirical coefficients. It was found that " $a$ " grows with increasing amount of organic matter. Coefficient  $b$  is in ordinal relation with average particle size  $d$ . The steepest increase of the SSC with  $T$  was found for rivers of the East-European plain under ice-cover conditions with the biggest average particle size ( $d = 0.23$  mm) and no organic matter. Equation for the Sylva and Bol. Kokshaga rivers was  $SSC = -1.57 + 2.53T$ . Middle rivers of the Central Russian (Protva, Sok) are characterized by the smaller average particle size ( $d = 0.17$  mm) and medium amount of organic matter. The yielded correlation is  $SSC = 4.14 + 0.93T$ . Similar conditions were found for the large plain rivers of the East-European plain (Sukhona, Mezen, Pechora, Moscow, Oka) where amount of organic matter is more and average particle size is less ( $d = 0.09$  mm). The equation for large plain rivers was  $SSC = 7.59 + 0.84T$ . Finally, in significantly altered environments (placer-mined in Koryak plateau in Vyvenka drainage and disturbed landscape of Mzymta basin in Sochi region of Caucasus) the polluted mountain rivers give a great access for the fine particles ( $d = 0.02$  mm). The relationship alters gently  $SSC = 1.92 + 0.75T$ . For the SSC and turbidity relationships correlation rates were significant ( $r > 0.9$ ).

### River flow in the alpine zone of North Caucasus under the influence of recent climate change

*Ekaterina Rets (Moscow University), Maria Kireeva (Moscow University)*

The North Caucasus mountain system is situated on the southern border of European territory of Russia. Its length is more than 1100 km, the highest point is Elbrus (5642 m). The alpine zone extends above the orographic snowline (the lower bound of perennial snow), which heights is approximately 2000 m in North Caucasus. An increase of precipitation with altitude and the additional contribution of perennial snow and glaciers determine the definitive role of alpine zone in mountain rivers flow in midlatitudes. The modulus of flow is 2-3 times bigger in alpine zone then in the lower territory in North Caucasus. Consequently, the amount of flow and water regime of alpine zone defines the availability of water recourses and the risk of hazardous hydrological processes in the mountain river basins. The methods of mathematical statistics were used to characterize the spatiotemporal distribution of climate and river flow characteristics in alpine zone of North Caucasus. As for the recent climate change, although the overall picture is quite heterogeneous, it is possible to point out some common tendencies: 1) an increase in total annual precipitation in the central and western part of the territory and a decrease in its driest, eastern part; 2) an increase in the snow-to-rain ratio ( $P_{snow}/P_{rain}$ ) in most sites; 3) a decrease in the number of days with negative temperatures in the year; 4) a decrease in mean winter temperature in the mountain territory. During 1970-2000, the area of glaciation dropped by 12.6%, the volume of ice by 14.9%, the number of glaciers increased by 2.4%, and the length of glaciers dropped by 100 m on average. The main characteristics of river flow haven't shown as yet any significant change on temporal scale in the alpine zone of North Caucasus. A physically-based mathematical model of

snow and ice melting in the alpine zone, corresponding to the up-to-date measurement facilities, has been developed in the course of our investigation. It has been used to model the possible changes in the liquid runoff of the representative Dzhankuat glacier responding to anticipated climate change and progressive deglaciation. If the counter radiation of the atmosphere increases by  $1.5 \text{ W/m}^2$  (which corresponds to the changes that have occurred over the last 100 years), the mean air temperature increases by  $4^\circ \text{C}$  (according to the MGEIK forecast), the debris cover increases by 180% (equal to the changes, occurred from 1968 to 1999), the atmosphere transparency index decreases by 5% and the Dzhankuat glacier melting rate will increase by 12-40%, depending on the elevation-slope zone of the glacier. Thus, as the area of glacier is expected to decline, the increase in glacier melting volume will not be dramatic. If the area decreases by 30%, which corresponds to the changes that occurred from 1910 to 1999, the increase in the volume of Dzhankuat glacier melting will be 8%.

## C08.34-10 - Water resources and management, hydrological budget and hydraulic emergencies 2

*Chair: Olga Eugenia Scarpattia, Chansheng He*

### New Developments in Flood Risk Management at the Flood Forecasting Centre

*Charlie Pilling (Flood Forecasting Centre/ Met Office)*

The Flood Forecasting Centre (FFC) is a partnership between the UK Met Office and the Environment Agency, established in 2009, to give an overview of flood risk across England and Wales. It was set up following the summer 2007 floods in England and Wales, and the subsequent recommendations of the Pitt review, to provide longer lead times for flooding. Based at the Met Office in Exeter, the FFC provides flood warning services covering England and Wales, primarily for the emergency response community. In addition, during times of heightened flood risk, close communication between the FFC and the Environment Agency Regions allows mobilization and deployment of staff and flood defenses at longer lead times. The FFC provides forecasts for all sources of flooding, namely fluvial, coastal, surface water and groundwater. This involves an assessment of possible hydrometeorological events in the next five days as well as their likely impacts. This paper will focus on new developments that provide longer lead times for fluvial flood risk, namely: (1) the implementation of the distributed hydrological model, Grid-to-Grid (G2G), which has been calibrated across England and Wales; (2) utilisation of the Met Office advances in deterministic and ensemble high-resolution numerical weather prediction; (3) application, interpretation and further developments of this new science to the benefit flood risk management. Results from some recent flood events will be presented.

### Relations between the River Morphology and the Macrozoobenthos in revitalized stretches of the River Lahn (Germany)

*Michael Groll (University of Marburg), Christian Opp (University of Marburg)*

The European rivers and streams were constantly impacted by anthropogenic intrusions throughout the course of human history, which led to manifold morphological and ecological problems. During the last decades, the public became more aware of these deficits and the European Water Frame Directive (WFD) accelerated this process significantly. Today, the revitalization of river stretches is the most important tool for the improvement of the ecological status of watercourses. In order to reach the ambitious aims of the WFD in time and cost-effective, detailed knowledge about the effectiveness of precise revitalization measures which can be gathered through the detailed evaluation of already implemented projects. In praxis however, a scientific evaluation of the

revitalization success is only seldom done and too superficial so that the knowledge gaps remain. The macrozoobenthos is one of four quality components used for the evaluation of rivers within the WFD and despite more than 100 years of limnological research focused on the benthic invertebrates, the central question of which morphological processes and structures have to be improved in order to reach the "good ecological status" is still largely unanswered. Extensive research is done for the dependencies of the macrozoobenthos from various environmental parameters on the macro- and mesoscale. The key scale of the choriotores as the main habitat for benthic organisms however is hardly analyzed at all. This is in part due to the lack of methods capable of registering the riverbed structures with the required spatial resolution. Extensive research was done in this area of conflict between applied science and fundamental research on the middle reaches of the river Lahn (German river type 9.2) between 2006 and 2008. The riverbed was mapped in three river stretches using the newly developed high-resolution method TRISHa ("Typology of Riverbed Structures and Habitats") and a detailed survey of the macrozoobenthos (165 samples) was done in accordance to the state of the art methods (PERLODES) available. Extensive analysis were done for the spatial distribution and the temporal dynamics (including the effects of a HQ50 flood event) of the structural parameters in revitalized and non-revitalized parts of the research areas. The relations between these microscale structures and the benthic fauna were statistically analyzed in depth and an overall assessment of the revitalization success was done as the final step. This evaluation revealed gaps in the official German river typology and the PERLODES method that might prevent the EU-WFD from fulfilling its purpose. The registered deficits are in dire need of a broader scientific discussion and the results presented in this presentation, most of al the newly developed TRISHa, are a first and important contribution to this dialogue.

### Feasibility of Rainwater Harvesting for Sustainable Domestic Water Supply in Rural Areas of Pune District, Maharashtra State, India

*Sudhakar Pardeshi (University of Pune)*

The water scarcity areas in Pune District of Maharashtra State in India encounter serious problems of domestic water supply. The study is carried out in different sample villages of Pune District in Maharashtra State. In this study, water availability through rooftop rainwater harvesting and through surface runoff harvesting is estimated. In last 35 years none of the stations within Pune district recorded rainfall less than (average - 2%). So the estimations done on the basis of (average - 2%) can safely consider being sufficiently dependable so far as meeting the domestic water requirement is concerned. It is also revealed that dependence on a single technique of rainwater harvesting is not enough in many of the villages. After analysis it is clear that even at (average - 2%) rainfall in the smallest watershed of 0.1211 km<sup>2</sup> rainwater available after losses is 40225.19 m<sup>3</sup> when the village receives annual rainfall 1629.67 mm. If we check water availability for a village Kendur with (average - 2%) rainfall i.e. 213.46 mm, it comes about 847057.9 m<sup>3</sup> after



losses. This volume of water is enough to fulfil all the domestic water requirements of the village. In the same fashion assessment of water availability through rainwater harvesting is done for all sample villages and it is found that even at (average - 2%) sufficient water is available to cater the domestic water demand. It highlights that the amount of rainfall received as low as (average - 2%) is also sufficient for rainwater harvesting. The economic feasibility of the rainwater harvesting structures are also checked and it is found that, in rural areas the cost of the structure for individual family is high but for a group of families the cost is low. It reveals that it is one time investment and the recurring cost of the structure is very low. If the initial capital investment is done through government and public participation, the rainwater harvesting is economically feasible. Through field survey the willingness of the local people to harvest rainwater is also checked. It is found that awareness of the rural people is must to accept the rainwater harvesting as an alternate and sustainable source of domestic water supply.

### **Watershed Management: A Case Study of Umtrew River Basin, North East India**

*Dhanjit Deka (B.Borooah College), Pradip Sharma (Cotton College)*

Watershed is defined as a topographically delineated geographical area in which the entire run-off tends to converge, through the existing drainage system, to the common outlet of the area for subsequent disposal. In other words, a watershed is an independent drainage unit. This drainage unit is the most suitable geomorphologic unit for organization of all kinds of human activities and natural processes continuing within it. But due to tremendous population pressure and their unsustainable activity in the recent years deteriorate the environmental quality of the watersheds of the world in general and North East India in particular. Therefore it is necessary to study the drainage basin characteristics including evaluation of morphometric parameters like preparation of drainage map, contour map, ordering of streams, measurement of catchment area, perimeter, relative relief, relief ratio, length of streams, drainage density, drainage frequency, bifurcation ratio, texture ratio and also the monitoring of changing land use/land cover which further helps in management of the basin environment. The present study involves the evaluation of morphometric analysis of the sub watersheds of Umtrew River as well as the changing pattern of Land Use/Land Cover for the last three decades of the said watershed using Remote Sensing, GIS and GPS techniques so that the data generated from the study will help in environmental management of the said watershed. Keywords: Watershed, Umtrew, Management, Remote Sensing, GIS

## C08.34-11 - Water resources and management, hydrological budget and hydraulic emergencies 3

*Chair: Olga Eugenia Scarpattia, Chansheng He*

### The ecological condition of surface waters in Armenia

*Trahel Vardanian (Yerevan University)*

The ecological condition of river waters is caused by quantitative and qualitative changes of water. The paramount place among the problems directed on protection of water resources, is occupied with an estimation of water quality. In natural state, surface water is characterized by certain physical, chemical and biological indicators which allow defining the degree of its usability. At present, the Environmental Impact Monitoring Center of the RA Ministry of Nature Protection ("Armecomonitoring") carries out monitoring on environmental contamination, including that of surface waters, at the state level in Armenia. The state monitoring program covers 54 water bodies (including 48 rivers, 6 lakes and water basins), and 146 observation posts. The control over water quality is carried out by several parameters: identification of the chemical and physical properties of water, gas structure, basic ions in water, contents of contaminants of organic and inorganic origin, as well as that of about 38 metals. The samples of surface waters, taken in 2010, have shown that water bodies in the country can be united into two groups. One of them encompasses water bodies with extremely high degree of contamination. The other group includes watercourses with high level of water contamination. To note, the "extremely high" level of surface water contamination is identified when the maximum (permissible) exposure limit (MEL) exceeds by 100 times and more, and the biological oxygen demand (BOD<sub>5</sub>) composes 60 mg<sup>2</sup>/dm<sup>3</sup> or more. High level of contamination corresponds to MEL exceeding by 10-100 times, and BOD<sub>5</sub> being equal to 15-60 mg<sup>2</sup>/dm<sup>3</sup>. Of rivers in Armenia, water of the Debed, Sevjur, Hrazdan and Voghji can be identified as having 'extremely high' and 'high' levels of contamination; there the MELs of separate ions (copper, aluminium, vanadium and ammonium) may exceed by 100 times. However, the observations mainly show 'high' level of contamination, i.e. exceeding by 10-100 times, in the water of the rivers. Thus, in the Voghji river, below town of Kapan, the MEL of copper during a year has exceeded by 93 times (10 occurrences), while in the Hrazdan river, near village Darbnik, the MEL of ammonium ion has exceeded by 34 times (10 occurrences). Summarizing the above stated, it is necessary to point out that the rivers in Armenia are subject to heavy technogenic load. It has led to the change of a river runoff, water regime and quality. Water resources of the Hrazdan, Debed, Metsamor and Voghji rivers underwent a maximum economic change of water runoff by the qualitative indicator and contamination index.

### Investigations of ground water in regions of recent volcanism by geophysical methods

*Robert Minasyan (YSU), Vahram Vardanyan (Yerevan University), Marat Grigoryan (Yerevan University), Arsen Grigorian (YSU)*

The Central volcanic plateau in Armenia is a typical region of recent volcanism. The differentiation of lava rocks by electrical conductivity depending on the degree of their humidity, the groundwater mineralization and the difference of the electrical resistance of lava and sublava water resisting formations allows to use geophysical methods widely there. They are successfully used for: - mapping of the relief of sublava water resisting rocks and determination of the mail ways of flow of underground water streams into artesian basin (electrical sounding, profiling) - determination of the places and the magnitudes of concentrated water losses from water reservoirs and channels (spontaneous potential electric field, charged body, profiling) - determination of water streams cross-section (electrical sounding and profiling) - mapping and estimating the thickness of riverlike deposits which fill local depressions among effusive formations, being of interest as reservoirs for the ground water accumulation (electrical and seismic sounding) - investigation of the well sections, especially to discover and to characterize the water bearing collectors (geophysical investigations of wells) interception of waters of river valleys with powerful groundwater flows on high levels allows usage of this water for supply and also influences hydrodynamic regime of plain territories below. This problem is solved using methods of mathematical modelling with large usage of information obtained by geophysical methods.

### Karst Spring Water Quality, Case Study: Beton Spring at Gunungkidul Regency, Yogyakarta, Indonesia

*Margaretha Widyastuti (Gadjah Mada Univ.)*

Beton spring is located in the Ponjong sub District Gunungkidul Regency, at the western part of Bribin undergorund river catchment area. Therefore, the research becomes an important as part of the validation step on the groundwater vulnerability assessment. The response of spring water quality to the rain indicates the velocity of pollutants to reach the subsurface system. The purpose of this study are: 1) to know the variations of rainfall in the area of "research, 2) to know the variation Beton springs discharge, 3) to know the characteristics of the water quality of Beton spring and 4) to determine the relationship between the variations of the rainfall toward the discharge and the quality of Beton springs. This study uses survey methods and the techniques of data collection using sample by purposive sampling. Measurements are conducted during one year, the frequency of measurement and sampling season as a consideration. The variables are rainfall (the depth and intensity), springs discharge and spring water quality (EC, T, TDS, turbidity, pH, major element, coli bacteria). The data analysis is conducted graphically and descriptively to explain the relationship between the variations of rainfall to the discharge

and water quality of spring. The results showed the rainfall variations include the pattern, events and the amount of rainfall. The peak of rainfall occurs in March-April, 156 days of rainfall within 1426 rainfall events every 30 minutes, and the amount of rainfall is 3332 mm/year. Beton spring has high discharge variations. The physical and chemical water quality of the spring meet to the water quality standards, while the biological quality of the spring water have exceeded the threshold according to the Government Regulation number 82 year 2001. The relationship between rainfall variations to the discharge and the water quality of Beton spring can be seen clearly. Increased discharge Beton spring happens every rainfall event at intervals around hours - day. The discharge and physical water quality has a strong correlation which reflected from the high value of R2, whereas for chemical and biological quality has not strong correlation. Besides, the correlation between rainfall and spring water quality is identical to the correlation between water quality and discharge of Beton spring water. Key words: springs, rainfall, discharge, water quality, response

### **Droughts in Buenos Aires province (Argentina), their impacts on agricultural emergencies**

*Olga Eugenia Scarpatti (CONICET - UNLP), Alberto Daniel Capriolo (CONICET),  
María Ines Botana (UNLP), Veronica Pohl Schnake (UNLP)*

The present study analyzes the distribution patterns of drought in the province of Buenos Aires (Argentina) taking into account the agricultural emergencies 'determined by the National Government-', in order to identify areas more vulnerable. The definition of the agricultural emergency in an affected area is concerned to an area with territorial delimitation, when induced factors, climate, telluric, biological or physical, which were not predictable or evitable, either in intensity or opportunity, would affect the production or production capacity of the region and influencing severely the development of farming and the fulfillment of obligations and tax credit. The soil water balance was performed using the evapotranspiration formula of Penman - Monteith and considering the soil water constants: Field Capacity, Soil Water Moisture and Soil Wilting Point for the different types of soils of the Buenos Aires province (307,571 km<sup>2</sup>). For the statistical study, the series of soil water deficit data obtained were adjusted by means of the theoretical Normal Cubic-root probability distribution. The years 1968, 1972, 1974, 1975, 1979, 1983, 1988, 1989, 1995, 1999, 2005 and 2008 presented high values of soil water deficit. Their data of agricultural emergency level were obtained and then the thematic map reflected the behavior of drought. The results show the distribution by drought-affected areas, their relationship with soil hydrological constants and the degree of vulnerability. The counties with more days of agricultural emergency are those with less than 220 mm of field capacity and where the soil wilting point exceeds 50%. The most affected area is the southwest of the province and it was followed by the central region.



# C08.35

# Transportation

## C08.35-01 - Large scale transport infrastructure and regional and urban impacts 1

*Chair: Richard Knowles, Christian Matthiessen, Yves Boquet, Jacques Charlier*

### The Channel Tunnel: An Assessment of the Regional Impacts

*Daniel O'donoghue (Canterbury Christ Church University), Peter Thomas (Canterbury Christ Church University)*

Since its opening in 1994 the Channel Tunnel has become a key element in the transport infrastructure linking Britain and continental Europe. But, as well as forming part of the Trans-European Rail Network, the Channel Tunnel was also seen as a potential stimulus to trans-frontier collaboration and as a possible catalyst for regional economic development. The aim of the paper is to evaluate the regional impacts of the Tunnel within the Anglo-French frontier zone on both sides of the English Channel. Overall, the evidence suggests that the benefits are fewer than had been anticipated. Despite the success of the Channel Tunnel in terms of passenger numbers, the English Channel still represents a psychological barrier (partly due to language differences) and the frontier zone has failed to develop as an integrated labour market. Moreover, the findings suggest that the Tunnel has failed to transform the spatial economy of the trans-frontier zone. Instead, its impacts have been spatially uneven. This has been to the detriment of local economies in Kent and Nord-Pas-de-Calais, while the main beneficiaries are locations at some distance from the Tunnel itself.

### The Fehmarnbelt Tunnel: Urban and regional development perspectives

*Christian Matthiessen (University of Copenhagen)*

The European Round Table of Industrialists identified in the 1980ies 14 missing links in the transportation network of the continent. Three of them were found around the Danish island of Zealand. One link is within the nation, the other two are between nations. One link connects heavy economic centres, one joins more thinly populated regions, and the last one links peripheral areas. Two of them (The Great Belt Link and the Oresund Link) have been constructed and are in full operation. The third (the Fehmarnbelt Link) has been decided 2008 on bilateral government level. The three links are impressive mega structures spanning international waterways. Their lengths are around 20 km (12 mi) each. They concentrate traffic flows and create strong transport corridors. They are the basis of new urban and regional development regimes. 'Ferries connect systems, fixed links unite systems'. The fixed Fehmarnbelt link closes a gap between the Scandinavian and European motorway and rail networks, which eliminate a 160 km. detour for freight trains via the Great Belt and will cut one hour of transport time between Hamburg and

Copenhagen for road and passenger railroad traffic. This will create a strong transport corridor between the Øresund region in Denmark/Sweden and Hamburg in Germany, allowing a new greater and more competitive region - the Fehmarnbelt region - to emerge. New trading opportunities, new forms of tourism, new jobs and new housing opportunities will arise. In turn, this will open up new urban and regional development perspectives for the entire Fehmarnbelt region.

### Evaluating the regional integration value of transborder projects based on spatial spillovers and commercial flows

*Ana Condeço Melhorado (Universidad Complutense), Javier Gutiérrez (University of Madrid)*

Historically, most countries have given priority to the development of their national transport networks; this favoured the integration of their territories and the consolidation of truly national markets. In contrast, less attention was paid to links with other countries. The result at the supranational level, therefore, was the existence of a set of independently developed national transport networks, weakly interconnected. Moreover, some of those links are located in outlying areas and enclaves near the borders of countries, where demand is not enough to justify the need for new infrastructure. However, these cross-border stretches have a crucial importance from an international perspective, because their construction provides a high value from the point of view of regional integration. There is a lack of an integrated approach during the planning, evaluation and funding process of cross-border infrastructure. This creates the potential for difficulties, as conflicts appear between national and local impacts. In this context, our study proposes a methodology based in the concept of spatial spillovers to measure the regional integration value of cross-border projects. Spatial spillovers are defined in this paper as those travel time savings in one country due to new transport infrastructure built in a different country. Travel times are calculated in a Geographical Information System (GIS) environment and weighted by commercial flow data between countries. By doing this we account not only for travel time gains of each section but also for the real use made by each country, when exporting their products. This way, sections with great spillovers will have a higher regional integration value. The validity of the methodology is tested with its application to a selection of TEN-T projects. Each project is split in different stretches and subsequently their regional integration value is evaluated individually for each project section. Generally, sections located in the border have higher regional integration value than those located in the interior of countries. Sometimes border sections are even more important for third countries than for the one responsible for its construction. In those cases it seems logical that the regional integration value should be taken into account in the financing process.

**The role of great infrastructures in the organization of supranational regions:  
The Catalan case**

*Juli Valdunciel (Universitat de Girona), Jaume Feliu (Universitat de Girona)*

Globalization is boosting global city-regions, new spatial platforms for the contemporary economic system. Indeed, great infrastructures have become basic means to articulate these new functional spaces, in many cases supranational, and they are key factors to ensure their performance. However, its construction and implementation involves not only technical and/or planning issues but also cooperation among stakeholders, consensus around new scenarios and strategies for development and conflict resolution. In recent years, two major transport infrastructures crossing Franco-Spanish border through the Catalan region, across the Pyrenees, have been planned, discussed and, in some parts, already built: the high-speed rail and the Mediterranean rail corridor for passengers and goods. These two great infrastructures can cause significant urban and regional transformations in the region of Barcelona. In fact, these changes have already begun to occur in the form of new territorial strategies of cooperation between socio-economic stakeholders and institutions. Moreover, its implementation unleashes as well a strong political and social debate in relation with the efficiency of the Spanish infrastructure model, traditionally built in a radial shape around the capital Madrid, and the option to build it as a network structure. The contribution is divided into three parts. The first part describes the two listed infrastructures and highlights their technical and geographical features. A second section analyses the mobilization of stakeholders due to its planning and construction, the planning and development tools deployed and the conflicts that have arisen. Finally, the paper reflects on the possible impact of such infrastructures on territorial development, taking as horizon the scheduled date of completion: 2025. Key words: Global city-regions; Trans-European transport networks; High-speed rail; Stakeholders; Barcelona.

## C08.35-02 - Large scale transport infrastructure and regional and urban impacts 2

*Chair: Richard Knowles, Christian Matthiessen, Yves Boquet, Jacques Charlier*

### Transport and Spatial Networks – an economic geographer's view of the European transport corridor Rotterdam-Genoa with special regards to logistics clusters

*Julian Brenienek (Universität Duisburg-Essen)*

The department of economic geography of University of Duisburg-Essen (chair of Prof. Dr. Rudolf Juchelka) is a partner in the EU-INTERREG IVb Project 'CODE24'. The project intends the interconnection of economic development, spatial, transport and ecological planning along the trans-European railway axis (TEN-T) no. 24 from Rotterdam to Genoa, which covers a number of most important regions in Europe. Partners of the project are located along this north-south axis across the Netherlands, Germany, Switzerland and Italy and cover different topics from infrastructure development to noise reduction (see official CODE24 homepage: [www.code-24.eu](http://www.code-24.eu)). The University of Duisburg-Essen is covering the topic of 'Creation, Development and Evaluation of Impacts of Logistics Clusters' along the corridor. International trade corridors merge traffic and direct them towards a global gateway. This causes spatial networks in great distances of these global gateways to align along these flows. With special emphasis on intermodal traffic, several case studies in the Netherlands, Germany, Switzerland and Italy are conducted in order to research in how far Rotterdam and Genoa influence the formation of logistics networks or clusters within the corridor. The term 'Cluster' as itself is relatively young in scientific terms. Thus, with regards to logistics, not much research on 'logistics clusters' in particular was conducted so far. The scientific demand for the CODE24 team at University of Duisburg-Essen is to develop a generic model for logistics clusters. The focus is on their elements and characteristics: Where are logistics clusters in the CODE24 corridor? How to identify approaches to form a logistics cluster? Furthermore, a 'tool-box' will be developed in order to give advice in how far a logistics cluster can be initiated and promoted. While this is still an ongoing project (runtime till the end of 2013), results can be shown of the case-study Karlsruhe, where two important European transport corridors cross paths. During the case study, logistics service providers within the administrative region of Karlsruhe and bordering districts were quantified. Together with a close look on intermodal loading equipment, statistical data provided by the chamber of industry and commerce and data that was mapped on field trips to Karlsruhe, a first simple model of logistics hierarchies within a region was developed. The paper will be presented by Julian Brenienek, PhD student at the department of economic geography of University of Duisburg-Essen.

### Impacts of a fixed link on creation of a bi-national urban region: A case of Öresund Bridge

*Jun Yamashita (Kyushu University)*

Since the inauguration of Öresund fixed link in July 2000, the number of bi-national trips has increased between Denmark and Sweden. However, it was not quantitatively proved that the Copenhagen and Malmö-Lund urban regions have been merged into a bi-national urban region. The present study attempted to reveal integration of the two urban regions after the construction of Öresund fixed link. As results derived from analyses on commuters' flows, it was concluded that bi-national trips have gradually increased since the bridge inauguration, but a bi-national urban region is not created so far.

### How Urban Planning Anticipates Major Changes in European Transport Corridors

*Eloise Libourel (LVMT)*

Since the early 2000s the concept of 'corridor' has been an architectonic element of European transport policies, as shown by the TEN-T (Trans-European Networks of Transport) priority projects of the European Commission. They aim to improve transnational integration and networks interoperability, in order to overpass the bounded national structure of the main transportation systems. By creating long continental transport infrastructures, European Commission wants to connect countries, to promote relationships between major cities and competitiveness of European regions in a context of globalisation. The trans-European corridors, as continental scale infrastructures, are not yet operational. They already became, however, a category for network analysis at different scales, especially at urban level. The signs of the new infrastructures first appear in the cities, which build new railway stations, make territorial marketing policies and try to attract new industrial and commercial establishment. It is interesting to observe that the argument of the corridor projects is most of the time highlighted by urban institutions. In today's increasing context of metropolisation, cities acquire a nodal position on the proposed trans-European corridors. The notion of 'major axis' as it is now assumed, just as the quest for an increased role in the future, leads the cities towards a particular urban development, building out an idea of 'corridor' based on economic and symbolic considerations rather than on the achievement of the railway infrastructure. The fact is that the 'corridor' actually becomes an argument for increased attractiveness of the city and almost a sort of label. Therefore, the notion of corridor shifts from the infrastructure to the cities on its route. The affected territory has another scale, as if a European scale network were symbolised by a few places. How can urban planning, of either public or private initiative, create a properly speaking 'corridor territory', regardless of the completion of the railway infrastructure on which the corridor is supposed to rely? The first objective of this paper is to show that the concept of corridor, as it is used by the European institutions to refer to large-scale transnational infrastructures, which is subject

to long delays and many adjustments, mostly acts as an impulse for metropolitan projects. It will then be observed how far urban planning and development is leading the infrastructure's construction through the elaboration of hubs, business districts or urban renewal operations. First, we will focus on the case of the Spanish 'Mediterranean corridor', and of the main cities on it. We will then try to link this particular case with other European examples, at various degrees of completion of the corridor projects.

### **The impact of large investments in transport infrastructure on development of the Poznań Metropolitan area and the Wielkopolska region.**

*Radosław Bul (Adam Mickiewicz University)*

Since the change of the socio - economic system in Poland in 1989, the level of economic development of the city of Poznań, its metropolitan area and the region of Wielkopolska has increased dynamically. The main factors of this impact are connected with a very attractive geographical location and high level of entrepreneurship among residents of the city and the region. One of the main strengths of the city and the region is their accessibility in terms of transport. The configuration of transport networks in Poland makes the city one of three major road and rail hubs. The City of Poznań is the first large urban area in Poland on the route from Berlin to the East. The main factor determining the choice of location by foreign investors in Poland is the accessibility of potential investment field. Development of the city and the region is highly determined by efficient and modern transport infrastructure. Unfortunately, due to the negligence in the development of transport infrastructure in Poland, urban economy has grown slower than it could have. The aim of the paper is to present the most important infrastructural investments and their impact on development of the city and region. Poznań and Wielkopolska are in privileged positions in the country because some of the biggest infrastructural projects in region have already been completed. For that reason, the accessibility of the city compared to the other agglomerations in Poland is high. The most important investments in the region, obviously raising the attractiveness and accessibility are: motorway A2 (Poznań - Berlin), western and eastern Poznań ring road, reconstruction and modernization of rail lines Warsaw - Poznań - Berlin, construction of new main railway station as an integrated communications centers (connecting national and metropolitan railways, buses, trams, fast tram), and development of Poznań-Ławica airport. In addition, a very significant investment in public transport is the construction of the Poznań Fast Tram. Thanks to the construction of large infrastructure projects the city has become more accessible and attractive for investors. This success was possible due to the use of EU funds ( f.e. reconstruction and modernization of rail lines Warsaw - Poznań - Berlin), and the program of public-private partnership (motorway A2, new main railway station). Many projects have been financed by the local government too (fast tram, Ławica airport). Thanks to this investments Poznań and its metropolitan area is the only metropolitan region among the regions of Central and Eastern Europe, where GDP per capita is higher than the average for the EU-15, and whose main city is not the national capital.



## C08.35-03 - Large scale transport infrastructure and regional and urban impacts 3

*Chair: Richard Knowles, Christian Matthiessen, Yves Boquet, Jacques Charlier*

### New high speed rail stations in the metropolitan periphery as gateways of the knowledge economy

*Angelika Münter (Research Institute for Regional and Urban Development)*

Investments in high speed rail (HSR) infrastructures gained in importance during the last decades. Not least this is encouraged by EU subsidized extension of Trans-European Networks. Within the metropolitan regions on the one hand the central stations profit from the increase in accessibility that come along with these investments. On the other hand constraints in the line routing and the maxim to minimize travel time between metropolises, caused that new HSR stations were build or existing stations were upgraded by the connection to the high speed rail network located outside the traditional CBDs (eg. Cologne-Messe/Deutz) or in the metropolitan periphery (e.g. Siegburg in the hinterland of Bonn). In this paper we focus on new and upgraded HSR stations in the metropolitan periphery, because for these locations improvements in the accessibility of the location can be analyzed detached from other location factors. Good accessibility is also a precondition for as a consequence of increasing economic linkages on all spatial scales, because a high-quality transportation infrastructure reduces the relational distance between different locations. In the case of HSR-infrastructure especially business companies that are heavily dependent on personal contacts on an inter-regional to international scale benefit from this locational advantage. Particularly this applies to companies of the knowledge economy: To generate new knowledge, on the one hand this business sector is due to the urbanisation economics generated in metropolitan regions, and on the other hand is due to interact with national and international partners via ICT but also face-to-face contacts. The general objective of this paper is to examine if HSR-stations in the metropolitan periphery play a role as gateway for the knowledge economy. Especially we want to investigate in what way and to what extend new economic poles of the knowledge economy emerge in the surroundings of these stations. To this end we compare the economic developments around selected new HSR-stations within the metropolitan periphery in Germany and other European countries. We focus on the analysis of the concentration of companies of the knowledge economy as well as on the causes of locational decisions of these companies

### Measuring Territorial Effects of High-Speed Trains on Metropolitan Areas. A methodological proposal using path capillarity indices.

*Alexis Conesa (LIVE)*

Questions about the links between investments in transport infrastructure and regional development is a longstanding topic for spatial planners, specifically economists. According to several transport and urbanism specialists[1], economic effects induced by transport infrastructures are not defined by a deterministic relationship. Moreover, the complexity of transport impacts on development leads Plassard[2], amongst others, to consider the significance of territorial (not only economic) effects. In this context, instead of producing economic predictions, this work proposes a measure of territorial effects of a new transport infrastructure in a forecasting approach. So, the aim of this research is to build a tool for decision support in planning and transport policy that can show the potential of transport networks to provide the structure of a regional and/or metropolitan area. This doesn't mean to replace an economic analysis, but rather to provide further and complementary information to the decision-makers. For instance, french LGV (high-speed train lines) are obviously major tools for development at regional scale. In PACA (Provence-Alpes-Côte d'Azur) region, the project can be seen as a future backbone to economic and social relations between Aix-Marseille metropolitan area and Côte d'Azur conurbation (around Nice). Nonetheless, within these two City-regions[3], LGV can be used as another transport service, thereby support local (urban) relations. To assess this double role of LGV, transport service, understood as the set of speed, schedule and fineness (number of train stops) has to be modelled. Modelling approach is based on a transport-oriented GIS using scheduled graph to represent transport service as previously defined. The model uses scheduled accessibility and path capillarity to define territorial effects of a given transport service. Scheduled accessibility gives disaggregated spatiotemporal distance between two places whereas path capillarity represents the fineness of transport service, i.e. potential for small scale use of the transport service. The confrontation of these two indicators can give an idea of the tension between speed and territorial potential. Indeed, a fine metropolitan service will necessarily damage trip speed at regional scale. At the opposite, a looser transport service (removal of a train stop), involves a speed gain. [1] For instance Offner, J.-M. (1993), « Les effets structurants du transport: mythe politique, mystification scientifique », *L'Espace Géographique*, N°3, pp. 233-242 [2] Plassard, F. (2003), *Transport et Territoire*, La Documentation Française, 97 [3] « considered to be the territorial scale at which international competition now frequently takes place », according to Sykes, O. (2005), « Metropolitan co-operation the gallic way », *Town and Country Planning*, pp. 320-323

### Contentious Space and Politics of Scale: Planning for Inter-City Railways in China's Mega-City Regions

*Jiang Xu (University of Hong Kong), James Jixian Wang (University of Hong Kong)*

Geographers have noted, over the past decade, that China's mega-city regions are coming to represent a new spatial scale for capital accumulation, state regulation, and political compromise. Unlike before, regions are now shaped by the existence of overlapping competencies among contending actors at multiple scales of governance. The 'politics of scale' thesis has thus been helpful in drawing attention to this complex political ballet. However, the growing importance of regional space is punctuated by several inadequacies and missing links in academic inquiry and political discourse. Among these are: (1) a tendency to apply a hegemonic interpretation of city-regionalism, at the expense of knowledge of place-specific practice; (2) a lack of detailed case studies revealing the key political processes and relationships that reflect historical contingencies and path-dependencies under transition; and (3) a reluctance to conduct empirical investigation to reveal the outcomes of the politics of scale in geographical terms. In this paper, we will go some way towards addressing this shortage of geographical research. We will use the Pearl River Delta Intercity Railway System as a case study to explore the ways in which planning decisions for this mega-regional project are initiated, planned, negotiated and implemented in the context of a diffuse regional power structure and an inadequate institutional environment. It is argued that China's multi-level hierarchical intercity railway networks are evolved from a single-level (national) system, and this coincides with the contradiction between the state's monopolistic control of operation and the propensity for a diversified investment regime. Consequently, governments at various levels and their respective functional agencies are engaged in numerous struggles over the design and delivery of railroads, creating much scope for established hierarchies and bureaucracies to 'flex their muscles' and avoid takeover by others.

### Effects of growing transport land use on daily mobility and implications for regional development: Case of Slovenia

*David Bole (ZRC SAZU)*

This paper is part of an ongoing post-doctoral research. The paper will discuss impacts of transport infrastructure growth over the last two decades from an inter- and intra-regional perspective. Slovenia is without doubt one of the countries where land use is radically changing due to the rising rise of needs on the level of motorized mobility. The structure of travelling has changed, most obviously seen in the shift from public to private means of transport. The rising demand of private transportation infrastructure (mainly motorways) has had multiple impacts: changes in land use patterns on a local and even regional scale and changes in the daily interaction of the population, which is supposedly 'more mobile' and makes new and completely changed patterns of daily mobility. In the

paper I will show how the transportation infrastructure has changed in the last 10 to 15 years. I will show that a bulk of these changes can be attributed to the large scale motorway construction, partly to the railway construction and in smaller part to the general suburbanisation of the territory. Later on I will try to show the effects of large scale transportation investments on spatial daily practices of the population. I will focus on daily commuters and their changing statistics, where – there is a clear correlation among the new motorway infrastructure and commuting flows, which follow the new infrastructure corridors. I will present the statistical data and the maps of changing commuter flows. From the abovementioned analysis I will try to form a new hypothesis regarding the effects of large scale transportation infrastructure on inter-regional and intra-regional development in Slovenia. Changes in employee commuting indicate changes in regional structure and infrastructure, and completely personal, psychological motives. However, at the same time changed daily employee commuting has important reciprocal effects on the environment, especially from the viewpoint of the pollution of landscape elements and economic costs. The latter are not only a result of using and building transport infrastructure, but also of polluting and destroying quality farmland, residential areas, and ecosystems. Therefore, studying and planning of large scale transport infrastructure should take into account direct and indirect environmental, social and economic costs.

## C08.35-04 - Large scale transport infrastructure and regional and urban impacts 4

*Chair: Richard Knowles, Christian Matthiessen, Yves Boquet, Jacques Charlier*

### The viability of Mass Rapid Transit System : A Case of Kolkata City

*Eshita Boral (University of Calcutta)*

The city of Kolkata supports 11.04 million vehicular population within an area of about 187.33 sq km. While in most modern cities, the road surface area relative to the total area is around 30 percent, here it is barely 6.4 percent. This meager network of roads fall short of requirements, therefore the best possible option is to shift to mass public transport services to reduce ever increasing traffic generated pollution and congestion. In Kolkata most mass transport services are road based. But in a city, where an uncontrolled mix of incompatible forms of traffic and increasing number of personalized vehicles ply on roads, surface transport remains slow and crowded. Moreover the existing infrastructure of roads and the un-segregated road public transport leads to an increase in average travel time and cost of travel. Thus in cities like Kolkata, rail based mass transport services, which have a greater capacity of moving people efficiently and cheaply within the city and even outside it, can be considered as a good alternative. In developing countries like India Mass Rapid Transit modes are only a few decades old, and are being developed in all mega cities to ease off traffic on roads. Kolkata has the privilege of being the first city in India to develop such a mode in form of Metro Railway. Metro railways stand out in comparison to other modes of mass transportation that ply on city roads because they are fast, cheap, pollution-free and safest mode of transport. Bus services, the predominant mass transport mode in the city, have several operational disadvantages. They stop indiscriminately between stoppages, which are just 500m apart adding to the inconveniences of travelling by bus. The Metro railways on the other hand are fast due to fewer stoppages, which are atleast 1-2 km apart and have no other issues than technical glitches to make it slow. The fact that metro rails have a defined route, be it underground or overhead where it does not have to compete with other modes of transport makes it possible to cover the distance between each station within much lesser time. The other rail based mass transportation modes that are in operation in the city are either slow or inefficient. Therefore metro services in Kolkata are gaining importance both for short and long distance travel within the city. This paper attempts to evaluate the viability of Mass Rapid Transit system in a city like Kolkata and analyses its performance and thus its position within the total transportation scenario of the city. It would also attempt to establish the advantages of Mass Rapid Transit over other mass transport services that are in operation in the city. However it could be stated that, effective running of Mass Rapid Transit System in the city depends not only on selection of appropriate technology

and phasing the development but whether it is compatible with city characteristics, requirements and economic capabilities that are existent.

### Madrid-Barajas airport as a transport national hub: Contribution of the Spanish policy of infrastructures in the last 20 years

*Miguel Pazos-Otón (Universidade de Santiago de Compostela), Rubén Camilo Lois-González (Universidade de Santiago de Compostela)*

In the last 20 years, Madrid-Barajas airport has become one of the most important in Europe, developing currently two main functions: main gateway to Europe from Latinamerica and national hub for the Spanish air routes system. In both cases, IBERIA is the main carrier and uses Madrid-Barajas as center of operations. Along these years, a main milestone was the construction and completion of the new Terminal-4 (T4), which symbolizes a political option for the reinforcement of the importance of Madrid in the Spanish infrastructure system and urban network. In fact, the rise of Madrid as a european metropoli and the progressive loss of weight of Barcelona after the Olympic Games (1992) are closely related to the strategy of a new Spanish centralism, easily viewable in transport infrastructure policies. From a geopolitical point of view it means a redrawing of the air routes map in Spain. These concentration of air routes in Madrid and its role as air transport hub have a symbolic representation in the new T4. It is important to analyze the role of AENA (Spanish Airports and Aerian Navigation, public company in charge of the management of Spanish airports), in the promotion of Barajas, which is also related with the big public investments done along these years. We will analyze this process in the last two decades by working with different statistics (investments, passengers, operations, etc) from AENA. We will also develop an evolutive analysis of the main milestones along these years. A last and very important issue to deal with is related to the future development of intermodality between air and high-speed train in Spain. Currently there are no conditions for intermodality in any Spanish airport, but there are plans to make possible the arrival of the AVE (Spanish high-speed train) to Madrid-Barajas. This fact would reinforce even more the power of Madrid-Barajas as a transport national hub, increasing its nodal role at national level.

### Transport accessibility of Polish cities and regions

*Jan Hauke (Adam Mickiewicz University), Anna Borowczak (Adam Mickiewicz University)*

High transport accessibility of cities and regions, which is the result of developed and used transport infrastructure can contribute to the spread of development processes. Development of transport infrastructure can support the positive mechanisms of the diffusion's development, while the lack of effective communication, not only between main centers but also between the main centers and centers of lower rank, not accelerate the economic growth and reduce the development of social bonds. Hence,

the transport accessibility is the basis for the processes of diffusion's development. Socio-economic transformations in Poland after 1990, associated with the transition from centrally planned economy to a market economy, significantly affected the state of the passenger transport sector. In the first years of transition the most important challenge was the introduction of market principles of functioning, which resulted in the necessity to restructure state-owned carriers. Enterprises PKS (State Car Communication) and PKP (Polish State Railways) was divided into dozens of companies responsible for different segments of passenger transport. Unfortunately, these changes were accompanied by reduction of passenger services, which caused a decrease the transport accessibility of cities and regions. These processes have changed significantly the level of transport accessibility of cities and regions in Poland. This situation concerns mainly small towns and those which are located furthest from the country's main transport routes which are Trans-European Transport Networks (TEN-T). It is assumed that modernization of the main transport connections with the development of them will improve the transport accessibility of cities and regions. Unfortunately, the position of large cities and metropolitan regions improves, while centers of lower rank becomes less important in the transport systems of the country. The aim of this study is to analyse the changes in transport accessibility of regions and cities in Poland in the years 1991-2011. Both the state of transport infrastructure and the level of transport accessibility of voivodeship cities in Poland were analysed. In this analysis were taken into account features such as: the extent and intensity of bus and rail services and the mutual time accessibility of selected cities in 1991 and 2011. The analyse attempts to answer the following cognitive questions: (1) How did the state of transport infrastructure change in the years 1991-2011? , (2) How did the level of transport accessibility of Polish cities change in the years 1991-2011? , (3) Which cities and regions did the most "feel" the restructuring processes of transport companies? (4) How did time accessibility change in selected cities in the terms of passenger connections?

## C08.35-05 - Large scale transport infrastructure and regional and urban impacts 5

*Chair: Richard Knowles, Christian Matthiessen, Yves Boquet, Jacques Charlier*

### The relation between freight transport accessibility and the location of logistics activities; an analysis of US counties

*Frank van den Heuvel (Eindhoven University), Liliana Rivera (Massachusetts Institute of Technology), Karel van Donselaar (Eindhoven University), Yossi Sheffi (Massachusetts Institute of Technology), Peter de Langen (Eindhoven University), Jan Fransoo (Eindhoven University)*

Although the accessibility of a location is an important factor for the location decision of logistics companies (warehouses, freight truck companies, etc.), there is not much literature that explicitly analyzes the relationship between the location of logistics activities and the accessibility of these locations. One of the reasons may be that existing accessibility measures are focused on measuring accessibility from a passenger transport perspective. For logistics companies, accessibility of a location has to be measured from a freight transport perspective. In this paper, we use three different accessibility measures and apply them on a county level in the U.S. The first measure simply uses the road density, defined as the kilometers of highways per county divided by the county's area, as an accessibility measure. The second measure extends the first one by also taking into account the road density of adjacent counties and not only normalizing by the county's area but also by the county's population. Finally, the third measure is a gravity based accessibility measure, in which a county's accessibility is assumed to be directly proportional to the size of an activity in other counties and inversely proportional to the road travel time between the counties. The advantages and disadvantages of these three measures are discussed. The different accessibility measures are related to the amount of logistics activities per county. This provides additional insights in the usefulness of the three different measures, and allows us to draw conclusions about the relation between freight transport accessibility and the location of logistics activities. Finally, as in addition to road accessibility, the three measures are also used to analyze rail, airport, and port accessibility, we analyzed the relative importance of accessibility to different transport modes.

### Impact of new transport infrastructure: Spatial and social transformations beyond economical facts

*Maik Hoemke (ETH Zürich)*

Increasing expansion of transport infrastructure is taking place in more and more countries. This trend, strongly encouraged by the globalization process, is reflected in ever-shorter journey times in both national and international travel. During such developments, extensive urban-planning alterations in areas that are being provided with new transport infrastructure tend to be viewed purely in terms of economic and efficiency benefits - and particularly in terms of the time saved when travelling the distance from starting-point to destination. However, there has been little research on the socio-spatial effects of new transport infrastructure systems. There is no awareness or sensibility for such changes, and as a result hardly any methods are available to investigate phenomena of this type. The present study is therefore intended to add a new level to research on the efficacy of new transport facilities - namely, the socio-spatial effects of transport infrastructure. The new Lötschberg Base Tunnel in Switzerland is to be taken as an example case for the purpose. When the 34.6-km Lötschberg Base Tunnel opened for scheduled operations in December 2007, the rural communes in the Upper Valais region acquired a strong new link with the catchment area of Berne. For example, the train journey between Visp (in Upper Valais) and Berne was shortened from 2 hours to less than 1 hour. In addition to the link with Berne, internal public transport connections in Upper Valais were also tremendously extended. Interchange links were improved, connections were better organized, high-frequency timetables were introduced and services were substantially increased - transport facilities that are every bit as good as an urban railway network. The present study will establish the following points of emphasis. In an initial step, the newly created infrastructure, the expanded public transport system and the urban development will be examined in greater detail. Following these investigations, the socio-spatial effects of the transport infrastructure are to be examined. Using a wide variety of empirical methods, the intention is to show the ways in which increasing urbanization can be demonstrated, on the basis of social criteria. This will close existing gaps in the way in which the effects of new infrastructure facilities are seen. In addition, alterations in the social perception of the area due to shorter journey times when crossing the Alps will also be investigated. The aim of the study is to demonstrate that research focusing merely on economic and physical effects in a given area, and ignoring the social aspects of new infrastructure, inevitably suffers a loss of quality. The special characteristic of the present study lies in the way in which it assesses infrastructure developments, in regions that were previously peripheral, on the basis of urban development phenomena and social phenomena.

### Foreign direct investment (FDI) in large scale transport infrastructure: The case of Poland

*Zbigniew Taylor (Stanislaw Leszczycki Institute of Geography and Spatial Organization)*

The paper presents results of two-year research project on FDI in the Polish transport sector, in carriage activities as well as in construction of transport infrastructure (without production of transport means, however). In the analysis, the following measures have been applied: (1) number of companies; (2) number of employees in companies; and (3) aggregated value of FDI in companies existing as of end of 2008. Settlements with branches of transport companies have been the basic units of spatial analysis, in other cases the phenomena have been investigated within counties. Majority of FDI is at urban and regional scale, particularly located in the largest cities, and include greenfield investment (such as maritime container terminal, road freight transport, forwarding and cargo throughput) and brownfield investment (such as freight rail transport, air transport, cargo throughput, passenger road transport). Relatively smaller share of FDI in transport is one of the reasons of 'fall' of this sector in the Polish economy. FDI in transport focus mainly on company takeovers by foreign investors (54.5% of total, according to capital invested) while greenfield investments are much smaller (30.7%) but there are great differences among various transport modes. Absolute majority of brownfield investments are observed in passenger road transport (98.7% of capital), in air transport and services (98.4%), and in rail transport (93.7%). Greenfield investments dominate in cargo throughput, logistics, forwarding and storage; maritime and inland shipping; and in freight road transport - but the domination is much smaller rather than in brownfield investments. By and large, much bigger is the share of companies involved in carriage activities rather than in infrastructure activity. Foreign investors influence the development of cities and regions but also modernisation of transport itself. FDI influence transport development in local and regional scale rather than nationwide. Spatial distribution of FDI is extremely uneven, and new investments strengthen existing interregional differences. Particularly many investments were located in metropolitan regions, especially in Warsaw area. Most uneven distribution of FDI is observed in the case of capital invested, smaller in number of employees and the smallest (but also visible) - in number of companies.

### Spatial Analysis of Urban Mobility in Belo Horizonte Metropolitan Region: A typology of the inter-city interaction intensity

*Renata Oliveira (CEFET-MG), Alexandre Diniz (PUC-Minas), Leônidas Conceição Barroso (PUC Minas)*

Urban mobility patterns of a region depend on two essential factors: (i) spatial location and intensity of activities; and (ii) movement patterns, provided by the transportation offer and its quality. A suburbanization process has taken place in many cities, modifying their structure from the concentration of activities in the central area to more complex and

broad distribution of activities, expanding the urban area, changing the inner and outer relation among districts and demanding an aggregate land use planning, especially when providing transportation in metropolitan areas. Belo Horizonte Metropolitan Region (BHMR) is composed by 34 municipalities, with serious differentiations of land use and mobility patterns. In addition, Brazil has signed up to host some major events, such as the Fifa World Cup in 2014 and the Olympic Games in 2016. These events can cause relevant changes on the ordinary demand for mobility, especially considering the inter-city interaction and the impact on the small municipalities, which present low intensity of activities and low transport infrastructure offer. Therefore, this paper intends to provide a typology for the BHMR, considering attributes such as the spatial intensity of activities and the movement patterns, distributed by the cities that compose this region. The highlight of this work is the discussion of the inter-city interaction. The method used for this analysis was the Principal Component Analysis and the implementation was made using the software Ninna. The results were analyzed using Microsoft Excel and the mapping was performed through ArcGis 9.3. The variables considered in this analysis refer to the size and structure of the municipalities, its occupation intensity, the location of jobs, the vehicle fleet (individual, motorcycles and buses), the proportion of trips with destiny in each municipality due to work or study, and movement patterns, such as time and transport mode. These variables were obtained from some IBGE researches, from Denatran and from the origin/destiny research developed by Fundação João Pinheiro in 2002. The typology proposed presents a consistent relation between the spatial location of activities and the transport broadness. The municipalities located in the further areas of the BHMR, especially in the north and south parts of this region, presented high movement broadness and low intensity of activities. On the other hand, the municipality Belo Horizonte, capital of Minas Gerais state, and other municipalities such as Nova Lima and Pedro Leopoldo, were the ones with higher intensity of activities and broader movement pattern. Some decisions regarding land use planning and transportation infrastructure offer can be guided by this typology proposal, especially considering the inter-city interaction among the municipalities that compose Belo Horizonte Metropolitan Region located in Minas Gerais, Brazil.

## C08.35-06 - Port hinterlands and urban logistics

*Chair: Yves Boquet, Theo Notteboom*

### **The creation of inland port networks in Europe : An analysis of cooperation strategies and institutional structures based on a comparison between the major river basins of France and Germany (the Seine, Rhône, Rhine and Elbe)**

*Antoine Beyer (Université Paris Est), Jean Debie (Université Paris), Romuald Lacoste (ERA FRET / Cete de l'OUEST / MEEDM)*

The links between ports are numerous and extremely varied in range and intensity. Although the links between inland ports have in some cases existed for several years, they are currently enjoying a marked renewal of interest. This seems to highlight the emergence of a new, larger, level of governance which is closely linked to maritime outlets. To illustrate the scale of this activity, it is sufficient to mention a few examples : the Comité de Coordination Interportuaire de la Seine (the Seine Interport Coordination Committee), which brings together Le Havre, Rouen and the Independent Port Authority of Paris, the Comité des ports Saône-Rhône-Méditerranée (the Saône-Rhône-Mediterranean Port Committee), the Verbund der Binnenhäfen Oberelbe (the Association of Inland Ports on the Upper Elbe) or the increased cooperation between the inland ports on the Rhine around Duisburg. Following operators, and in order to meet their needs, port managers are tending to institutionalize new interdependencies. This dynamic seems to be a logical response to the consolidation of maritime traffic into the hinterland. Consolidation is prompting private actors and the public authorities to organize their activities around inland ports which act as relay points. Networking may be initiated by various actors: the maritime ports which seek to strengthen their continental support structures by setting up special partnerships; the public supervisory authorities, operating at different geographical levels, which seek to rationalize the investment that is required to achieve modal transfer, and the managers of the river ports themselves in order to satisfy the expectations of users and achieve a higher profile. In order to reveal the strategies at work, we shall focus on three points: - 1. Conducting a survey of the cooperative structures that covers the diversity of their goals. This requires a thorough understanding of the content and real impact of the agreements in question and how they will affect the future of the selected river basins. - 2. Revealing the reasoning behind the cooperative choices with reference to the theories of political science and regional economics. To what extent is this cooperation driven by the responsible political authorities? How does this influence cooperation? Do the structures in question eradicate competition? The media attention aside, what are the real consequences of these cooperative links? - 3. Establishing a typology of the situations encountered on the basis of two principal variables: the distance between the partners and the intensity of the transactions (these two concepts must obviously be interpreted in a geographical and political sense).

### **The World Ports Climate Initiative (WPCI) in the ports of the Hamburg – Le Havre range and in their hinterlands**

*Mathilde De Keukeleire (UCL), Jacques Charlier (UCL)*

In 2008, 55 ports launched a major environmental program in order to face the challenges of climate change, the WPCI. Its missions are to raise awareness in the port and maritime community of the need of action and to initiate actions to reduce GHG emissions and improve air quality all along the maritime transport chain (from the sea to the port hinterlands). It has formed subgroups focussing upon themes that will provide guidance to ports looking to reduce GHG emissions; 3 of these will be dealt with here: -at section 1, the introduction of the Environmental Ship Index (ESI) and Onshore Power Supply (OPS) for seagoing vessels; -at section 2, the "greening" of hinterland transport, with a higher share of inland navigation and rail transport in order to reduce the share of road transport. A series of 13 major ports of the Hamburg-Le Havre range with a traffic of at least 25 million tons in 2010 will be taken into account, namely Hamburg, Bremen, Wilhelmshaven, Amsterdam, Rotterdam, Flushing-Terneuzen, Antwerp, Ghent, Zeebrugge, Dunkirk, Calais, Rouen and Le Havre. At section 1, we will show that, in the diffusion process of ESI and OPS, there are pioneers, followers, and outliers. The epicentre lies currently in the largest Dutch and Belgian ports, especially Rotterdam and Antwerp, but also Amsterdam and Zeebrugge. However, the large German ports of Hamburg and Bremen are joining them, as well as the French port of Le Havre. For the time being, the ESI has been introduced in 7 of these ports, whereas 3 are already equipped for OPS. It seems that large general cargo ports are more sensitive to these initiatives than smaller, bulk-oriented ports. As inland navigation is a major hinterland transport mode in many of these ports, some are also providing OPS for river barges. OPS has also been or will be introduced at several Scandinavian ports and a system similar to ESI is already in use in several of these. Even if British ports are currently in a wait and see attitude, one may consider that Northern Europe as a whole will adopt the ESI formula (or a similar one) and that OPS systems will flourish. At section 2, we will show that the epicentre of actions for a greener hinterland transport is located in the same Dutch and Belgian ports. Historically, they have promoted a higher use of inland navigation thanks to their unique location at the mouth of the Rhine, Meuse and Scheldt systems. Despite the fact that the Elbe, Weser and Seine systems remain very isolated, the German and French ports followed the same path, and their interconnection with the Rhine and with the Scheldt will help. The same is true for rail transport, where the Benelux seaports were again the leaders for massive investments favouring modal shift (Betuwe and Port lines for Rotterdam, tunnel under the Scheldt in Antwerp, additional freight tracks from Zeebrugge), and with more recent initiatives in the German and French ports.



### **The development of a sea and land logistics system in the Philippines: The Strong Nautical Highway System**

Yves Boquet (Université de Bourgogne)

As an archipelagic nation, the Philippines suffer from the splintering of its territory between islands which are not linked to each other by fixed structures such as bridges or tunnels, except between Samar and Leyte. In the early 21st century, the Philippine government has started to implement a new nationwide logistics system, dubbed 'Strong National Highway System', aiming at an improvement of the travel experience between the capital region of Manila and distant islands, and also to improve the transfer of goods across the archipelago. It consists in a series of improvement of roads alongside the 3 corridors that make up the system, also improvements in the ports where trucks transfer ro-ro style to other islands. There are also several agreements between trucking and bus companies on one side, shipping companies on the other side. This paper will present the current organization of the system, assess its efficiency in comparison to the stated goals, and will try to determine what kind of new spatial organization - if any - is resulting from its development. Given the position of the Manila metro area within the Philippines, should the system be managed from and for Manila mostly, or can it improve also the interactions between other parts of the Philippine territory - Are there hub effects occurring in major transfer points - Does it help Batangas to become a competitor port to Manila - What is the real hinterland of Manila -

of Hong Kong and its surrounding region, Pearl River Delta, which kind of value-added logistics activities will stay in the city of transport hub in concern is associated with the relative level of the 'dual readiness' that differentiates this city and the rest cities along the GSCs. This leads to a conclusion that the government of advanced hub city is critical for such urban centre to capture value-added logistics and GSC management role by upgrading properly the infrastructural and institutional settings, the latter in particular, as it cannot be done by the market alone.

### **Adding values to a city of transport hub: A global supply chain perspective**

James WANG (University of Hong Kong)

Hub operation in transport is an outcome of efficiency search for a better network structure of supply. The hub-&-spoke (H&S) structure allows the transport providers to gain from the economies of scale. The efficiency gains will then partly pass to the users when the delivery cost via an H&S system is lower than using the point-to-point system. The stop-over for transshipments made at the hub provides a time-window as well as a collective point where shipments of cargo from different origins may be reconsolidated before reaching multiple destinations. Such reconsolidation may be seen as value-added logistics activity that will benefit the end-users as well as the H&S system, as it may bring more business to the hub. However, from a global supply chain (GSC) perspective, which type of logistics and where should it be carried out are not simply depended on the availability and use of a transport hub. To the GSC management, a transport hub is no more than part of infrastructural GSC. The GSCs have three parallel systems, handling physical flow, information flow, and monetary flow respectively. The choice for GSCs to process some components of these flows at some locations rather than others depends largely on the infrastructural and institutional readiness for the shipments to go on schedule at the expected cost. From a GSC perspective we argue that the level of this 'dual readiness' relies on a concerted effort of key players across different hierarchy of the GSCs, which characterizes each transport hub city. We further argue, with the case





C08.36

# Landscape and Landscape Analysis

## C08.36-01 - Global Change Session

*Chair: Nodar Elizbarashvili*

### A landscape-ecological assessment of mountain geosystems applying geographical information system (GIS)

*Ashot Khoetsyan (Yerevan University), Vahagn Mouradyan*

Regional landscape-ecological studies have acquired a special topicality as efficient environmental conservation and rational use of natural and resource potential is a major prerequisite to sustainable development. Such studies are underpinned by collection, systematization and consequent arrangement of information on environmental components. Such an opportunity is provided by geographic information systems (GIS). In mountain regions similar to Syunik marz (province) landscape-ecological problems are sharply manifested. The diversity of the region's natural conditions and high sensibility of natural-territorial complexes to man-made intervention is seen in their poor and unstable ecological state. As a software while preparing a landscape-ecological GIS, we employed GIS package ArcGIS 9.2, with expansion moduli 3D Analyst 1.0, Spatial Analyst 2.0 and ERDAS Imagine 9.1. A landscape-ecological analysis of Syunik marz was performed based on 5 underlying parameters: 1. Assessing ecological potential of mountain landscapes 2. Assessing ecological stability of mountain landscapes 3. Assessing ecological load of mountain landscapes 4. Assessing ecological tension of mountain landscapes 5. Assessing ecological dynamics of mountain landscapes. The values of basic parameters of the landscape-ecological analysis were calculated as sums of respective indices expressed in scores and multiplied by their significance reflecting coefficients. Conversion of natural unit measurement indices to a single score system is implemented through division of natural value (minimal to maximal) segment into a quantity of equal-size segments ('????? 2000), corresponding to the quantity of single-scale scores. To obtain compatible collation units by different indices, a single score scale was assumed (1-5). Then produced were chains of significance of diagnostic indices in a complex index. In agreement with that rule, a formula was derived of calculation of basic indices of landscape-ecological analysis (ecological potential, stability, load and tension):  $Mint = K1*(F1) + K2*(F2) + K3*(F3) + \dots + Kn*(Fn)$ , where Mint-is an integral assessment of basic indices of landscape-ecological analysis;  $F1..Fn$  values of under-consideration indices in scores;  $n$  - the number of factors;  $K1..Kn$  corresponding weight factors. Subsequently, those factors were integrated by 'Model Builder' in ArcGIS 9.2 applying 'Weighted Sum' functions. The produced maps enabled us to assess general landscape-ecological conditions of Syunik marz. The present-day ecological situation in the region results from the dynamics of landscapes predetermined by natural and man-induced processes. Remote sensing data reflect in detail the current and recent state of basic properties of landscape cover.

### Saving of the landscape diversity: Legal support for balanced, harmonious environment

*Viacheslav Oleshchenko (National Academy of Science of Ukraine)*

Landscape becomes very important object and conceptual approach in regulation of natural environment from the very beginning of the modern period of the Environment Law development in Ukraine. Ukrainian legislation accepted such concept in the Laws About Protection of Natural Environment (1991), Natural Reserved Fund (1992), EcoNet Programme (2000) EcoNet System (2004) and a lot of other acts of national legislation and relevant chapters of laws, devoted to the related spheres of regulation. European Landscape Convention (2000) become more and more important document, which plays significant role in the process of formation and realization of national and international legislation and policy. Due to this Convention Landscape become not only a geographical term but really as a very important instrument for establishment, development and better understanding of human rights, social cohesion, democracy, safety environment, relevant self identification of nationalities, different cultures, for better integration of sectoral policy. One of the ways for making of this activity more effective should be a rising of the role of the diversity of landscapes in supporting of the balanced and harmonious territorial development. More diversified systems as we know are much more sustainable. We should remember too that we dealing with diversity not only of landscapes but of their natural components and interests of society to the concrete territories and resources too. That's why the task is - to reach better integration of possibilities of diversity of landscapes, natural diversity in wider context and interests of society. As we know modern diversity of landscapes was formed on the base of integration of different natural, economical and social processes. Such processes give us different positive and very often negative results. For better organisation of the activity related to territory and it's recourses on the base of the mentioned above European and all other international documents we developed in Ukraine relevant system of legislation and institution for it's implementation, for better saving of landscape diversity and planning of the territories with this aim. A special Law about Landscapes is in the process of development now in the Ukrainian Parliament.

### Management and spatial planning of metropolitan areas in the area of economic globalization (Focus on the metropolitan area of Tehran)

*Rahim Sarvar (Share Rey Azad University), Hooshang Sarvar (University of Maragheh)*

In recent decades, economy globalization process has affected the structure and economic-social and space organization of countries tangibly. This process with integration of countries economy, has led to a new organization of urban areas, particularly metropolitans in global scale, which have close economic and social relations. In this article the relations of globalization process with development of metropolitan

areas, particularly its reflections in spatial-space planning and management of metropolitan areas, has been examined. The analytical - descriptive method with relying on document study has been used. Results of theoretic and case studies of metropolitan areas shows that , the recent structural changes in the global economy has been had extensive reflects in the balance of structures and approaches of spatial-space management and planning in these areas, especially in some developing countries for organization of geographical space for playing the desired in the national and global scale. The results of examining of spatial policies and programs of Tehran metropolitan area already shows that, in the favour distinction in the views of development of Tehran metropolitan, at least in past two decades' spatial policies and programs, the changes of globalization of economy in metropolitan areas and the use of potential capabilities of these areas has been noted . However , because of govern of traditional structures of state management and planning , particularly this region has not been had suitable reactions to requirements of economy globalization process and no ability to regional, national and promotion of national position . Keywords: Spatial planning and management, metropolitan areas, economy globalization, Tehran

### **Analysis of the fragmentation of vegetation cover in the central region of Benin Republic: Trends and future scenario of change**

*Joseph Olouko (RECTAS)*

The present paper analyzes the fragmentation of the ecological landscape with a focus on vegetation formations in the central part of Benin Republic. The land use land cover change has been assessed using remote sensing multispectral and multirate data, Landsat TM 1986, ETM 2000 and NigeriaSat1 of 2006. The landscape pattern and its evolution were investigated by the combined use of Remote Sensing and GIS techniques, based on the theory and method of landscape ecology. Simulations based on a cellular automata application, Spacell model, were used for the projections of the landscape dynamic towards 2016, 2025 and 2034 horizons. Landscape pattern and its evolution was analyzed through the quantity distribution of various landscape patch types, their structure and changes, including the number of patches and the size of every landscape type, diversity and dominance indices, the isolation index and fragmentation index. Land use land cover change has been assessed at an annual rate of change of -4.66 %, expressing a regression of dense vegetation formations and the expansion of farmlands, settlements and savannahs between 1986 and 2006. This analysis made on four landscape units reveals that this trend will be maintained towards 2016, 2025 and 2034. Environmental implications are the fragmentation of the vegetal formations followed by the isolation of some land use land cover units. On the socio-economic aspects, it has been noted the emerging of new economic activities such as wood exploitation and commercialization, charcoal production, activities that are seriously contributing to the degradation of natural resources in the area. Keywords : Fragmentation, Landsat, Dominance, Diversity, Benin



# C08.37

# Geoparks

## C08.37-01 - Session on Geoparks

*Chair: Wei Dongying, Wolfgang Eder*

### The geodiversity in the Cilento and Vallo di Diano Geopark (Italy) as support in the enhancement of sustainable development

*Alessio Valente (University of Sannio), Aniello Aloia (Parco Nazionale del Cilento e Vallo di Diano), Angelo De Vita (Parco Nazionale del Cilento e Vallo di Diano), Domenico Guida (Università di Salerno)*

The National Park of Cilento and Vallo di Diano was listed in the European Geoparks Network in 2010. This territory extends over 1800 square kilometres in southern Italy. It includes several mountain ranges, whose peaks reach altitudes above 1900 m, hillside and ridges, interrupted by valleys, often deeply incised. These valleys, where flows the Alento, Mingardo, Lambro and Bussento rivers, sometimes become wider to the coast, creating small alluvial plains. In correspondence of these flat areas, sandy or pebbly beaches are formed, otherwise the coast is dominated by high and rocky cliffs. This articulated morphology is due to the geological nature of the rocks that make up the area, as well as to the geological history, rather complicated, which has suffered this area. Some relieves consist of Mesozoic limestones and dolomites, extremely widespread in the southern Apennines. They have been shaped by karst morphogenesis, with the formation of surface form (dolines and polje) and underground ones (caves). The tectonic is evident along the slopes of the relieves or in the deep gorges and canyons which dissect them. Other relieves are made up of sandstones and conglomerates of the Middle-Upper Miocene, in the upper portion, and of clay and calcarenites with marls of the Paleocene, in the lower ones. These outcrops are exclusive in the southern Apennines. The slopes of these relieves have been shaped by water runoff and gravitational movements. Along the coast, changes in sea level, that succeeded in the Quaternary, are recorded by many significant traces, such as marine terraces, notches and caves, sometimes with associated sediments and fossils. These geological characters can be represented by a large number of emergencies, with different degrees of importance and interest (stratigraphy, geomorphology, hydrogeology, etc.). Their scientific value can be assigned according to research carried out on them that they have also allowed relevant scientific publications. As regard the educational value is related to their representation in the territory, and therefore their inclusion in some learning and /or tourist paths. In addition, these emergencies can be integrated with a wide variety of ecosystems, already include in the UNESCO program "Man and Biosphere" as well as archaeological sites, unique and exceptional, Paestum, Vella and Padula, recognized as World Heritage by UNESCO. However, in this territory, where the physical landscape is an attractive scenario, we can not overlook the areas in their natural state with endemic vegetation and fauna of great ecological value, or the castles, churches and places of worship, indicative of a long history and a unique tradition, expressed in various ways and

attractions. The geodiversity in the Geopark, supported by a cutting-edge scientific research, can contribute to the search of new paths in education and development of sustainable tourism activities.

### Geotourism industry & geoparks in Iran (case study: Qeshm geopark in environmental landscape)

*Tahereh Sabouri (University), Roya Mousazadeh (Environment), Kaveh Homayoun*

Developing geotourism in the world and study of abiotic nature towards growth of nature-based tourism plays an important role in sustainable development of various parts of Iran. The study of the elements of abiotic nature and its zonation in environmental landscape can provide optimal use of nature and God-given facilities in the context of geotourism. Also, registration and protection of national natural properties reveals the necessity of academic zonation of geotourism potentials with the aim of general monitoring and identification of properties of various regions. In the present study, an extensive survey was carried out in order to identify and evaluate areas prone to geotourism and geoparks, and environmental landscape of Qeshm Island as the largest island in Persian Gulf and a potentially touristic region was chosen as a case study to develop tourism industry branches particularly ecotourism and geotourism, beach and marine tourism. This island in terms of cultural, historical and natural attractions is among the richest regions of Iran. Of wonders of Qeshm nature is an attractive and rare complex of geological heritage and unique environmental landscape. This complex was registered in Global Geological Network (GGN) in 2006. Obviously, Qeshm geopark is of special importance due to being located at strategic region of Persian Gulf. In addition, Qeshm geopark that is located between Asian and European geoparks has found a particular position both in the region and in international geoparks. Warm and sunny beaches lying along the geopark has doubled its beauty. The only geopark in the Middle East is placed in a higher rank due to diversity of geological phenomena and the sites. Qeshm has a diversity of all other rare attractions the example of which is mangrove forests and their diversified ecosystems. Key words: Iran, tourism, geopark, geotourism, Qeshm, environmental landscape.

### The role of geomorphology studies in site selection for geoparks and sustainable geotourism-proposed geopark: Dorfak and Deylaman (Gilan Province)

*Tahereh Sabouri (University)*

This paper deals with the role of geomorphologic studies in environmental planning in order to select suited sites and develop geoparks based on sustainable geotourism criteria. Identification and site selection for attractions of establishing a geopark and develop geotourism in Dorfak and Deylaman are main objectives of this research. To establish a geopark, the most important factors are geologic studies, geomorphologic



studies and unique landscapes. Other natural and cultural heritages are also important, which are regarded as a second priority. Dorfak mountainous mass (Gilan Province) was selected due to following particular conditions and environmental potentials: variety of faults, valleys and landslides, picturesque landforms resulting from karst erosion such as dolines and lapies in Dorfak zone. There are also numerous caves in which monuments of early men and Paleolithic tools have been discovered and each of them is a potential geopark to be introduced to UNESCO. Key Words: geomorphology, geopark, geotourism



# C10.38 IGU/ ICA Commission/ Working Group on Toponymy

## C10.38-01 - Place names as markers and ingredients of space-related identity 1

*Chair: Peter Jordan, Cosimo Palagiano*

### The Power of the Geographical Names

*Paulo Marcio Leal de Menezes (University of Rio de Janeiro), Claudio João Barreto dos Santos (FIBGE), Ana Cristina Resende (FIBGE)*

This paper is part of the research in Geographical Names accomplished by the Laboratory of Cartography of the Department of Geography of the Federal University of Rio de Janeiro. Its main objective is to analyze the aspects of power contained in geographical names and their empowerment characteristics, applied to the research, as well as to emphasize the characteristics and concepts in general on the aspects of power that surrounds geographical names. In a general way the geographical names are supported by a binomial composed by the culture and popular will, for which are settled down the base of its perpetuation. The break of one element of the binomial, give conditions to have actions for changes and in consequence changes about the original characteristics and motivations over the geographical name. The geographical names are, from an unquestionable way, linked also to the conceptual structure of territory, mainly when is focused the quadruple fundamental concept structure: identity, belongment, appropriation and administration. In these four supports, the territory denomination will always be made present and materialized by geographical names. As territory and power are intimately linked, for consequence, the relationship between the geographical names and the structures of power becomes a natural unfolding. In a cartographic way the geographical name has a juridical registration, when it is printed in a official cartographic document. Once put in an official map, he has a juridical recognition and they can be part of referencing cadastral documents, as for instance, for physical limits definition, in any administrative levels, municipal, state or federate. Changes of a geographical name in those cases will have serious impacts on the defined area. Cadastral litigations are still solved for the location confrontation of defined places by geographical names, even when modern cadastral systems established by GNSS are available. Actions for changing names by any reasons must be preceded by an extensive and deep impact study that can be generated. On the other hand, change names took by political aspects or political power, but that also lean on in the basic binomial can perpetuate a geographical name or not, depending more on the popular support than through the binomial's cultural aspects. The geographical names of the population nuclei in Rio de Janeiro State, Brazil will be analyzed under the optics of the power and associated empowerment. Taken into account its original motivation, it will be defined a new kind of relationships of geographical names under the mentioned aspects.

### Place name, space and society – The role of place names in relating people and place

*Peter Jordan (Austrian Academy of Sciences)*

Place name, space and society - The role of place names in relating people and place In its Addendum to the Glossary of Terms for the Standardization of Geographical Names (2007, p. 2) the United Nations define the endonym as a 'name of a geographical feature in an official or well-established language occurring in that area where the feature is situated.' In this definition just the factors 'geographical feature' (as a subunit of the geographical space), 'language' and 'name' are mentioned, as if place names (and languages) could exist without a human community or social group. But place names are not just attached to certain features of the geographical space, they are not just - colloquially speaking - 'hanging around' in space somewhere, but they are also attached to a certain social group in the sociological sense, i.e. in the sense of a number of people characterised by mutual relations and a common culture (ranging in size from a family or a couple of friends to a nation). They have in fact been created and are applied by this group. Without social groups place names simply would not exist. And this is also the very reason and justification for dividing place names into endonyms and exonyms. An endonym is under this aspect a name applied by a social group permanently residing in a certain section of the geographical space for geographical features within this section as opposed to an exonym, which is a name used by another social group residing outside this same section of the geographical space and not corresponding to the endonym. Apart from hinting at this basic relation, this paper will also highlight the meaning of place names for social groups and the concrete roles place names play in relating people and space - in which way and why they convert space into place in the sense of Yi-Fu Tuan. Three roles will be mentioned here: (1) In the naming process social groups highlight what they find to be characteristic for geographical features; (2) social groups construct space-related identities by attaching place names to a feature or section of geographical space - attributing place names functions similar to flags or coats of arms and elevating them to the rank of symbols of space-related identities; (3) place names strengthen emotional ties between man and place and have also in this way an important function in space-related identity building. The paper may be classified as a cultural-geographical approach to place names.

### Stone Age place names as markers and ingredients of space-related identity

*Peter Raper (University of Free State)*

In discussing the semantic contents of place-names, a distinction is noted between lexical, associative, pragmatic, referential and such different meanings. The Stone Age peoples of southern Africa were as aware of the identity-bearing contents of place-names as later immigrants. The ingredients of their place-names were determined by their life-





style as hunter-gatherers. The physical character of their environment determined their toponymic landscape, reflecting the descriptive elements of size, shape, colour, etc.; the flora and fauna on which they depended for their survival, and the like. The role of place-names as markers of their identity is reflected in many ethnonyms derived from the place of habitation of the various groups: Einiquas 'Big River People' on the Orange River (Grootrivier); Chariguriquas 'Great Mountain People' on the Great Berg River; Taaneiquas 'Grass Plains People', etc. Adaptation, desemanticization, reinterpretation of Stone Age place-names by later immigrants, settlers and others resulted in new semantic contents and new markers of identity, and in competing claims to ownership, identity and authenticity.

## C10.38-02 - Place names as markers and ingredients of space-related identity 2

*Chair: Peter Jordan, Cosimo Palagiano*

### Identifying seas and their names: Koreans' emotional ties to the seas as reflected in their place names

*Sungjae Choo (Kyung Hee University)*

A place name is normally given to a geographical feature with some visible limits. But when a feature is big enough to go over to a far unseen limit, e.g. a sea beyond the horizon, it would not be easy to delimit its boundary within which it is called by the given name. One way of its delimitation could be finding a point up to which people's emotional ties reach. When naming a feature, they must have intended one being within their emotional grasp. If there are another group of people at the other side of the feature who have another emotional ties, then it may well have a different name given with different identity. This paper firstly attempts to figure out up to what point Koreans identify the sea with their names and how their emotional ties with the sea are working. A structured questionnaire is suggested. Secondly, the paper tries to reveal how strong Koreans emotional ties are to the sea by examining place names in coastal areas which reflect the traces of the sea name.

### Semantic uncertainty of concepts in generic name of undersea features

*Hyo Hyun Sung (Ewha University), Hyowon Ban (California University)*

There are many existing works that focus on aspects of techniques and methodologies for detection, measurement, modeling, and estimation of concepts in seafloor topography. (Bell, 1975; Goff and Jordan, 1988; Smith and Sandwell, 1997; Wynn, Masson, Stow, Weaver, 2000; Baba and Seama, 2002). However, some of the concepts -for example, seamount, sea valley, basin, or plateau-have multiple different definitions (Pitcher, Morato, Hart, Clark, Haggan, and Santos, 2008; Staudigel, Koppers, Lavelle, Pitcher, and Shank, 2010). When one of the concepts is spatially represented using its multiple definitions, the definitions may not show an identical boundary on a map. Due to the reason there may exist semantic uncertainty (Ahlqvist, 2004) in such concepts. Some studies deal with classification of the concepts in seafloor geology (Mitchella and Clarke, 1994; Jakobsson, Grantz, Kristoffersen, and Macnab, 2003). However few of them have focused on the uncertainty of concepts in seafloor topography. Instead, there exist studies that tried to demonstrate, measure, and represent the uncertainty of geographical concepts such as land-use/land-cover classification system and spatial boundary of urban sprawl (Ahlqvist, 2004; Ban and Ahlqvist, 2009). In those studies locations of the uncertain geographical concepts were represented in fuzzy boundaries rather than crisp boundaries that were created by using approaches of fuzzy-set theory (Zadeh, 1965),

Geographic Information Science (GIScience), and geovisualization techniques. Following Ban and Ahlqvist (2009) this paper aims to 1) identify some existing uncertain concepts in generic term of undersea feature that have multiple different definitions of spatial range, 2) measure and analyze the degree of uncertainty in each concept by using fuzzy-set membership functions, spatial analytical methods, and empirical spatial data, and 3) represent the degree of uncertainty spatially explicit using geovisualization techniques. Results of this study may provide contribution to better understand the uncertainty of concepts in seafloor topography for naming undersea feature by applying existing approaches of measuring and geovisualizing uncertain spatial concepts. The study can be further extended to deal with spatio-temporal characteristics of the uncertain concepts in seafloor topography for generic term of undersea feature. In addition, the methodologies in this study may be applied to some uncertain concepts in geomorphology- such as mountain range- to measure and represent the semantic uncertainty.

### Wanganui and Whanganui: Two identities and two names?

*Philip Matthews (retired)*

Maps of New Zealand, irrespective of scale and purpose, have shown over time the name of a town and the name of the river on which it stands as both Wanganui and Whanganui. The question as to how the names should be spelled has been intermittently controversial over the last 170 years. The issue became more pressing when, in February 2009, a M'ori organization made a submission to the New Zealand Geographic Board seeking a change in the name of a city and its district to Whanganui and in August 2009 a submission was made by the local government authority to retain the Wanganui spelling. This paper discusses the histories of the two names and, more particularly, the two identities underlying the names. Finally the proposed resolution of the matter is commented on.

### The Meaning of A Place by VGI-The Case of Gongguan, Taipei

*Bor-Wen Tsai (Taiwan University)*

Fox (1997) proposed that space is based on directional co-ordinates and symbolic co-ordinates and place is socially constructed and personally experienced. Thomas (2001) also thought that a place is not merely a spatial location but something with meaning. Traditional GIS has implemented space of physical environment successfully based on computational geometry. However, how GIS can implement place which is formed through human experience from the interaction between their culture/social activities and natural environment is still in developing stage. This research employed VGI (volunteer geographic information) concept and used geo-tagged photos from flickr and Picasa web albums to explore human spatial cognition of Gongguan which is a native



place locates in southern part of Taipei city. This article aims to provide a methodology for the study of a native place name in Toponymy and a region in New Regional Geography.

## C10.38-03 - Place names as markers and ingredients of space-related identity 3

*Chair: Peter Jordan, Cosimo Palagiano*

### Toponymy and landscape in historical cartography: The case of Josep Aparici's map referred to Catalonia (1720)

*Joan Tort (University of Barcelona)*

The catalan cartographer and geographer Josep Aparici published in 1720 the map entitled 'Nueva descripción geographica del Principado de Cataluña', devoted to the Spanish King Felipe V. It was drawn in six sheets, and its scale is equivalent to approximately 1:250,000. It is considered a significant document in the context of the history of cartography in Catalonia and Spain. Scholars have stressed the accuracy and the precision concerning its place names as one of the most remarkable qualities of the map. Probably the author's training as a geographer and his detailed empirical knowledge of the Catalan territory, contributed to this attribute. We focus our analysis on a particular aspect of the Aparici's map: the approximately fifty place names that have a regional dimension in terms of spatial meaning. That is, names that refer to places or geographical areas of what in Catalonia is considered 'medium size' (usually between 100 and 500 km<sup>2</sup>). Areas with a specific name (that usually have persisted with little change throughout time) and which have usually a common feature: they tend to coincide with physically well defined landscapes. On this basis, we ask questions such as the following: 1. In all studied names, which kind of semantic connection does it exist between 'name' and 'landscape'? 2. To what extent this semantic connection has been maintained over time? Is it still valid today? 3. Once the connection between 'name' and 'landscape' has been established, can we verify any specific relationship of this name with the etymological meaning attributed to it? 4. From the names discussed, can we speak of a 'toponymic landscape' of Catalonia around 1720? 5. How different would be this 'toponymic landscape' if we would take as starting point the cartographic toponymy of the sixteenth and seventeenth centuries? In the concluding section, we will consider what might be the most important scientific contributions and the analysis we propose, both in terms of Geography and in terms of Onomastics. For our study, in addition to the main reference, we will consider other maps from earlier and later dates, and relating to both the Catalan and Spanish historical cartography, and also to other countries. Also, we will work with concepts that we have already used in previous analysis, as the toponym as "landscape indicator."

### Eléments d'analyse et de compréhension de la toponymie tunisienne: Cas du golfe de Guèbis

*Mohsen Dhieb (King Abdulaziz University)*

La compréhension de la toponymie des noms géographiques est essentielle pour la construction de l'identité d'un territoire. Elle réfère à une série de facteurs géographiques, historiques, culturels et linguistiques. C'est particulièrement le cas de pays ouverts, à fortes charges historiques ou des interférences linguistiques multiples. Différentes civilisations et cultures se sont succédé en Tunisie. Les événements récents ayant eu pour lieu certaines régions et villes intérieures, ont reposé la question régionale mais aussi la question toponymique. Des noms peu connus jusque là -Sidi Bouzid en est un exemple- sont devenus des symboles ou des icônes pour le peuple tunisien et pour d'autres peuples de la région. En comprendre l'origine ou la signification est devenu une nécessité identitaire. Comprendre l'origine et l'évolution des quelques 15000 toponymes tunisiens que nous avons pu estimer n'est point une entreprise facile. Cela exige un travail collectif systématique qui dépasse l'ambition de ce papier. Les multiples civilisations et cultures qu'a connues la Tunisie, les langues parlées et les dialectes régionaux et les parlers locaux ont contribué à des degrés divers à façonner les toponymes tunisiens. Mais, du fait du jeu de l'évolution de la langue et des parlers, elles ont contribué quelquefois à en camoufler l'origine et la fonction. Très peu de personnes savent que l'actuelle Gafsa renvoie à la civilisation capsienne dont elle tire l'appellation. L'autopsie des toponymes tunisiens devrait s'appuyer sur une démarche objective, tangible et transposable. Le cas étudié ici est celui de 4 cartes topographiques du golfe de Guèbis (Gabès). En l'absence de littérature spécialisée sur la question, notre recherche s'appuiera sur les matériaux existants: significations sémantiques, textes historiques, récits d'auteurs, légendes populaires, croyances locales et connaissance terrain. Cependant, il restera toujours soit des lacunes soit des ambiguïtés par rapport à une reconstitution systématique. Nous posons les jalons d'une démarche de recherche d'éléments fondateurs d'une identité nationale dans une toponymie devenue symbole d'une révolution, nous discutons les résultats, mais nous sommes conscients des limites de la recherche.

### Egyptian place names as a reflection of identity, languages changes and emotional ties

*Eman Oriby (Central Agency For Public Mobilization And Statistics)*

The diversity of Egyptian place names on Egypt represent the rich history of the 7000 years civilization with different languages and written systems and successive conquest from different rulers who had variant cultures .They represent emotional tie between people and places where the majority of place names of Egypt are eponyms ,dates of important events and Sure names .Egypt has a long history of recording Egyptian place names , the oldest known record is Tel Al Amarna tablets ,holly books and later historical

books and maps, gazetteers and census data and finally GIS systems .Through recording there are major challenges that affect recording the correct place names which I will represent them in this paper. Other cultural aspect is using Egyptian place names on other parts of the worlds like pyramids and Cairo and in recognizing Egyptian cotton and lately Tahrir Square for liberty .On the other hand using foreign place names to reflect some properties like Beverly hills city in Cairo governorate for high level standard property.

### **The Name Brazil – Considerations under a Historical Toponymyc Approach**

*Paulo Marcio Leal de Menezes (University of Rio de Janeiro)*

The name Brazil is known practically since the 12th Century, and was mentioned in the most several legal documents, customs annotations and trade lists, mainly in Italy and old France. As a place name, the name Brazil as a cartographic reference is known at least since 1325, in a map due to the Genoese cartographer Angellinus Dalorto. It was repeated as a representation widely until the 15th Century, without related with the new discoveries happened on the new Continent. These references occurred mainly in maps elaborated by Italians and Catalans cosmographers. The researches show and an extensive bibliography mentions the existence of cartographic references of the place name, mainly as an island with names, under a variety of orthographies, among them: Brazil, Berzil, Bracie, Brazil, Bracir, Brasill, Brezill, Brazail. They also act references to the Mystic islands of the Sea of Darkness. The connection between some of these islands and the place name Brazil is narrow and they possess representations even diversified, just as the Hereford Map, of the 12th century, until to the Vinland Map, of the 15th century. It is included the representations that influenced the subsequent Portuguese cartography. The italic influence began with Andréa Bianco, member of Sagres School turned and elaborated important maps to the study developed for the discoveries. On the maps built between 1436 and 1448, important references and statements are acted, showing the assumed knowledge of the Brazilian lands in a time previous to its discovery. This paper aims to show the cartography pre Portuguese with their references to Brazil.

## C10.38-04 - Place names as markers and ingredients of space-related identity 4

*Chair: Peter Jordan, Cosimo Palagiano*

### Romanian Exonyms on the territory of Serbia

*Remus Cretan (University of Timisoara)*

There are several areas on the territory of Republic of Serbia where Romanian exonyms could be found, mainly at the Serbian-Romanian border where a Romanian minority population lives. Most of the Romanian exonyms are extended in the north part of the Serbian Banat area as well as on the Timoc Valley where the Walahian population (vlasi) preserve their cultural values and still use Romanian names. These exonyms could be categorized in two main groups: habitation names (towns, villages, homestead) and feature names (oronyms, hydronyms, places of natural vegetation growth), expressing both characteristics of the specific places the Romanians migrated in the past and geographical elements related to the Serbian place they settled.

### Decoding urban landscapes through the analysis of place names and imaginaries at a local scale

*Ayar Rodríguez de Castro (University of Madrid)*

Toponomastics is increasingly interested in the subjective role of place names in daily life. In the frame of Urban Geography, the interest in this matter is currently growing, as the recent change in modes of habitation has urged our discipline to find new ways of exploring the cities. In this context, the study of how name's significance is connected to an urban society constitutes a very interesting approach. We believe in the importance of place names as tools for decoding urban areas and societies at a local-scale. This consideration has been frequently taken into account in the analysis of exonyms and macrotoponymy, although in their case they are not exempt of political and practical implications that often prevail over the tool function. The study of toponomastic processes helps us understand how the city works by analyzing the liaison between urban landscape, imaginaries and toponyms. This is reflected in the scarcity of some names, in the biased creation of new toponyms and in the influence of tourists, residents and local government over place names and their changes, maintenance and disappearance. Our study-case, Toledo, is one of the eldest cities in Spain, full of myths, stories and histories that can only be understood in combination with processes of internal evolution of the city linked to the arrival of new residents and the more and more notorious change of its historical landscape. At a local scale, we are willing to decode the information which is contained in its toponyms about its landscape and its society.

### An analysis of the use of Catalan on place name signs in València (Spain)

*Joan Carles Membrado (Universitat de València)*

The land of València (officially Comunitat Valenciana) is a bilingual territory in eastern Spain inhabited by five million people where both Catalan (officially known as Valencian in this territory) and Spanish are official languages. The official use of Catalan/Valencian was banned there in 1707, but restored in 1983, after democracy arrived in Spain. From 1983 to the present, Catalan/Valencian has made significant advances in València as regards its legal and official status, advances that have not been accompanied by a rise in the number of Catalan speakers, since the migrants who have come to Valencia -2 in 6 of the current inhabitants of this territory were born outside it in areas where Catalan is not spoken- have not usually learned Catalan, but have used Spanish instead for integration into Valencian society. Among the legal advances, we have to mention the reinstatement in most Valencian municipalities of their original Catalan names as the official ones. Nowadays, 350 out of 396 Catalan-speaking municipalities in Valencia have a Catalan official name. As a result, most signs in Valencian roads referring to place names are written in Catalan nowadays. Also street name signs have regained their Catalan form, or have been translated into this language. It must be remembered that road signs (for drivers), along with street names (for pedestrians) are perhaps the main instrument of symbolic perception for understanding the sociolinguistic situation of a territory. There is no doubt that the presence of Catalan in signs has increased over the last decades -not just in road or street signs, but also in those belonging to many private businesses, for instance restaurants or baker's shops, which are often given Catalan names in order to emphasize their Valencian identity. The regional Valencian government, and most Valencian municipalities as well, have made a considerable effort over the last decades in order to promote signage in Catalan in streets, roads, businesses, etc. We do not find that a comparable effort has been made in order to promote the public use of this language and give it prestige. Many Valencian authorities do not speak Catalan in public ever. It is therefore unsurprising that, for most people -including most Valencian speakers of Catalan- Spanish remains the important language, whereas Catalan is still relegated to secondary, subordinate, symbolic status.

### Transonimization of the ancient toponyms of Split

*Marina Marasovic-Alujevic (Faculty of Philosophy), Katarina Lozic Knezovic (Faculty of Philosophy)*

The paper deals with the toponyms of Split, centre of the Croatian region of Dalmatia. The revitalization of its ancient toponyms is achieved by their transonimization into the category of chrematonyms, by the nomination of institutions, shops, restaurants, sport facilities etc. The toponyms are etymologically analyzed and classified into respective semantic categories. These names continue emotional connection with the inhabitants and the denominated place. This is the most appropriate way to avoid the oblivion of the extinct appellatives from which the toponyms have been formed and to re-enrich the



active vocabulary. Along with numerous monuments of spiritual and material culture, in which the city of Split abounds, toponyms are evident examples of the preservation of immaterial heritage of the two-millennial city. Key words: toponyms, chrematonyms, etymology, lexis, Split



# T08.02

# Megacities



## T08.02-01 - Governance and Informality

*Chair: Guenter Mertins, Frauke Kraas, Desheng Xue*

### Managing mega-cities growth – from the perspective of university relocation in Hochiminh city

*Hieu Nguyen Ngoc (National Academy of Public Administration of Vietnam), Ha Le Thuy (VIAP)*

Relocation of universities from city centre to the outer region is a solution for resolving overpopulated and congested problems in mega-cities of Vietnam. Hochiminh city, the largest city in Vietnam, accommodates over 30% of Vietnam's student. The current ratio of student to local citizen is 1/13 seems small; however, the number of students has grown over 20 times over 5 decades, compared with city area grew 2 times. Students are blamed for its new demand for housing, infrastructure, and services, which is overload for city's capacity now and future. Therefore, the relocation plan has been approved with many new restricting measures on renovating campuses of the universities in the city centers. However, the search for effective solution is a long process, as there were no sign of decrease of student number in the old districts so far. It seems that universities find no trade-off at current plan. Outside city centre, they may have weak attraction to students and lecturers. The cost of operation may underestimate in new campuses comparing to the old ones, given the current development status. For municipalities, there are no clues for lowering the floor area ratio and attraction power of new types of building in the old campuses. Until recently, the management of relocation may have to rely on external factors such as the emerging demand from the region as well as new linkage of new express way. Perhaps the more matured urbanisation of satellite towns in the region would balance the trade offs for relocating universities in the city centers. If it is the case, the new plan for the relocation may have to boost its incentive measures to the right objectives besides the strict control of development as they are doing over past few years. Key words: urbanisation, mega-cities, university relocation, regional planning, demographic changes, planning.

### In the absence of statutory planning – planning on the ground

*Wolfgang Scholz (TU Dortmund)*

Joint research project together with Prof. Dr. Sabine Baumgart, Faculty of Spatial Planning, TU Dortmund and Prof. Dr. Wilbard Kombe, Ardhi University, Dar es Salaam, Tanzania In the absence of statutory planning - planning on the ground In Sub-Saharan Africa urbanization is progressing at a rate unprecedented in human history. In most countries, the state is not in a position to apply a responsive legal framework and to mobilize adequate resources to guide urbanization. A major obstacle are the outdated legal framework and the inappropriate planning concepts inherited from colonial

governments which often contradict post colonial policies and are unsuitable to respond to rapid urban growth. The chronic underperformance of the public sector vis-à-vis rapid urban growth caused a large cumulative backlog in the provision of building land and basic services. In addition, uncontrolled informal urbanization has often caused dysfunctional settlement lay-outs and urban structures. In Dar es Salaam, Tanzania, informal settlements cover now more than 70% of the city areas because the statutory system cannot provide sufficient building land and settlers have to find plots on the informal land market. It shows the need for a new approach to statutory planning in order to guide urban development effectively, to create more functional settlements, to assist the urban poor to access affordable plots with basic services, and to release financial assets for the urban economy. The paper will present results of a joint research analyzing empirically factors that determine space standards and land use in prevalent types of formally planned and informal settlements in Dar es Salaam. Goal is to identify parameters to ascertain the long-term suitability of settlements, understood as being functional and flexible to respond to future demands reflecting from socio-economic development. The research reveals that today there is not much difference between planned and unplanned settlements in regards to land use changes, land use conflicts and violation of planning regulations and procedures. More important are therefore negotiation procedures on the local level to replace the statutory system and to find solutions on the ground. The paper will present potentials but also limitation of this approach. At the centre of the research are the livelihood strategies of the residents. The overall aim is to evolve a responsive framework for statutory planning including spatial standards for settlements that reflect the current reality of urbanization under poverty while addressing future needs. Main actors will be local leaders and the community to ensure sustainable planning.

### Urban security governance in São Paulo – a multilevel analysis of in\_formal structures and agencies

*Dominik Haubrich (University of Kiel), Rainer Wehrhahn (University of Kiel)*

In Latin American metropolises we recently observe substantial qualitative changes of public security policies at all administration levels as well as a proliferation of technical and personal security measures in residential areas of the broad middle class. The scientific discussion of these processes usually concentrates on their relationship with complex urban insecurity situation, the privatization of public space or fragmentation processes of parts of the urban society. Urban geography and geographical security research rarely focus on the reciprocal processes of (permanently and rapidly changing) public security care on the one side and in\_formal activities of the local people with respect to security measures in urban neighbourhoods on the other side. Against this background the paper discusses the questions, if local debates on security and order - based on increasingly consolidating security councils at the city quarter level (CONSEGs - Conselhos de Segurança comunitária) - help institutionalize public cooperative structures or if the civil society organizes itself bottom-up like without the influence of public actors. In this

context, questions of neighbourhood empowerment and governance have been researched using qualitative interviews with stakeholders of public and civil society entities as well as with inhabitants of non-gated residential middle class areas in São Paulo. The results help understanding if different kinds of organization and cooperation in the field of security policies can be interpreted as a constitutive part of urban security governance.

### **Contentions for Water: Case of Chennai Metro Region**

*Sridharan Nomperumal (School of Planning and Architecture)*

Historically, water has been a contentious issue among nations and states. From source sharing to final pricing, institutional conflicts dominate and get manifested in various forms. These conflicts deprive access to water by various segments of the population, especially the marginalized groups. To achieve the Millennium Development Goal of bringing down by half (MDGs), 90 million urban Indians have to be provided with safe and sustainable drinking water by 2015. Taking Chennai metropolitan area as an example, which has perennial water crisis and institutional conflicts, this paper analyses contestations over source, contestation over distribution and resultant marginalization of various population sub-groups. It probes into aspects such as urban form, territorial and institutional conflicts, regulation over water and its impact. It shows how the water provision has become a private good from that of public good due to political interests. It analyses the water policy in the context of local politics. It reviews how far the local commitment exists towards achieving MDG in drinking water. Using the information gathered from various stakeholders in the city and from secondary sources, this paper evaluates the sufficiency and sustainability of existing water supply system to meet the equity and efficiency criteria of the city. The paper argues that even in certain sectors, such as water, decentralization will not address efficiency and equity concerns, especially in favour of vulnerable groups, though the State and Local Governments have come out with pro-water harvesting and high tech water production policies.

## T08.02-02 - Securing resources 1

*Chair: Günter Mertins, Frauke Kraas*

### **Contribution of an Optimized Waste Management to Energy Supply in Santiago de Chile under Climate Change Conditions**

*Rainer Bräutigam (Karlsruhe Institute of Technology), Volker Stelzer (Karlsruhe Institute of Technology)*

Total production of Municipal Solid Waste (MSW) in the Metropolitan Region of Santiago de Chile (MRS) in 2007 was roughly 2.9 million tonnes, representing 1.2 kg/cap\*day). The organic fraction, which is responsible for the production of greenhouse gases (CO<sub>2</sub> and CH<sub>4</sub>) in the case of disposal in sanitary landfills, had a share of about 50% in 2007. The main part of MSW is disposed of in sanitary landfills (recycling rate is about 13%) without any further treatment. Landfill gas, produced at the three operating landfills is captured and mainly flared, the use of landfill gas as an energy source is negligible, and therefore the contribution of waste to energy supply for MRS can also be neglected. Within the project 'Climate Adaptation Strategy for the Metropolitan Region of Santiago de Chile (CAS)', which is supported by the Federal Environment Ministry of Germany (BMU), climate adaptation strategies for MRS have been developed on the basis of different explorative scenarios for the year 2050 for the key areas energy, water and land use. In this paper results of the above mentioned study, regarding the contribution of waste management to energy supply in 2050 for MRS, taking into consideration effects of climate change, will be presented. In 2007 electricity demand in MRS was about 17 TWh, electricity generation in MRS was about 4.2 TWh, from which about 50% was produced by hydro-power plants. Due to climate change, temperatures will increase and rainfall rates will decrease, resulting in a decrease of the stream flow of the rivers and therefore in a decrease of electricity production from hydro-power plants. On the other side the energy demand will increase due to rising population and rising living standards. Within the explorative scenarios, it was assumed, that mainly due to an increase in population and in living standards (Gross Domestic Product) electricity demand will increase to 40-50 TWh in 2050 and the production of MSW will increase to about 6,6 Mio tons (2 kg/cap\*day). Regarding waste management it was assumed that in 2050 separate collection of a major part of the organic fraction with subsequent anaerobic digestion to produce CH<sub>4</sub> for the production of energy, capturing and using landfill gas for the production of energy as well as the production of a Refuse Derived Fuel (RDF) to be co-fired in cement kilns or in power plants will be common practice. Taking these assumptions into consideration, between 2 and 3.5 TWh of electricity can be produced from waste, which means a share of about 4% to 7% of total electricity demand in the Metropolitan Region of Santiago de Chile in 2050.

### **How to construct a water shortage, even if you live on a huge river: The case of Shanghai**

*Michael Webber (University of Melbourne), Jon Barnett (University of Melbourne), Zhong Yuan Chen (East China University), Brian Finlayson (University of Melbourne), Mark Wang (University of Melbourne), Dan Chen (Hohai University), Jing Chen (East China University), Maotian Li (East China University), Taoyuan Wei (East China University), Sarah Wu (East China University), Hao Xu (East China University)*

Shanghai is a subtropical city, located on the second largest river (by volume) in the world. Yet it faces the threat of shortages of drinking water. This situation has virtually nothing to do with population growth and economic development, nor yet with privatisation or the commodification of the commons. Instead, many decisions and environmental characteristics have contributed to this threat. First, Shanghai has become dependent on the Yangzi River for its drinking water. The city neither recycles significant quantities of water nor does it store local precipitation. Therefore, it relies on water brought into the municipality by rivers. Second, it has changed its river-borne supply from the Huang Pu to the Yangzi River. This decision has been made in order to control the levels of pollution in the water that enters its treatment plants. China's pollution control regime underpins this decision. Third, for reasons of inter-provincial rivalry and politics, the city has chosen to draw water from the Yangzi through water intakes that are located within the municipality, and that are therefore within the estuary zone and subject to tidal intrusions of salt water. Fourth, the characteristics of the Yangzi itself play a role. At high tide, when the river's discharge is low, salt intrudes into far into the estuary, far beyond the current water intakes. If sea levels rise, these intrusions will become more pronounced. Fifth, large-scale central government infrastructure projects are altering the hydrological characteristics of the river. Dams on the Yangzi, such as the Three Gorges Dam alter the seasonal flow of the river, even if they do not alter the total amount of water discharged annually. The South-North transfer, designed to alleviate water shortages in the great cities of China's north, promises to extract 50 billion cubic metres / year, transferred out of the Yangzi basin. Such projects raise the probability of salt water intrusions into the water intake zone, especially during some periods of the year. The Shanghai and central governments have thus made a series of decisions that, taken together, have forced the municipality to rely on a source of drinking water that is increasingly unreliable (even if its annual discharge is huge and its annual variability small). Why these decisions have been made - and made independently - is an important topic for those who would understand the provision of water for cities and the practical efficacy the Chinese governance systems.

### Analyzing Energy Performance of New Quality Building Envelop by Computer Simulation

*Kamran Naeiji (TU Berlin), Klaus Rückert (TU Berlin)*

'New Quality Building' is a residential building which is built as a pilot for the project of 'Young cities - Developing Urban Energy Efficiency - Tehran - Karaj' in 'Hashtgerd New Town' which is located about 70 km west of Tehran capital city of Iran. The Main goal for implementation of this building was to recognize the potentials, resolve the defects and train the labor in Iran by designing and constructing a high quality residential building according to Iranian national buildings code with the supervision of German side by using existing materials, facilities, labors and etc. The main goal of this paper is to investigate the energy performance of 'New Quality building' during one year and comparing it with a conventional building in Hashtgerd New town. The effect of different component of 'new Quality building' such as envelope insulation, windows etc. on energy demand of this building is also calculated in this paper. To achieve these goals a computerized dynamic energy simulation is performed. In order to simulate the sun radiation and shadings, wind effects, to solve the transient heat transfer equations and to calculate the heating and cooling energy demands of buildings, EnergyPlus software is utilized. According to results, a conventional building in Hashtgerd, consumes nearly 2.8 times higher energy for heating and 1.2 times higher energy for cooling than the 'New Quality Building'.

enough window area, or bedrooms windows dimensions should follow cultural restrictions. 3. The form, size and dimensions of windows of each residential unit (or nonresidential), according to its solar energy demand. The building land piece direction and location have influence on this issue and can provide more or less amount or time duration of solar radiation for a certain window in different urban building location.

### Solar Energy Efficiency in Contemporary Architectural Design of Iran's Residential Apartments, Case Study: Hashtgerd

*Mohammad Reza Razavi (University of Berlin)*

Cold cities of Iran (among them Hashtgerd) mostly located in the mountainside regions around the country. Buildings of these cities use a lot of fossil fuels for heating during cold seasons of the year, which a considerable amount of this need can be provide by solar energy via exposed walls (including windows) or other absorbing and keeping solar radiant energy methods. A factor which has influence on amount of solar energy receiving by each unit of building is the architectural design methods. Since a large number of new urban area buildings are apartments or multi unit residential houses (among them in Hashtgerd), three parameters are influential on taking solar advantages which have examined in this research: 1. The way which land piece is divided between residential units in each floor (for example two or more residential units in a piece). The range of current residential unit area is between 50 to 150 square meters, and in some land division for architectural designing, there is probability of having unit(s) that do not get enough solar energy. Briefly equilibrium establishment in receiving solar energy for all building units is a necessity that should be guaranteed by exact instructions. 2. The internal arrangement of residential unit parts, according to the function and usage of spaces, regarding the size and form of their exposed wall parts (like window). For example stair cases and washing and service spaces of a residential unit could not have



# Mediterranean Renaissance Program

## MRP-01 - Recent developments of geography of energy

*Chair: Maria Paradiso, Stan Brunn*

### Social and Environmental Impacts of U.S. Oil Boom Economies

*Stan Brunn (University of Lexington)*

During the past two years the economy, society and environmental setting of northwestern North Dakota has been significantly altered by the development of massive new oil fields open to oil exploration and extraction. According to some estimates, the state is or soon will be the second or third leading oil producing state. The small towns and rural areas in a six county area centered around Williston have been the scene of huge influxes of outside workers living in "man camps" as well as other temporary shelters for this fluid and growing population. Towns have discovered that local planning, health care, and security institutions, as well as retail establishments, have been severely challenged to cope with the new social dynamics of these "outside" workers and unforeseen harmful impacts on the region's transportation systems. The wheat raising and cattle grazing areas are now the sites of hundreds of oil derricks pumping oil for distant markets. The roads are being overburdened with heavy trucks and equipment vehicles supporting this frontier-like landscape. The boom has brought new wealth to some residents and also headaches that were unknown five years ago. The economic and social fabric of rural and small town northwestern North Dakota is being transformed daily as are the human and physical environments. This paper discusses some preliminary findings of a detailed survey we conducted of permanent and temporary residents in the region to measure the social, economic and environmental impacts of the oil boom frontier. These results will be useful to local, regional and state officials as they seek ways to effectively address issues of social and environmental risk, comprehensive local planning, excessive extraregional immigration numbers, and the preservation of local culture and livelihoods. The North Dakota example is but one of a number of "energy boom economies" in North America, and elsewhere, that calls for collaboration by social and environmental scientists.

### Microgrids for the Optimal Use of Renewable Energy in Mediterranean Countries

*David Chinarro (Universidad San Jorge), Luis Hernandez (El Centro de Desarrollo de Energías Renovables)*

The electric power system needs new conceptual paradigms that encourage better control, empower the distributed renewable energy generation, and improve the energy efficiency and the environmental stewardship. Microgrid is not only a small-scale version of the centralized electricity system. In addition, it achieves important goals as the reliability, carbon emission reduction, diversification of energy sources and cost reduction.

In addition, it is a business opportunity to produce a viable business case. A growing number of stakeholders are considering the smart microgrid as an efficient approach toward the grid modernization and an entrepreneurial job creation in the local area. This work shows that the constraint of the smart technology scope, maximizes the service quality, and optimizes the design to supply local energy to meet the exact needs of the customer being served, whether a town, university, neighborhood, business park or industrial area. The study deals with international projects focused to achieve energetic models of industrial areas in the southern Europe, also discusses the conference results celebrated to bring together experts. All issues have suggested the necessary shift towards a new model based on sustainable development, alternatives in the electricity market, and technical solutions based on self-generation of renewable energy and automatic coupling optimization between generation and demand. Mathematical models adjust production to actual demand and ensure to customers the contracted service quality at a competitive price. This justifies the need for the demand forecasting computing with an error as small as possible. Artificial Neural Networks (ANN) as a very effective tool for forecasting electricity demand. The utility of Wavelet afferent cores in the modeling of electricity demand is one of the most used tools in systems analysis in various fields (medicine, glaciology, meteorology, economics, etc.), given its efficiency to extract information from time series and estimate the prediction electricity demand, especially in the novel technique of prediction by SSA (Singular Spectrum Analysis) with Wavelets adapted. The result was calculated on historical consumption data from a working microgrid in Walqa Technology Park (Huesca, Spain). There are some arguments for cases where it is possible to quantify external factors, such as socioeconomic and weather ones, affecting demand, to apply wavelet cross-correlation for detecting the sensitivity and coherence of compared data, and thus, to improve prediction accuracy.

## MRP-02 - Towards a democratic Maghreb-Mashrek? Vers un Maghreb-Mashreq démocratique?

*Chair: Maria Paradiso, Ali Toumi*

### Géographie d'une révolution

*Toumi Ali (Université de Tunis)*

Entre décembre 2010 et janvier 2011, la Tunisie a vu se déclencher une véritable révolution contre la dictature, révolution qui annoncera en fait le début d'un printemps arabe. La Révolution Tunisienne a une géographie bien originale tant au niveau de ses différentes phases qu'à celui de ses origines. Partie des régions intérieures déshéritées, elle n'atteindra la capitale du pays que dans une seconde phase au cours de laquelle elle va s'accélérer et s'intensifier tout en se concentrant dans un espace très réduit avant de faire tomber le dictateur. Il est à constater également que la révolution tunisienne a été celle des citoyens. La ville a été en effet son principal espace catalyseur et ce, dans toutes ses phases. Plus encore, c'est la ville capitale qui, écartée lors de la première phase de déclenchement de la révolution, a fini par reprendre son rôle de leader. Et ce sont quelques unes de ses artères et de ses places principales qui se sont transformées en véritable théâtre de cette révolution dans ses phases cruciales. La présente communication tentera de dresser le décor de cette révolution à travers l'analyse de sa géographie, en fonction de ses différentes échelles tant au niveau national que sur le plan international. On essaiera également d'apporter à cette analyse quelques éclairages d'ordre socioculturel.

### Les grandes puissances et le "printemps arabe": analyse de leur rôle et de leurs enjeux en Tunisie, Libye et Egypte

*Hilaire de Prince Pokam (Université de Dschang)*

Depuis janvier 2011, un ensemble de manifestations populaires d'importance inégale se produisent dans de nombreux pays du monde arabe appelé « Printemps arabe ». Ces mouvements révolutionnaires nationaux sont aussi qualifiés de révolutions arabes, de révoltes arabes ou encore de « réveil arabe ». Outre le départ des dictateurs et l'instauration d'une démocratie, les manifestants exigent un partage des richesses qui leur assure de meilleures conditions de vie, des emplois, et la dignité. Ces mouvements sont soutenus en grande partie par la communauté internationale, principalement les grandes puissances, à l'instar des États-Unis, de la France, de la Grande Bretagne, etc. Cet article se propose, à travers l'analyse stratégique et à partir du cas tunisien, libyen et égyptien, de déterminer non seulement le rôle joué par ces grandes puissances de manière individuelle ou collective dans ce processus révolutionnaire en faveur de l'émergence de la démocratie, mais aussi et surtout les enjeux qui structurent leurs actions et interactions étant donné que ces acteurs sont des acteurs stratégiques

motivés par d'autres enjeux plus ou moins avoués sur la scène internationale. Car leurs enjeux transcendent ceux des acteurs internes dans les pays concernés, la quête et l'établissement d'une véritable démocratie.

### Empowerment and Control: The Evolving Role of ICT in the Middle East and North Africa

*Mark Wilson (Michigan University), Kenneth Corey (Michigan University)*

The Internet, social networking and mobile telephony have considerable social and political application and influence, but technologies that enable diverse views to be expressed are also a target of control. Through history social movements have actively sought out new information and communication technologies (ICT) to give voice to their concerns, and at the same time authority has adopted technology to silence, control or influence protest. Since the introduction of the printing press, ICTs have been contested technologies for the control of information. Significant in recent political and social movements is the widespread availability of the Internet and mobile phones to facilitate organization and action, which is often countered by government and opponents using the same technologies to limit voice. The growth of information and communication technologies in the Middle East and North Africa (MENA) region provides an important vehicle for communication and interaction; opportunities for both expression and control. ICT is a technological and generational challenge to the hierarchical social order of many MENA societies. The growth of social networking, such as the 2009 introduction of Facebook in Arabic, confronts governments trying to restrict networking activities. The recent experience of democracy movements in a number of MENA countries shows how communications during times of social protest and unrest can be a force for organization and mobilization. Analysis of the scale and scope of ICT use in a number of MENA countries (Tunisia, Libya, Egypt, Syria, Yemen, and Bahrain) illustrates the power available for social and political action by individuals, as well as the role and reaction of the state to ICT use. The paper argues that while ICT is a facilitator of social movements it is also subject to controls and intervention from governments seeking to limit public expression.

### North African democratic movements: The role of ICTs in Tunisia's Jasmine revolution.

*Maria Paradiso (University of Sannio)*

The paper presents and discusses the results of a field study carried out at the Italian Lampedusa island in March 2011. The research was aimed at investigating the exposure of migrants to the Internet and to communications technologies while still in their North-African countries of origin, and the influence of ICTs on recent democratic movements. Empirical work proved the use of the social networks and communications as the tipping point to break isolation, to spread information and indignation, to virally coordinate



demonstrations. However, why democratic movements happened there and in that time is due to local geography and changes in information geography.





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# Global Change & Globalisation

## GCG 01-01 - Analyzing climate change and its impacts via method combinations 1

*Chair: Jan Cermak, Jörg Bendix, Monika Steinrücke*

### Integration of Climate Change Scenario and Geographic Information System for Impact Assessment due to Enhanced Lahars Flooding under Control of Climate Change (Case Study Yogyakarta City, Indonesia)

*Andung Sekaranom (Gadjah Mada University)*

Yogyakarta City, located in the southern slope of Merapi Volcano, has a big threat comes from the volcanic hazard resulted by Merapi eruption. Merapi volcano is one of the most active volcanoes in Indonesia, where the eruption occurred for each 4-7 years. The eruption of Merapi Volcano is very well-known for its destructive and devastating power towards people and their environment. Material ejected from the eruption is mainly consists of pyroclastic material, which sometimes mixed with ash and hot gases and formed pyroclastic flow. Pyroclastic flow, which categorized as primary hazard, moves from the top of the volcano to the bottom with incredible speed, killing people and animal, and also destroying the building alongside the way. In addition to pyroclastic flow, secondary volcanic hazard comes in the form of lahars flood brings more threats to the city. Lahars flood, which is a mixture of pyroclastic materials and rainwater that falls on the top of the volcano, has caused some problems in the recent eruption in 2010. Great mass of pyroclastic materials ejected, combined with very high intensity of rainfall that rarely occurred, resulted in high volume of lahars flood. The lahars flood not only destroyed infrastructures such as bridges and dams, but also caused the loss of hundreds settlements near the riverbanks. Although the magnitude and volume of lahars flood mainly influenced by volume of pyroclastic materials, the rainfall intensity could generate higher magnitude of lahars flood. The threat of climate change, which might give influence in increased intensity and frequency of extreme rainfall, potentially caused increasing in lahars flood in future years. The purpose of this study was to determine the potential increase in rainfall intensity as a result of climate change and analyzing its impact on lahars flood. To analyze the potential impacts of climate change towards the lahars flood, climate scenarios and model development using Geographic Information System (GIS) has been applied. The results of this study indicate that rivers located on the southern slope of Merapi potentially suffered in increasing extreme rainfall, in which the increasing might reach up to 30% compared to current conditions. This condition implies that settlements located near the riverbank will gain higher threat from the lahars flood, so that mitigation and adaptation to the local communities become very important to be improved.

### Modeling the effect of climate change on water supply and the future water demand in Urumqi, NW-China

*Katharina Fricke (Heidelberg University), Yuan Yao (Heidelberg University), Olaf Bubenzer (Heidelberg University)*

In this study hydrological and socio-econometric modeling was used in order to calculate the water balance for the catchment area of Urumqi City as well as to analyse the water consumption by population and economy now and in the future. The research area is located in NW-China, on a narrow oasis belt between the semi arid Junggar Basin and the Tianshan Mountains. The development depends very much on the water supply from the mountain range, which serves as a meteorological divide and stores precipitation in snow and ice. Over the last 36 years, the area has experienced an increase of 1.7 °C in mean annual temperature. This climate change will also likely continue in the future and change the spatial and seasonal distribution of precipitation type, runoff and water supply. At the same time, Urumqi Region has experienced enormous growth of economy and population. The average GDP growth rate between 1978-2010 was 14 %, while the population increased by 2.4 % per year. Until now, the largest share of water supply has been used by agriculture which is based on irrigation. In the future, however, industrial and domestic water use will be the new drivers of water consumption the water consumption side. For the water consumption of population and economy, socio-econometric modeling was performed. The water demand was coupled with population and GDP growth and additional relevant factors (e.g. urbanization rate, sector specific quotas of water use) controlling the water demand of production, households and the ecological system. Based on national standards and urban master planning, it forecasts the factors mentioned above and the water demand is determined. The hydrological model for the catchment area was calculated raster-cell-based in a monthly time step. Various remote sensing data sets provided the input information for the model: Spatial gradients for the extrapolation of climate station data were based on TRMM and MODIS 11A1, land use and cover characteristics were classified from Landsat imagery, digital surface models and their derivatives were obtained from SRTM2 and ASTER data. A precipitation-runoff model was implemented using a physical model to calculate potential evapo-trans-piration (Penman-Monteith), on the other hand index models for the estimation of snow melt water and runoff generation were used. Based on the distribution of surface runoff and groundwater recharge, areas of 'water production' and 'consumption' now and under a changing climate could be identified. In the end, the results will be compared and the applicability of the methodology to the topic and scope is discussed in order to assess the quality of the model results. This analysis is important to evaluate and confirm the necessity and degree of measures to adapt to climate change and possibly insecure water supply on the one side as well as an increasing water demand by industry and population on the other.



## Glaciers Response and climate Change: A Case Study of Sikkim Himalaya

*Parvendra Kumar (Jawaharlal Nehru University)*

Glaciers being one of the most sensitive parameters of climate change contain huge repository of landforms that can be used as proxy data source to assess magnitude and frequency of processes over time and space. From these glacial landforms, we can reconstruct the paleoclimate i.e. temperature and precipitation. The Himalaya has the largest concentration of glacial mass outside the Polar Regions. Most of these glaciers are not easily accessible. A majority of scientific studies on the glaciers response and climate change is concentrated on the western Himalaya and not on the eastern Himalaya. The present study tried to focus on two important issues, one on the basis of past we can predict our future and can do the best planning, and second is that weather climate change is global or regional. Sikkim, with an area of 7096 km<sup>2</sup>, has a rectangular shape measuring about 114 km from north to south and 64 km from east to west. There is a great variation in altitudes from south to north (300 m to 8500 m), largest relief for any Indian state. A large number of glaciers descend from the eastern slopes of Kanchenjunga into Sikkim where snow-line is found above 5300 m.

## Modelling Future Water Availability in the Central Andes under the Climate Change Hypothesis

*Maxime Souvignet (University of Bristol), Hartmut Gaese (Institute for Technology and Resources Management in the Tropics and Subtropics), Juergen Heinrich (Universität of Leipzig)*

Arid and semiarid areas cover on third of the Earth's surface and estimates for populations living in these regions varies between 1.4 to 2.1 Billions. By 2080, three Billions of people are projected to live in such areas. Mountainous zones, hosting the headwaters of these arid and semiarid basins provide these populations with freshwater. However, these zones are very sensitive to changes in precipitation and in temperature. Consequently, shifts in the regional climate will possibly influence snowmelt processes or foster glacier retreat, and therefore durably introduce perturbation in the local hydrological processes. However, despite their substantial socio-economic relevance, variations in temperature, precipitation and discharge are poorly studied in drylands, and this although they are expected to be among the ecosystems most affected by Climate Change. The Central Andes - of interest in this study - shares all common characteristics

of arid and semiarid mountainous zones, which makes this region an ideal candidate for the investigation of the impacts of Climate Change on water resources. Consequently, the objectives of this work are i) to downscale climate projections in the region, ii) to simulate future water availability in a selected headwater catchment and, iii) discuss the uncertainties linked with the combination of such methods. Projections of future water availability were obtained combining downscaling techniques with hydrological modelling. For climate projections, two different downscaling techniques (statistical and delta method downscaling) were use and were preliminary tested for their accuracy in the region for four different GCMs (CGCM3, GDFL, HadCM3, and MRI). Subsequently, a hydrological model (SWAT) was calibrated and validated. SWAT performance statistics returned satisfactory to good results (ENS>0.71, d>0.89), showing a good agreement between observed and simulated discharge. Finally, downscaled variables (precipitation, Tmax and Tmin) were introduced in the hydrological model. Future streamflow regimes in the Upper Hurtado watershed were simulated at the time horizons 2050 and 2090. Results show a general decrease of the annual water availability. In the same vein, a one-month shift perturbation in the catchment's hydrograph is projected at both time horizons. This indicates a decrease of water availability in summer, when it is most needed. Consequently, agriculture in the region might be seriously challenged in the region. Nevertheless, although these conclusions are in agreement with observed long-term trends in the study area, it is worth discussing if all sources of uncertainties at stake (GCMs, downscaling methods, hydrological modelling) do allow enough confidence in these projections.



## GCG 01-02 - Analyzing climate change and its impacts via method combinations 2

*Chair: Jan Cermak, Jörg Bendix, Monika Steinrücke*

### Drought characteristics under current and future climates in the Jordan River region

*Tobias Törnros (Universität Heidelberg), Lucas Menzel (Universität Heidelberg)*

The Jordan River region is one of the most water scarce regions in the world. A combination of methods has been applied to characterise current and future droughts and their impact in the arid/semi-arid to sub-humid region. A well known drought index was applied first on observed precipitation and then on future projected data. Thereafter the irrigation water demand during drought was simulated. The Standardized Precipitation Index (SPI) has been applied worldwide. The drought index can be applied on different time scales (e.g. 3 or 6 months) to assess among others meteorological and hydrological droughts. In this study, the index was applied on spatially interpolated precipitation (1x1 km) with the aim to characterise current and future agricultural droughts. To confirm SPIs performance and to identify the most suitable timescale, correlation analyses were conducted with the Normalized Difference Vegetation Index (NDVI) received from the Advanced Very High Resolution Radiometer (AVHRR). NDVI was used as a spatial estimation of the green biomass. It was assumed that if SPI and the vegetation index would be correlated for the overlapping time period 1982-2002, then SPI would be suitable to assess agricultural droughts. Correlation analyses were conducted for several land-uses, multiple SPI-time scales and for each month of the year. It was shown that in overall, the 6-month SPI had the best performance. The correlation between SPI and NDVI was highest during vegetation peak. Since SPI could explain the inter-annual variation of NDVI, it was assumed that it could be used also under future conditions. SPI was applied on three climate scenarios based on the IPCC emission scenario A1B. The drought index was computed for the years 1961-2060 and thereafter evaluated according to a reference (1961-1990) and future time period (2031-2060). The average drought length during the reference period was 9.5 months. Under future conditions, the average drought is expected to be 1.5 months longer. Future droughts are further expected to become more severe. The number of moderate droughts is expected to slightly decrease and the severe droughts are expected to become more common. The number of extreme droughts is expected to almost double. To better understand

the hydrological impact of the more intense droughts, the physical based hydrological model TRAIN was applied. The model is able to simulate a potential value of the irrigation water demand (IWD). The IWD was simulated for average conditions (1961-1990) and during the longest drought within the reference and future time period. For the years 1961-1990, the annual IWD was 80 mm or about 1810 million m of water for the whole study region. The annual IWD during the longest current and future drought was 122 mm (2770 million m) and 174 mm (3950 million m), respectively. Compared to the average conditions, this implies to an increased demand of 53 and 118%, respectively.

### Impact of climate change on water availability of beech stands in Rhineland-Palatinate, Germany

*Gayane Grigoryan (Universität Trier), Markus Casper (Universität Trier), Jürgen Gauer (Zentralstelle der Forstverwaltung), Philipp Reiter (Forschungsanstalt für Waldökologie und Forstwirtschaft)*

In order to find best silvicultural decisions, foresters need to know how far climate change will influence the water availability of forest sites in the next 50 to 100 years. This knowledge is crucial because water availability mainly determines biomass production of tree species. The foresters in Rhineland-Palatinate, Germany, already have an approach for determining the water availability of forest sites, but it is assumed that under fast changing climate conditions the current (static) approach will be inappropriate. For this reason, the aim of the present study is to find a new approach which objectively detects the impact of climate change on water availability of forest sites; exemplarily beech sites. First of all, the study area is divided into characteristic landscapes using a geographic information system. These landscapes are classified as a function of mean annual precipitation, mean annual temperature, exposition, slope and available water capacity. They represent a bandwidth of potential beech sites in Rhineland-Palatinate. In the following step, hydrological simulations for each of the resulting 156 landscapes are run on plot scale with observed climate data, in order to mimic the hydrological cycle of potential beech sites in Rhineland-Palatinate. Afterwards, simulations for the beech sites are run with projected climate data (WETTREG). After this, the results of the simulations are statistically analysed in regard to water availability and transferred to the 156 landscapes. Based on this, we produce maps which show today's and possible future mean water availability of beech sites in Rhineland-Palatinate. For the near future (2021-2050) the changes of water availability are small, with the biggest changes on the beech sites with small available water capacity. The results for the far

future (2071-2100) reveal considerably larger changes for the whole study area. The largest decrease is expected for today's beech sites with low water availability as well as for submontane beech sites. In summary, the new model-based approach allows detecting the non-linear impact of climate change on water availability of the simulated beech sites. Future work will focus on additional plausibility checks of the simulated water availability. These checks include e.g. the use of remotely-sensed data and simulations with additional time series of climate projections.

### Analyzing the impact of climate change on wheat phenology in Iran

*Elham Rahmani (University of Bonn), Andreas Hense (University of Bonn), Jan Keller (University of Bonn), Petra Friederichs (University of Bonn)*

This study will present a refined model of wheat phenology to be used in regional climate downscaling to study the effects of climate change on wheat phenology and yield in Iran. Local temperature variability being an important factor for phenology is very well represented in the ERA-40 data set. This was found by a regression analysis between ERA-40 grid point based near surface temperatures as predictor and long term observations of 45 years of daily temperatures at climatic stations covering whole Iran as predictand. The results indicate high significant correlations and correlation structures between ERA-40 calculated temperature data and Iran observed temperature data on monthly and daily scales. The seasonality is pronounced and needs to be incorporated into the statistical model. Spatial structures or modes of large scale temperature are well defined in both seasons. These form the basis for the downscaling model by projecting large scale near surface temperature fields from ERA-40 and later from global climate models onto these modes and regressing the amplitude with the local observations. In a second step wheat phenology (ripening date) is compared to GDD (Growing Degree Days) based on the FAO model for several Iranian stations. Instead of a classical regression analysis we took a probabilistic view of the time to ripening. We used probabilistic models from survival analysis to model the probability that after a certain time after sowing the probability of ripening is large. A linear regression between GDD as predictor and the parameters of several classical survival functions as predictand was developed. To assess the probability forecasts, we considered two scores; the Ignorance score (IGN) and continuous ranked probability score (CRPS). We achieved the best model using an exponential distribution for the time to ripening. In the next step we will combine the ERA-40 grid points values and the

correlation modes to develop an optimal wheat phenology model for large scale reanalysis data or global climate models.

### The seasonal transition of monsoon in Bangladesh and its association with atmospheric circulation

*Roxana Hoque (Tokyo Metropolitan University)*

This study presents comprehensive aspects of climatological characteristics of the monsoon seasonal transitions associated with the atmospheric circulation in Bangladesh, focusing on the pre-monsoon, monsoon and post monsoon seasons. In addition, the onset and withdrawal phases were examined using pentad and 20-day mean wind, moisture flux, precipitable water and rainfall distributions. These were obtained from Japanese 25-year re-analysis data from 1979 to 2003 and rainfall data from the Bangladesh Meteorological Department (BMD) from 1948 to 2008. Analysis of the pentad and 20-day mean the horizontal wind at 850 hPa, the total column water vapor flux, the precipitable water and rainfall distribution around Bangladesh showed that, the onset and withdrawal of the summer monsoon seasons in Bangladesh occurred between Pentad 31 (May 31-June 4: P31) and P32 (June 5-9) and between P56 (October 3-7) and P57 (October 8-12), respectively. It is worth-noting that during pre-monsoon, southwesterlies wind, and water vapor flux zones are established around (24-29°N, 84-93°E), in P15-18 (March 12-31) over India and Bangladesh. At this time, the precipitable water distribution is found increasing. The rainfall distribution map also has shown obvious change in P15-18, at this time pre-monsoon rainfall observed northeast region at Sylhet station. These criteria indicate that precipitation gradually developing over land and the Bay of Bengal for the monsoon onset process. The dramatic changes have occurred during the monsoon onset period, between P31 and P32. At this time southerly wind, water vapor flux, and precipitable water are shown drastically stronger over the Bay of Bengal and Bangladesh. Drastic changes also have shown in rainfall distribution maps in P31-32, when abrupt increases of precipitation occur. Remarkable changes also have shown between P56 and P57, which is regarded as withdrawal of summer monsoon. At this time southwesterly flow vanished not only in and around Bangladesh, but also in almost the whole Indian Ocean and Indian subcontinent. Eventually the rainfall distribution maps have showed decrease in rainfall in P56-57. The annual cycle of 5-day mean rainfall has shown heavy rainfall occurs in the northeast region (Sylhet) during the pre-monsoon season and in the southeast region (Teknaf) during the monsoon season. The central west region (Ishurdi) receives relatively less rainfall in all



seasons. Cluster analysis indicates that seasonal march of pentad mean precipitation at Sylhet is very unique pattern. Analysis of horizontal U and V-wind components, it has revealed that the V-wind component clearly defines the monsoon onset and withdrawal and very clearly identifies the conditions of pre-monsoon, monsoon, post-monsoon and winter over Bangladesh.

## GCG 01-03 - Analyzing climate change and its impacts via method combinations 3

*Chair: Jan Cermak, Jörg Bendix, Monika Steinrücke*

### Dynamics of northern treeline in Russia as indicator of climate change: Combining remote sensing and ground research

*Olga Tutubalina (Moscow State University)*

The dynamics of the northern forest-tundra transition zone is one of the indicators of climate change. This paper reviews the experience of research in the forest-tundra ecotone carried out within the IPY core project PPS Arctic by scientists of the Faculty of Geography, Moscow State University. The forest-tundra transition in Russia is formed by various tree species. Regional differences and variations in data availability led to several research approaches. Initially we tried to use topographic maps of the 1960s and 1980s (1:25,000 and 1:50,000 series) because they exist for the whole of Russia. Unfortunately, a detailed examination of maps for Kola Peninsula has demonstrated that most identified changes were due to map errors. Therefore we switched to change detection at local representative test sites. In Kola Peninsula these were Kanentiaiv (hilly plain, 190-350 m a.s.l., more maritime, unpolluted), Khibiny mountains (200-1,200 m a.s.l., more continental, unpolluted) and Monchegorsk (200-700 m a.s.l., more continental, heavily polluted). For Kanentiaiv and Khibiny we compared airphotos of the 1950-1960s and very high resolution satellite images of the 2000s. We identified, and validated by field data, the altitudinal treeline advance of up to 30 m in Khibiny and advance of dwarf shrub tundra to lichen tundra in Kanentiaiv. Changes in Khibiny are supposedly due to the increase of winter precipitation. At Monchegorsk, a comparison of a vegetation map of 1932 with field data revealed a pollution-induced retreat of altitudinal limit of living trees by over 200 m (i.e. overriding the climate change impact). No old airphotos or maps were available for the North-Central Siberia sites. In general, the approach has been successful for local sites, but is not applicable to large areas, due to high costs and data gaps. The next step was to use imagery from Landsat satellites. We found that the image resolution (30 m) was not sufficient for representation of ecotone structure changes. However, comparison of vegetation index (NDVI) images has worked successfully for a pair of multitemporal Landsat TM images over Kanentiaiv area, and identified regional changes, confirmed by more detailed studies. Future research should include investigation of more local test sites to provide a comprehensive picture of

species- and environment-dependent dynamics and its connection to climate change. The increased availability of satellite hyperspectral imagery (such as EO-1 Hyperion, 30 m spatial resolution) might enable, in the future, the analysis of ecotone dynamics through spectral unmixing. To support such research, detailed ground studies of key sites will be necessary to provide baseline data. This study has been financially supported by the Research Council of Norway (grants 185023/S50 and 176065/S30), the Russian Leading Science Schools Programme, and Russian Scientific Educational Centres programme (grant 14.740.11.0200).

### Statistical Downscaling of Regional Climate Models in Bulgarian Mountains

*Petar Nozharov (Bulgarian Academy of Sciences)*

Air temperature and precipitation data from three high mountainous Bulgarian stations were used. A total of 13 Regional Climate Models (RCMs) for air temperatures and 12 RCMs for precipitation, included in ENSEMBLES project, were checked. Air temperature and precipitation outputs of the IPCC scenario SRES A1B were compared with actually observed values. RCMs with the

### Towards integrated climate change vulnerability assessments

*Anne Holsten (Potsdam Institute for Climate Impact Research (PIK)), Carsten Walther (Potsdam Institute for Climate Impact Research (PIK)), Jürgen P. Kropp (Potsdam Institute for Climate Impact Research (PIK))*

While sectoral vulnerability assessments have become common usage in the climate change field, integrated and standardized approaches are still rare. However, comprehensive knowledge is demanded to concretize and prioritize adaptation strategies, which are currently being drafted at national and state levels. We present a multisectoral analysis where sensitivity is quantified by the physical, social, environmental and economic dimension by means of tailor made approaches for specific sectors. These are directly related to relevant exposure variables defined as relative climatic changes until the end of this century. Aggregation of the sector specific impacts, comprising both sensitivity and exposure, lead to integrated impact measures. These are then combined with the generic adaptive capacity. We exemplify our methodology for municipalities in the German state North Rhine-Westphalia for two regional climate models. Our approach allows for the integrated assessment, while at the same time enabling a sector-specific perspective of risk analysis. However,

various limitations remain, especially regarding the aggregation across sectors. We emphasize the need to consider the aim and methodological advantages and disadvantages before applying any vulnerability assessment.

### **Towards a methodology to assess the vulnerability of landscape types and their heritage to climate change in Flanders (Belgium)**

*Tim Van Beveren (Ghent University), Lien Dupont (Ghent University), Veerle Van Eetvelde (Ghent University)*

Changes in temperature, precipitation, evaporation and storm events are primary effects of climate change. These cause secondary effects like flooding and drought, which in turn induce tertiary effects on nature and agriculture, e.g. the drought-related extinction of species. The combination of these effects can change landscapes drastically. So far, most studies on the impact of climate change have been sector-oriented and focused on a country-scale. In addition, the impact of climate change on landscapes and their heritage values on a regional and local level has rarely been analysed, although the chain of effects, combined with adaptation and mitigation measures, is causing changes on the landscape pattern and the related functions and services. In previous research, a landscape typology of the present-day landscapes of Flanders has been set up as a reference base, determined by soil properties, land use, elevation and landscape heterogeneity, which are sensitive parameters likely to be affected by climate change. The aim of this paper is to set up a methodology (1) to judge the sensitivity of the landscape types to potentially increasing soil erosion, drought and floods at the regional scale level, and (2) to assess the vulnerability of landscape heritage at the local level. This overall assessment is needed to formulate spatial planning strategies, including future adaptation and mitigation measures to reinforce the resilience of the different landscapes types. The method used to determine the sensitivity of landscape types, combines GIS, spatial and statistical analysis and multi criteria evaluation. Data sources indicating potential soil erosion, drought and floods were selected and reclassified in the GIS-database; variables indicative for environmental changes were derived. Each variable was attributed a weight, calculated by an Analytic Hierarchy Process (Saaty). The weight is depending on the landscape type, since the properties of the types (e.g. soil, topography, amount of build up and paved areas) will be influenced differently by the environmental variables. As a result, we obtained a sensitivity index (very low to very high) per landscape type. For the calculation of the vulnerability maps of landscape heritage and the compilation of adaptation maps at the local scale, a multi criteria evaluation was

compiled in a GIS. Therefore, the sensitivity maps were overlaid with heritage maps (the Landscape Atlas of Flanders) to determine their vulnerability to soil erosion, flooding and drought. In response to this vulnerability, we produced corresponding adaptation maps for case studies. These case studies were selected in different landscape regions to assess the solidity and robustly of the methodology: the Flanders coastal landscape, the basin of the river Dender, the heterogeneous landscape of the sandy region of the 'Kempen' and the hilly loamy agricultural landscapes of 'Haspengouw'.

## GCG 02-01 - Bridging the gap? Scope and limitations of practice-oriented development studies

*Chair: Juliane Dame, Thomas Lennartz*

### Contribution from the scientific community to the Brazilian environmental policy regarding the climate issue

*Teresa da-Silva-Rosa (Universidade Vila Velha), Gustavo F. Seda (UVV/NEUS-Center for Urban and Socio-Environmental Studies), Priscila Z. Guio (UVV/NEUS-Center for Urban and Socio-Environmental Studies), Joao Paulo Almeida (UVV/NEUS-Center for Urban and Socio-Environmental Studies), Renato Maluf (Universidade Federal Rural do Rio de Janeiro)*

The emission of greenhouse gases related to the current development model has compromised the sustainability of the planet and reinforced the socio-environmental vulnerability of populations. This confirms the socio dimension of climate change (CC) and its complex and interdisciplinary character. The mitigation and adaptation measures needed to handle climatic events demand an environmentally-based rationality, placing upon society the challenge of sustainability and of new environmental governance. Aiming at making these measures more effective, the path of constructing a dialogue between the realm of science and that of politics appears as an alternative that should be explored. In this context, the role of the knowledge produced in different scientific areas cannot be underestimated. The scientific community, as knowledge producer and as an actor in the environmental governance, can contribute towards providing the base for public policies, as well as to better inform society in order to lessen vulnerability and help communities facing CC. This paper discusses the contribution of the knowledge produced in different areas in Brazil when a theme as CC is addressed seeing that a dialogue between different areas of knowledge must be prioritized. In order to map the production, the keyword 'climate change' has been used since to 2009 to identify the research groups in Brazil. In April 2011, 146 groups were identified, pointing to a significant increase when compared to the 58 groups identified in 2009. Despite greater interest from groups in the area of SHS, the area of Exact Sciences (ES) remains as the one with the highest representation. The production by the leaders of these groups was categorized using Lattes Brazilian database of academic curriculums, and, then, bibliographical online database. The categories showing the highest number of publications were those which do not presuppose a social concern: 'Agriculture' or 'Water'. Those categories with a social character were

secondary - adaptation, health, vulnerability and housing. 'Amazon' is the most studied biome, while the Atlantic Forest is almost completely ignored. The publications which were identified will be made available online in order to facilitate access to knowledge about the theme. It was observed that (1) fragmented knowledge demonstrates lack of communication between the different areas of science; (2) the recent interest in the climate issue by the SHS compromises its contribution towards understanding CC within a social context. These observations may have implications for decision-making processes, for the design of public policies inadequate to tackle the climate issue, and for the use of knowledge by actors participating in environmental governance, as in the case of the civil society, which could be compromised.

### From pilot areas to global awareness: Local flood early warning systems in the Philippines

*Johannes Anhorn (Universität Heidelberg)*

The creation of the United Nations International Strategy for Disaster Reduction (ISDR) and the incremental implementation of the Hyogo Framework of Action (HFA) shows that Disaster Risk Management (DRM) is increasingly recognised by the "development business". The concept has developed into a broad approach used in several fields of action not only with respect to "natural" disasters, but also regarding a variety of economic and ecological issues. In the light of this evolution community-based early warning systems gained more attention and raised the need for convenient participatory approaches. This paper provides insights into a case study of Local Flood Early Warning Systems (LFEWS) in the Philippines, which were implemented by the German development cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit, GIZ) and local authorities in the Eastern Visayas. In an extended partnership between the German Aerospace Agency (DLR), Canadian Space Agency (CAS) and GIZ the capabilities of high resolution Synthetic Aperture Radar (SAR) to provide reliable flood extent maps were examined. This was done using field measurements, near-flood-peak SAR data acquisition and the development of an enhanced semi-automatic flood detection algorithm. The advantages of this international partnership were expected to be: better access to ground truth data for the satellite data provider, elaboration of capabilities for near-real-time (NRT) flood processing as a service tool requested by international agencies or networks (e.g. SAFER, ECHO, UN-OCHA, MapAction), and accurate measurement of the flood extent as basis for hazard-, risk assessment or evacuation routing for DRM implementing institutions. Thus to

enhance the positive outcomes of FEWS by narrowing the gap between (political) practitioners, researchers, and (data) service providers at their interrelated levels. The paper gives a short overview of the SAR processing results and shows how effective knowledge transfer can be realized. Such flood inundation maps help local communities to improve the early warning chain and minimize their risks. The transfer of highly sophisticated technology remains challenging if up-scaling from pilot areas to other regions as well as "down-scaling" from international partnership to local authorities is done. One key step is to carefully balance the expectations in an international cooperation to gain good results.

### **Dealing with the Requirement of Producing Exploitable Knowledge – Differences Between Social and Natural Sciences. Case Study in An Argentinean Peripheral Research Institute**

*Angelika Hubl (Universität Frankfurt)*

For some time past there is a global debate about today's mission of universities and research institutions as providers of education, research and knowledge transfer (third mission). Especially the future orientation of these institutions is hard debated. They have to justify themselves as providers of social benefits for society and economy. Due to globalization this debate was spread from Europe and the United States to emerging and developing countries in the global south. As one of Latin America's economically leading countries Argentina as well takes place in the worldwide discussion. Argentina is a very centralistic state. Therefore the offer and reputation of universities and research institutions is very centralistic as well. That's why especially institutions in rural areas have to justify themselves exceedingly and have to struggle for reputation and funding. The case study will focus on a research institute and its close by university in the north-east of Argentina, which is a region of extremes and contrasts. Especially in population aspects it is one of the regions of Argentina with the highest social inequality and very diverse habitants like little farmers, indigenous people and marginalized people. Since this region is so peripheral, the research institute's task to vindicate itself is very important. The goal of the case study is to examine how the knowledge transfer at the Argentinean research institute CONICET Tucumán works, how the institution and the researchers deal with the requirement of producing exploitable knowledge and what are thereby the differences between social and natural sciences. The field studies will be carried out between February 2012 and April 2012 at CONICET Tucumán. As method semi-structured interviews with the management of the CONICET Tucumán, the

heads of the various research groups, and particularly with selected scientists of innovative research areas in the sense of knowledge transfer will be conducted. The interviews will be evaluated interpretative-reductively. The hypothesis that there are significant differences between social and natural sciences in dealing with the requirement of producing exploitable knowledge will be examined during the field study and will be extended with new insights about the role of research areas for knowledge transfer and adaption in this institute. Therefore it will be an important Latin American case study as an example for dealing with the requirement of producing exploitable knowledge in peripheral regions. Results will be available in June and will be ready to be presented in my master's thesis and at ICG in August 2012.

### **ForUm – Networking and cooperation for Urban Futures**

*Christine Knie (Universität zu Köln), Eni Harmayani (Gadjah Mada University)*

ForUm – "Forum for Urban Futures" – an international network of urban experts under the leadership of the Department of Geography, University of Cologne, Germany. The program focuses on an active contribution to the North-South-South dialogue in the field of worldwide urbanisation and provides a forum for exchange on concepts, research and application of Southeast Asian and German universities, institutions, private sector, civil society's groups, including local NGOs and non-university partners ([www.geographie.uni-koeln.de/projects/urban-futures](http://www.geographie.uni-koeln.de/projects/urban-futures)). Experts from nine Southeast Asian countries and Germany are sharing their experiences and expertise, and discuss challenges and conflicts of urban development. The network is consisting of scientists and researchers as well as practitioners. At present about 150 active members of 9 countries in Asia as well as Germany belong to the network. There is a huge potential of practical experiences and scientific knowledge and we would like to discuss the challenge of common practice-oriented studies as well as the implementation of scientific concepts. The presentation will give examples of good practice and introduce new approaches of interdisciplinary stakeholder oriented projects with a special focus on a recent food safety programme at the Gadjah Mada University in Yogyakarta. Food safety is one of the aspects that give impact on food security in any country. Food safety issues refer to the continued globalization of the food supply, the impact of international travel and tourism, and the impact of food-borne diseases. Food safety crisis has resulted in human morbidity and mortalities, trade disruptions and huge economic losses for all concerned (FAO, 2009). Food-borne illnesses adversely affect the health of millions of people every year. The increasing global demand





for food safety standard has raised concern to local food industries. In attempt to achieve the global food safety standard, Center for Food and Nutrition Studies, Gadjah Mada University has conducted a project to assist small food industries and street vendors in improving their food safety standards. This project involves academicians, local governments, small food industry owners, as well as the local community leaders. The project was conducted in four steps: 1) mapping the existing condition; 2) conducting a workshop to discuss the findings with local governments and the food industry owners; 3) training on food safety and good manufacturing practices; 4) assisting the local small food industries to establish better and safer food processing. The result indicated that this collaborative project was successfully done in achieving its goal when all the stakeholders share a common goal and perspective, and establish a mutual dialogue and directly involve in the execution of the activities.

## GCG 03-01 - Central Asian ecosystems under water scarcity 1

*Chair: Bernd Cyffka, Yumiti Halike*

### Water scarcity and environmental change in northern Mongolia: Findings from field research in the Khentii mountains

*Lucas Menzel (Universität Heidelberg), Stefanie Minderlein (Universität Heidelberg), Benjamin Kopp (Universität Heidelberg)*

Within the project 'Integrated Water Resources Management in Central Asia - Model Region Mongolia (MoMo)' the components of the water balance and their governing factors are studied in the Sugnugur valley, a sub-catchment of the Kharaa river basin in the Khentii mountains, northern Mongolia. The investigations aim at improving our knowledge about the spatio-temporal variations of water availability in a semi-arid environment as well as the impacts of environmental change on hydrological processes and water resources. The Sugnugur was selected as a research basin since it is situated in the transition belt between the taiga and steppe zones and therefore includes a variety of environmental factors, e.g. snow storage, permafrost occurrence or forest distribution, which determine hydrological processes, water quality and water availability. Parts of the region represent a pristine boreal and mountain environment. It is assumed that they act as the major freshwater generating parts of the catchment. However, there are several indicators of direct and indirect human impacts on the ecosystem, first of all human-caused forest fires, leaving extensive areas with burned forest. Observed warming trends may also amplify the degradation of the discontinuous permafrost in the region. Both developments will undoubtedly have consequences for water retention in the headwaters and thus water availability in the dry steppe zone. For a better understanding of the environmental factors and their impact on freshwater generating processes, a small network of hydrological, meteorological and ecological observation sites is in operation in the Sugnugur basin since autumn 2010. It includes a main hydro-meteorological station at the entrance of the Sugnugur valley. In the upper parts of the catchment, three soil moisture transects were installed on dry, south-exposed, forested north exposed and burnt north exposed hill slopes. Two weather stations, river gauges and a high-mountain precipitation gauge complete the observation network. During summer 2011, an intensive field campaign was carried out, including investigations on water infiltration characteristics in soils, the spatial variation of soil temperatures

or the determination of the Leaf Area Index of dominating vegetation cover. The analysis of the data and processes is envisaged to further develop the hydrological model TRAIN which in turn will be applied to study the impact of environmental change on the water systems in neighbouring catchments, including the dry steppe area. Our contribution will present first results from the described activities and investigations.

### Integrated Water Resources Management in a water-scarce environment: Experiences from the Kharaa Catchment, Mongolia

*Daniel Karthe (UFZ), Dietrich Borchardt (UFZ)*

Located to the north of the Mongolian capital Ulanbataar, the Kharaa catchment covers an area of around 15.000 km<sup>2</sup>. The region is characterized by a highly continental climate with warm summers, extremely cold winters and low rainfall (about 300 mm annually). The industrial city of Darkhan in the north of the catchment contrasts sharply with the largely rural character of the region and results into highly disparate pattern of water usage: Surface and ground water generation occurs largely in the upper part of the catchment, whereas water withdrawals are greatest in the lower catchment. The project presented (IWRM MoMo - Integrated Water Resources Management / Model Region Mongolia) aims at the development and implementation of an integrated water resources management for the Kharaa catchment in particular and an investigation of its transferability to other parts of Mongolia and Central Asia in general. For the study region, several key problems have to be addressed: - naturally limited water resources which may decrease due to global change; - degradation of natural water bodies and water contamination due to anthropogenic influences, particularly mining and agriculture; - insufficient infrastructures for water supply and wastewater disposal; - insufficient institutional capacities and legal framework. Spatial disparities related to the present and predicted availability, state and usage of natural water resources further complicate the situation. In this light, a transdisciplinary approach is indicated not only for the investigation of the scientific basis but also the implementation of an integrated water resources management aiming at the protection of water resources and the preservation of the ecological functions of water bodies. Ultimately, such measures would also contribute towards improving local living conditions.

### Transnational upstream and downstream water resource analysis at the Zarafshon River with special consideration of land use and climate change influences

*Michael Groll (Philipps-Universität Marburg), Christian Opp (Philipps-Universität Marburg), Rashid Kulmatov (University of Uzbekistan), Marieke Lewanzik (Philipps-Universität Marburg), Inom Normatov (Academy of Sciences Republic of Tajikistan)*

The Central Asian countries are particularly affected by the global climate change. The cultural and economic centers in this mostly arid region have to rely solely on the water resources of the large streams Amu-Darya and Syr-Darya. Both streams glaciated headwater regions already today respond very sensitive to the increasing air temperature. In the course of the expected climate change, the safekeeping of a sufficient water availability and the sustainable water usage will pose the most important challenge for the Central Asian countries. While the Amu-Darya and the Syr-Darya are well analyzed in terms of their water quality and quantity since Soviet times, the major tributaries have moved out of the focus of the scientific research since the political transformation and the breakdown of the water quality measurement network in the early 1990s. Today, only selective data, if at all, are available for these important rivers. The WAZA CARE project - Water quality and quantity analyses in the transboundary Zarafshon River basin - Capacity building and Research for sustainability (financed by the German BMBF) was conducting essential water quality research at the transnational Zarafshon River in Tajikistan and Uzbekistan in order to fill the existing gap of knowledge for this major tributary of the Amu-Darya and lifeline of the silk road centers Samarkand and Bukhara. The Zarafshon is characterized by significant seasonal fluctuations of the discharge and the water quality. The latter is heavily influenced by inputs from the ore processing complexes, intensive irrigation farming, industrial and domestic waste waters and extensive water withdrawals. The resulting problems of the water availability and quality as well as the impaired functionality (e.g. self-purification abilities or habitat configuration) of the river and its riparian zone are affecting foremost the middle and lower reaches in the Uzbek lowlands. Central aim of the WAZA CARE project was the transnational current state analysis of the water resources as a first step on a way towards an integrated water resources management. This presentation shows selected results from the collected data and own measurements. It gives an outlook of the planned future research under special consideration of the climate change and the very different interests of water users in the upstream and downstream sections of the Zarafshon River.

### Water consumption of agriculture and natural ecosystems along the Tarim River, China

*Niels Thevs (University of Greifswald), Ahemaitijiang Rouzi (University of Greifswald), Christine Kubal (University of Greifswald)*

The man-made ecosystems, mainly cotton under irrigation, and the natural ecosystems in the arid lowlands of Central Asia depend on river water as main water source. Under the arid climate with annual precipitation of less than 100 mm, all agriculture depends on irrigation. Irrigation water mainly is diverted from the rivers, like the Tarim, Amu Darya, or Syr Darya. The natural ecosystems, i.e. riparian forests, grasslands, and shrub vegetation, depend on the groundwater for their water supply. The groundwater is recharged by the rivers. The sources of the rivers are melting water and precipitation in the mountain regions. The Tarim River's headwaters are located in the Tianshan Mountains. Due to climate change and increasing area under irrigation, the water runoff into the downstream parts of the river systems decreases and becomes more and more unreliable for water users. Against this background it is crucial to understand the water consumed by irrigated land and natural ecosystems along such rivers, in order to point out needs for environmental flows or potential for water saving. Along the Tarim River evapo-transpiration (ET) maps were made based on MODIS satellite images from 2009 and 2010. The maps were made after the approach from Senay et al. (2007), which is based on the model of Bastiaanssen et al. (2005). The annual ET of cotton ranges from 700 mm to 1100 mm. At the middle and lower reaches of the Tarim River crop failure is frequent due to water shortage. The riparian forests have an annual ET of 350 mm to 700 mm. Natural stands of *Apocynum pictum* show an annual ET of 200 mm to 300 mm. *Apocynum pictum* is a natural plant along the Tarim River, which can be used as medicinal and fibre plant. Under the conditions of water shortage along the downstream of the Tarim River natural plants like *Apocynum pictum* could provide water saving utilization options. References: Bastiaanssen, W. G. M.; Noordman, E. J. M.; Pelgrum, H.; Davids, G.; Thoreson, B. P.; Allen, R. G. (2005): SEBAL Model with remotely sensed data to improve water resources management under actual field conditions. *Journal of Irrigation and Drainage Engineering*, Jan./Feb.: 85-93. Senay, G. B.; Budde, M.; Verdin, J. P.; Melesse, A. M. (2007): A coupled remote sensing and simplified surface energy balance approach to estimate actual evapotranspiration from irrigated fields. *Sensors*, 7: 979-1000.

## GCG 03-02 - Central Asian ecosystems under water scarcity 2

*Chair: Bernd Cyffka, Yumiti Halike*

### Global Change Impacts on Central Asian water resources

*Tim aus der Beek (Kassel University), Marcus Malsy (Kassel University)*

Large parts of Central Asia feature arid to semi-arid conditions and are therefore of high interest for hydrological studies, as water scarcity often limits the development of human, ecological, and industrial resources. Within this integrated model study the hydrological and water use model WaterGAP3 is being applied to all river basins located in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Southern Russia, North-Western China, and Mongolia in five arc minutes spatial resolution (~ 6 x 9 km per grid cell). First of all, water abstractions for the sectors households, irrigation, livestock, manufacturing industries, and electricity production are being computed and fed into the hydrological module of WaterGAP3. Then, water fluxes such as evapotranspiration, soil moisture and routed river runoff, are being modelled for each Central Asian grid cell. The performance of the model is then being evaluated by comparing modelled with observed river runoff for the period 1971 to 2000, which yields good agreement. Also, the Central Asian water towers in the mountainous regions, such as the Pamir, Tien Shan, and Altai Ranges are well depicted by WaterGAP3 with mean annual water availabilities above 200mm. Similar, arid regions, such as the Gobi and Karakum deserts with values less than 10mm are also realistically represented by the model. Human water impacts, especially from the irrigation sector, are high in the Amu and Syr Darya river basins, as well as near densely settled areas. Following the successful validation of the model results, transient bias-corrected Climate Change scenarios are being applied to estimate their impact on the water resources of Central Asia. Therefore, precipitation and air temperature output from the Global Circulation Models (GCMs) CNRM-CM3, ECHAM5, and IPSL-CM4 for the SRES-IPCC scenarios A2 and B1 are being used as drivers for WaterGAP3 to calculate potential changes in future local water resources. Therefore, daily water balances are being calculated for each scenario-GCM combination until the year 2100. Generally, an increase in water availability can be derived for Chinese, Eastern Russian, and Southern Tajikistani river basins, whereas a decrease in water availability can be observed in Northern Kazakhstan and Mongolia, Western Russia, and Eastern Uzbekistan.

### Patterns of the Balkhash Lake level change and its climatic correlates during 1992-2010

*Pavel Propastin (University of Goettingen), Martin Kappas (University of Goettingen)*

The variation of the Balkhash Lake water level over the period 1992-2010 and its relationship with climate dynamics were investigated using satellite altimetry data and meteorological records from climate stations located in the lake catchment basin. The altimetry-derived water level demonstrated a general rise with a mean value of 8.1 cm/yr achieving in July 2005 a maximum value of 342.52 m. We found that the rise of the Balkhash Lake water level was accompanied by an overall upward trend in precipitation and temperature in the catchment basin during the study period. A strong increase of winter and spring temperature was the main contributor to the general upward temperature trend, whereas a significant change of summer and autumn precipitation was the major contributor to the annual precipitation trend. Both precipitation and temperature did not increase uniformly across the entire basin. The results showed that the most pronounced climate change occurred in the mountainous part (> 2000 m above sea level) of the basin, in the upper reaches of the Ili-River, the main contributor to the Balkhash Lake. Statistical analysis indicated that the Balkhash Lake water level is strongly correlated with both precipitation and temperature. Correlations were investigated for three altitudinal strata (below 1000 m, 1000-2000 m, and above 2000 m) corresponding to the lower, middle, and upper reaches of the River Ili. Best correlations were obtained for the upper reaches of the Ili River indicating that changing snow cover and glacier equilibrium are the main factors controlling the trend in the Balkhash Lake water level.

### Snow cover variability in Central Asia during the last decade derived from MODIS

*Andreas Dietz (University of Würzburg), Christopher Conrad (University of Würzburg), Claudia Kuenzer (German Aerospace Center)*

In Central Asia which is characterized by a very dry strongly continental climate water is scarce but highly required for irrigation, power generation, and even pasture. Extensive areas receive less than 200mm precipitation per year generally occurring during winter and spring season in the form of snow. High amounts of snow falling every year in the mountainous regions are essential basis for producing crops along the river systems in the region. But snow cover is susceptible to changes in temperature and precipitation during these seasons

and is therefore reported to be affected by climate change (Foster 1996, Peng 2010). Long term changes in snow cover duration and amount may have profound consequences for the entire region. The vast area and the relatively sparsely distributed climate station network make a detailed observation of these changes difficult. Using remotely sensed data can help to monitor snow cover development at both, high temporal and high spatial resolution. The MODIS (Moderate Resolution Imaging Spectroradiometer) sensor aboard the Terra and Aqua satellites fulfils these requirements, providing two observations per day with a spatial resolution of ~ 500m per pixel. MODIS maps the Earth surface in 36 spectral channels, and offers the opportunity to map snow cover with a reported accuracy of more than 90% under cloud free conditions (Hall 2007). As during winter and early spring clouds often obscure more than 60% of whole Central Asia, the MODIS snow cover products lack the ability to provide an estimation of the actual snow cover condition. We used four successive steps described by Gafurov (2009) and Parajka (2008, 2010) to estimate snow cover conditions below clouds and produced a cloud-free time series of daily data for the years 2000 to 2011 for whole Central Asia. In a next step, snow cover duration information products for each hydrological year were generated which allowed the derivation of further products like mean snow cover duration and anomalies for each year. Onset of snow cover season as well as the beginning of the melting process was examined additionally to snow cover duration and percentage of snow covered area. Furthermore, the analysis that was first applied to all of Central Asia was then performed for single hydrological catchments like Amu Darya and Syr Darya - also including processing of single subcatchments. On this scale, a differentiation between mountainous regions and the flat plains became possible - both regions that behave differently with regard to temperature, precipitation, and snow duration/amount. The analysis of these datasets demonstrated a high temporal and spatial variability of snow cover. We identified regions with more or less stable snow cover conditions during the last 11 years, while for other regions, snow cover stood out due to its high variability.

### **The dynamics of Aral Sea, Caspian Sea, and Sharda Water Reservoir during the past decade based on MODIS data classification**

*Andreas Dietz (University of Würzburg), Igor Klein (German Aerospace Center), Ursula Geßner (German Aerospace Center), Claudia Kuenzer (German Aerospace Center)*

According to the IPCC (2007) semi-arid and arid areas are particularly exposed to impacts of climate change. Central Asia with its desert and semi-deserts has been facing essential water-related challenges such as water scarcity, water quality degradation, and inefficient water use during the past, and at present. Because water in this region is economically crucially important, particular for irrigation and hydroelectricity purposes, the intense water use leads to conflicts of interests as water resources cut national borders (GFZ, 2011). According to FAO (1998) about 8000 small lakes have disappeared in Central Asia due to overexploiting of water resources in last decades of the 20th century. However, new water bodies arise due to the construction of water storage basins and hydropower dams. 180 water reservoirs have been constructed alone in Kazakhstan in the last ten years. Accurate information on the transformation of small water bodies and the variability of big water bodies is crucial for various applications, including environmental research (e.g. up to date information for modelling) and political decision making based there upon (e.g. hydropower, irrigation). In this study we performed a land cover classification based on 250m resolution MODIS reflectance data for the region of Central Asia and derived annual water masks for the period from 2000 to 2010. Based on water masks results we present the fluctuation of important water bodies in Central Asia, namely the Aral Sea, the Caspian Sea and the Sharda water reservoir over the past 10 years and put the derived dynamics into a geographical context. The examples illustrate that the extents of different water bodies show a completely different dynamic depending on their natural environment (size of hydrological basin, precipitation, land cover, extreme events), and human influences within these regions (construction of dams, political decisions on water discharge, irrigation, oil and minerals exploration). The presented approach allows automatic and accurate derivation of water masks from remotely sensed MODIS data in the region of Central Asia on an annual time scale.

## GCG 04-01 - Climate change mitigation from global to local 1

*Chair: Rüdiger Glaser, Fabiana Barbi*

### Designing Strategies on Mitigating Climate Change – Towards Development of Wind Energy Potential in The Tropical Region

*Andung Sekaranom (Gadjah Mada University)*

The use of renewable energy is increasing as one of the strategies in the climate-change mitigation efforts. One of the renewable-energy resources mainly developed is wind energy. Nevertheless, the distribution of wind resources in each region is different, especially the difference between the tropics and subtropics. Wind speed in the tropics tends to be slower, whereas the wind at high speeds only found in certain areas. Thus, the development of wind resource potential as an energy source is only found in certain locations, which have higher wind speed than the average. This paper aims to analyze the wind resource potential in the tropical region with the case studies in southern Java, Indonesia, mainly in the Karst Gunungsewu area. Results of analysis with GIS model indicate that the wind resource potential in this area is high, where the wind flows of about 6-9 m/s at a specific location. This allows the development of windmills on the site. Areas with high potential extend along 12 kilometers on the coastal of Karst Gunungsewu. The area extends from the beach to an area 2 kilometers towards the mainland. Wind resource potential area affected by winds blowing from the Indian Ocean in the south. In addition, hilly karst topography also brings a contribution to the magnitude of the wind resource in the area. Compared with wind resource potential in the flat area over southern of Java, the wind speed is higher karst hills. In the flat areas, the speed is only about 3-4 m/s. This suggests that wind resources in karst areas have a good prospect to be developed as a renewable-energy source. However, at present the development of wind resources in the southern Java coast frequently occurs in areas with flat areas, while in hilly karst areas are still neglected.

### Climate change policy in a globalizing world: How the EU is coming to terms with going-it-alone

*Yda Schreuder (University of Delaware)*

The ambitious energy and climate change policy adopted by the EU has led to carbon-leakage and relocation or a shift in production of energy-intensive

manufacturing to parts of the world where carbon reduction commitments are not in effect. EU business organizations state that corporate strategies are now directed towards expanding production overseas and reducing manufacturing capacity in the EU due to carbon constraints in the EU. Business leaders want the EU to scale back on the Emissions Trading Scheme (ETS) and to permit national governments to provide for compensation for industries affected by competitive disadvantage in the global market place. As the EU has been "going-it-alone" with mixed success in terms of complying with the Kyoto Protocol's binding emissions reduction targets, the paper attempts to address the question of what's in it for Europe and how to weigh the benefits of carbon emissions reduction against employment and business benefits. Until 2005, carbon costs were external to the cost of production in the EU, but under the compliance rules of the Kyoto Protocol and the ETS this is no longer the case. Taking carbon and energy/electricity prices into account, the cost of production - in particular energy costs for energy-intensive industries - are substantially higher in the EU than in most other parts of the world. At the same time, the institutionalization of a global free-trade regime under the IMF, the World Bank, and the WTO induces energy-intensive industries to relocate or shift production to countries where environmental regulations are less stringent and where no carbon constraints apply. Host countries encourage the export of high carbon-content products to developed home markets and have set up free-trade zones or export platforms for that purpose. The combined effect of the EU ETS and the institutionalization of a global free-trade regime is the driving force behind the world-wide increase in the use of fossil fuels - in particular coal - , the increase in carbon emissions, and the development of a fossil-fuel-based infrastructure in developing countries. As the prospects for further economic growth in Europe have dimmed, business leaders and politicians have rallied behind a scheme where national governments are permitted to compensate industries for the impact of the ETS undermining the effectiveness of the ETS in combatting global climate change. The paper will give examples of these strategies and provide evidence of how the EU ETS effectiveness is slowly being eroded. In this context the paper will also try to provide a background and framework for the outcome of the UNFCCC in Durban and a perspective on the way forward in climate change policy in a globalizing world.

### Local climate change mitigation between pretension and reality

*Fabian Sennekamp (University of Freiburg)*

The presentation focuses on the local scope of action and governance structures with regard to climate change mitigation. It is based on a dissertation project. With climate change being a global challenge, mitigation measures have to be implemented not only on an (inter)national but also on a local level in order to achieve the reduction targets imposed by the Kyoto protocol. This means that cities need to find local solutions to a global problem. On the one hand, the local scope of action can be limited due to guidelines imposed top-down, such as national laws. On the other hand, the example of the German Renewable Energy Sources Act shows that national laws can stimulate local climate action. Therefore, local climate change mitigation can be regarded as a multi-level challenge, which means that all scales from local to international are linked up. Particularly important for progress are actors who build up networks aiming to implement local climate change mitigation measures. Typically, environmental activists, local businesses, municipal administration and municipal enterprises are involved. This raises the question which actors play a significant role in local climate governance. The objective is to work out a suitable governance definition. It can be observed that non-public actors get involved in decision-making processes, and the focus is shifted from a hierarchical perspective to consensus-orientated patterns. This theoretical basis coincides with empirical results from the dissertation project, which show that non-public actors play an important role. The contribution and influence of actor networks dealing with local climate change mitigation was analysed in Freiburg (Germany), which is known as a cutting-edge city in sustainable development. Interviews were conducted with all relevant groups of actors involved in local climate change mitigation. Three issues were central: First, the interviewees were asked to indicate which other actors they collaborate with. It can be assumed that pioneers are of special importance as they act as change agents who initiate climate action. Thus, the second aspect was the temporal dimension of climate change mitigation. Finally, the extent of the local scope of action was addressed. It mainly depends on the municipal capacity to act. This point can be generalized because the municipality is an important actor even if the particular surrounding conditions differ. Furthermore, municipal governments have allied in transnational municipal networks to support each other and to lobby for better climate change mitigation conditions on a European level. This way, they bypass the national level so that these networks become an interesting case of multi-level governance. Thus, the role of these networks is a further facet in the

presentation. Putting the different arguments together, the objective is to investigate the extent of the local scope of action to mitigate climate change.

### Governing Climate Change in São Paulo, Brazil: Political responses and strategies

*Fabiana Barbi (State University of Campinas), Leila da Costa Ferreira (University of Campinas)*

Climate change is characterized as one of the most pressing issues in the 21st century. There are still many uncertainties related to the rapidity of these changes and how devastating they will be. It is recognized that climate change poses a major threat to important development issues such as water supply, food security, human health, natural resources and protection against natural hazards. Thus, modern society is challenged to manage growing risks and threats. In terms of responses to climate change, it has been argued that governments are important actors that play a key role setting regulations, institutions and appropriate modes of governance in order to address these risks at different levels and scales. This paper investigates how climate change is being framed by São Paulo State, in Brazil, in terms of policy strategies and instruments and how the responses of local governments in the coastal cities are linked to the Climate Change State Policy. Our findings suggest that this issue is not recent in São Paulo State: the State Program on Climate Change dates from 1995. However, very little was developed under the Program. In 2005, the Climate Change Forum, a civil society initiative, was established in the State aiming at subsidising the state policy. The Forum had a fundamental role in this direction and in 2009 the São Paulo State Climate Change Policy was enacted into law. The international context was also important for this approval, which happened a few weeks prior to the 15th Conference of the Parties to the United Nations Convention Framework on Climate Change in Copenhagen (COP 15). Despite the difficulties of implementing the law, especially regarding energy and transportation, its approval was essential to the national policy on climate change, approved in the same year. One of the flaws of the state policy is the lack of dialogue with local governments. Local responses to climate change are still detached from state actions. One of the highlights of the policy is that it also addresses climate change adaptation, following what the literature on climate policy has pointed out, that is, the growing need for mitigation and adaptation policies synergy. The analysed cities in the coast of São Paulo State do not have specific climate strategies, but the issue has been addressed by local governments in their different sectors of activity. Our findings suggest that the



responses to climate-related risks are blended with the responses to problems typically faced by local governments, such as floods, irregular land occupation, landslides on hillside areas, among others, which can be exacerbated by climate change. Thus, these policy strategies and instruments are not related to the cause of the problem itself but instead to the impacts resulting from it.





## GCG 04-02 - Climate change mitigation from global to local 2

*Chair: Rüdiger Glaser, Fabiana Barbi*

### Potentials and risks of REDD+ implementation in indigenous lands in the Ecuadorian Amazon

*Toa Loaiza-Lange (University of Goettingen), Udo Nehren (Cologne University of Applied Sciences), Gerhard Gerold (University of Goettingen)*

The lowland tropical rainforest of the Yasuní Man and Biosphere Reserve in Ecuador, described as the most biodiverse place in the world and an important carbon sink, is also home of 12 indigenous groups. Oil exploitation, illegal logging and mining have caused major shifts in the landscape and affected the lives of its original inhabitants, resulting in serious social and environmental conflicts. Against this background, REDD+ (Reducing Emissions from Forest Deforestation and Degradation) could be a valuable opportunity not only for climate change mitigation, but also for biodiversity conservation and poverty reduction. In this paper, an analysis of the territorial configuration and the socio-political organization of two indigenous groups, the Shuar and the Kichwa are presented; and compared to a 'campesino-mestizo' group living in the buffer zone of the Yasuní National Park. Using various mapping techniques and workshops with communities, the potential benefits and potential risks of REDD+ were assessed. Communities in this area are highly heterogenic and their social organization is complex. Therefore, a potential implementation of REDD+ needs an approach adapted to the specific local conditions. Insecure land tenure and population development as well as legal uncertainties about carbon property rights should be clarified before entering the national REDD+ scheme. On the other hand, the inclusion of large indigenous territories in REDD+ mechanisms may have a greater conservation impact and lower transaction costs that could enhance the management of forest resources inside communal reserves. Actual governance of common indigenous property could be seriously threaten by external mitigation mechanism rules and should be taken into account along with social and environmental safeguards.

### Global overview of local peri-urban food crop production potential

*Steffen Kriewald (Potsdam Institute for Climate Impact Research), Anselmo Garcia Cantú Ros (Potsdam Institute for Climate Impact Research), Till Sterzel (Potsdam Institute for Climate Impact Research)*

Urban areas are currently the main sources for population, population growth, and GHG emissions. In the light of climate change mitigation and sustainable food production, the scale and rapidity of population growth confronts cities with many problems, such as the highly CO<sub>2</sub>-emissive transportation of food to cities. A concentration of food production within or near cities could be a solution, and currently lacks a quantitative general overview of its potential. We provide an overview of the potential of peri-urban agriculture for over 380 cities globally to nourish their populations. Cities are by definition locations where fertility accumulates. As cities are often built along rivers, their soils are often fertile. Furthermore, labour force and the possibility of using fertilizers from human fecal matter within the city promises sustainable cycles. Although urban and peri-urban agriculture can be found in many cities worldwide and already has a substantial contribution to food supply it is considered just little in scientific research. Commonly cited examples of cities with urban agriculture are Havana, Dar es Salaam, and Dakar. Many case studies exist for these and other cities or regions, but all these case studies are not unequivocally comparable. Using high resolution land-use data, global agricultural yield datasets and census population data we evaluate the potential of peri-urban agriculture globally and calculate the fraction of the cities' respective populations which can be nourished by it. Therefore we define urban areas not by administrative boundaries but by connected built-up urban areas, and peri-urban area as the surrounding area with the same size. Only already existing agricultural areas are considered for the food-production. We consider the influences of cropping seasons, national food consumption patterns, and population density. In a review of over 380 cities with populations over 500,000 we find that 4% of all cities are already able to nourish their inhabitants through peri-urban agriculture (e.g. Adelaide, Islamabad, Munich, Novosibirsk), and 25% are able to nourish over 50% of their inhabitants (e.g. Beijing, Budapest, Oklahoma City, Kuala Lumpur). For most cities vegetables are the most calorie-yielding cultivars. With regard to making use of local circumstances, our results of potential peri-urban agriculture for selected cities support the further investigation of reconciling climate change mitigation with sustainable food production in urban areas.

## Global forest politics going local. Contingency and power relations in forest carbon projects in Thailand

*Annika Mattissek (Department of Geography)*

The overall picture of climate negotiations in Durban has been rather disappointing and little progress has been made towards developing effective mechanisms to reduce global emissions. However, one instrument that has gained increasing attention and has been hailed as a glimmer of hope is the mechanism to Reduce Emissions from Deforestation and Forest Degradation in Developing Countries, REDD+. Supporters praise REDD+ as a cost-effective way of cutting emissions that - if implemented appropriately - can have additional positive effects on local populations and ecosystems. Negotiations on REDD+ in the last COP-meetings in Copenhagen and Durban focused on financing and safeguards for the implementation of REDD+ to ensure that forest conservation policies will not have negative impacts on local populations and indigenous peoples. However, opposition against REDD+ has come from exactly these groups. Local and indigenous people associations not only argue that REDD+ will cut emissions in the wrong places, i.e. in the developing world as opposed to in industrial countries. They have also articulated strong concern that the proposed financial incentives for forest conservation will increase pressure on forest-dependent dwellers and, in the worst case, may result in evictions of local populations. Drawing on empirical research on REDD+ and other forest carbon related pilot projects in Thailand, I discuss possible impacts of the implementation of these global political instruments on local contexts. The empirical findings suggest that outcomes of such mitigation instruments depend largely on historically established power relations and conflict constellations. Using the example of Thailand, I show how transferring political instruments designed on the global level to national and regional contexts may lead to new conflicts and shifting power relations. This does not mean, however, that REDD+ or related forest carbon projects necessarily lead to increasing discrimination of local communities. Rather, the implementation of global climate politics in local contexts is both contingent and contested - it has the potential to destabilize long-grown arrangements of resource use and gives rise to new debates about forest governance and appropriate policies.

## Local Assessment of Urban Vegetation in the Context of Global Climate Governance

*Jan Tigges (Humboldt-Universität zu Berlin), Tobia Lakes (Humboldt Universität zu Berlin), Patrick Hostert (Humboldt-Universität zu Berlin)*

To date discussions move ahead on carbon regulation towards mitigation of climate change. To a great extent such global change is analyzed in the perspective of its local effects. Whereas recent research mostly disregards the opposite point of view concerning the importance of local urban vegetation in the context of adaptation and mitigation strategies of global climate change. In the matter of climate relevant functionalities of carbon storage, urban vegetation has recently gained more attention in the role of a regulating ecosystem service. The assessment of such service is challenging as field measurements of vegetation lack up-to-dateness and a consistent area-wide basis. Moreover field measurements do not offer a unique representative value of an ecosystem service as it is manipulated by different stakeholders. Stakeholders differ in their assessment of a service due to individual interests and different scales of acting. Therefore the aim of this case study is to discuss a remote sensing and modeling approach to assess urban vegetation in the city of Berlin (Germany) as a proxy for carbon storage concerning different stakeholders' strategies on climate change. The discussion considers different stakeholders' interests, possibilities and problems of adaptation and mitigation of global climate change, among those are such public awareness, planting strategies, green economics as well as addressing public and private space. A remote sensing and modeling-based approach addresses measurements of carbon storage of urban trees to provide a spatial up-to-date and consistent area-wide basis. This basis of field measurements is confronted with urban stakeholders considering their individual evaluation of urban vegetation as a climate regulating service. Regarding the evaluation is to first say that a high quantity of urban vegetation might act as a global carbon sink itself. The second is to point out that urban vegetation offers various ecosystem services which act as complementary climate regulators, as cooling & shade of trees can reduce energy consumption of urban housings as well. The third is to say that the urban share of total carbon storage of urban vegetation might be low. Nevertheless urban stakeholders can function as a seedbed inducing and diffusing socio-ecological and socio-economic behavior towards climate governance on a global scale.

## GCG 05-01 - Critical junctures of globalization – Reshaping globalized living conditions in contexts of rupture

*Chair: Sebastian Lentz, Ingo Breuer*

### Stabilizing everyday living conditions in a place of transition: The changing geographies of the island of Lampedusa

*Holger Jahnke (University of Flensburg)*

Migration flows between the Global South and the Global North have characterized living conditions at the island of Lampedusa and shaped the island's geography in different ways. For its geographic location in the middle of the Mediterranean, in a triangle between Sicily, Tunisia and Libya Lampedusa has become since the 1990s one of the most important entrance gates for many refugees and migrants from African countries and even beyond. Whereas the island itself has only about 5000 inhabitants, only in 2008 around 30.000 refugees arrived by boat from Libya and Tunisia in the port of Lampedusa. As a reaction, the European Union and the Italian government followed a consequent policy of externalisation which lead to an almost complete decline of arriving refugees, until the Revolutions in Tunisia and Libya finally caused so far unseen migration flows. The presentation will focus on the local geographical, political and social consequences of these external events for the everyday living conditions on the island, and how the inhabitants are trying to construct a future in this context of uncertainty.

### Impact of globalization on spatial development and regional peculiarities in Ukraine

*Eugenia/Ievgeniia Maruniak (National Academy of Sciences of Ukraine)*

Spatial development issues are crucial for any country or region. In Europe it was reflected in a number of resolutions of the Conferences of Ministers responsible for regional/spatial development. Their decisions are being implemented successfully in developed countries, as well as becoming increasingly important for countries undergoing the integration into the EU. The present situation requires that we take into account the growing influence of the external components - global challenges, including those arising from globalization. Well-known concept of space transforms radically and acquires

new dimensions and new differentiation. Changes in mentality, social development mean that approaches to the analysis of space, its organization, processes like homogenization and marginalization should also change. Innovation and the customs barriers disappearance may reduce the costs of moving people and goods; improve management of these flows, especially for multinational corporations. However, such competitive advantages always come at a certain cost to a particular territory, its potential, and usually extrapolate to the global space. The need for changes in Ukraine spatial organization is caused by two groups of factors: internal (structures formed during the 30s-80s of the XX century and the results of inconsiderate decisions after 1991), and external (increased competition, global players, integration processes). In our opinion, main directions of the spatial development in Ukraine and its regions are: 1. Improvement of spatial structure, providing regional cohesion and possibilities, arising from polycentric development. 2. Improvement of accessibility: transport, information technologies. 3. Reduction in the negative impact on the environment, paying careful attention to possible effects of natural and manmade disasters. 4. Improvement in governance and spatial planning quality. Every year the level of country's involvement in the global economy is growing, but the qualitative characteristics of this integration are questionable and they limit opportunities for sustainable development. Export of goods is associated with the production of no more than 3-4 technological modes, and such are the FDI. The overall level of innovation and infrastructural development is low. Aspects of the so called 'shadow' globalization are forming; not to mention their impact on the environment. Regional peculiarities of globalization's impact represent special points of interest. There are substantial differences between directions and intensity of the integration of western and eastern regions, as well as response (reaction) from industrialized and agricultural areas, readiness for the development of tourism, etc. Their assessment is based on the author's methodology and its results should be taken into account when drawing up strategies and plans of spatial development.

### The New Rush for Food Security: Globalised Arenas of Land and Water Discourses

*Sarah Ruth Sippel (University of Leipzig), Birgit Kemmerling*

The conjunction of the world food price and financial crises in 2007/08 in combination with population growth and climate change has led to a repositioning of global food security. We approach food security from a discursive perspective, focusing on its construction in globalised arenas of land



and water discourses within and beyond the Arab world. We consider food security as a concept that is embedded in a broader neoliberal discourse and constantly reconstructing and renegotiating resource distribution and power relations. In a first step, we seek to analyse globalised arenas of land and water discourses using two concrete examples: (1) global investments in land properties coming from the Gulf; and (2) international development assistance in agricultural production and irrigation in Egypt. The Arab Gulf States on the one hand depend on external food supplies, which have become increasingly uncertain and expensive since 2008. Scarce soil and water resources but huge oil and cash reserves have led them to re-examine their food politics, identifying global investments in land as one strategic asset for the future. Government representatives in Egypt, on the other hand, while also facing scarcity of land and water resources and high dependency on staple food imports use different strategies to cope with food insecurity. Without similar cash reserves however high poverty rates and social inequalities, food and agricultural politics concentrate on improving agricultural and water management efficiency. This strategy is endorsed by the official development assistance in order to strengthen national food security. By focusing on investments from the Gulf and official development assistance we investigate how "private" and "state" actors, "official" and "hidden" agendas, "development promoting", "profit seeking" and "Islamic/Arab" rhetorics are overlapping and become sometimes fluid, sometimes fuzzy. In a second step, we assume that the materialisation of food security discourses has an impact on everyday living conditions by shifting existing power relations and altering the social landscapes of rural communities. Drawing on the complementary insights from our case studies, we aim to tackle the following questions: (1) What are the implications of the "new rush for food security" on the local reallocation of the access to natural resources? E.g. does it lead to new empowerments or rather unfold mechanisms of exclusion? (2) How do the political events in the Arab region and the discursive practices of revolution shape local identities? E.g. does it enable a renegotiation of the "local" and local power asymmetries? (3) What are the underlying concepts of spatialities that we can identify in these discourses? E.g. how are new spatial references employed, perceived and constructed? Can we identify a reification of national spatial references?

## GCG 06-01 - Current shifts in globalizing logistic networks, importance of distance and spatial implications

*Chair: Robert Scholz, Barbara Weig*

### Ports and urban development: Unpacking the co-evolutionary dynamic

*Wouter Jacobs (Utrecht University), Cesar Ducruet (French National Centre for Scientific Research (CNRS)), Peter Hall (Simon Fraser University)*

The dynamic relationship between ports and cities has long constituted a rich object of study for geographers and economists alike. This paper builds on these earlier works in which port-city interactions have been considered from various territorial scales and functional specializations. While viewing port and urban development as distinct processes is both theoretically supported and analytically tractable, this detracts attention from the vectors or links through which each system exerts influence on the other. Hence, in this paper we call attention to the co-evolutionary relationship between port functions and the wider urban economic spaces in which they are embedded. Building upon evolutionary economic geography thinking, we address a framework to enrich existing port-city - and wider, urban-regional - analysis. Two main databases on port activities are combined with urban population data for the 1970-2010 period: container throughputs and various centrality scores of port cities in the global shipping network. Such information allows for exploring co-evolutionary dynamics; what is the trajectory of the relationship between port and urban growth over time? Are there regional specificities in the nature, level and evolution of such interactions? Controlling for urban specific variables, we present the results of this preliminary analysis.

### Site Generation and Network Integration of New Logistics Hubs Impacted by Globalization: The Instance of Dubai

*Rudolf Juchelka (University Duisburg-Essen)*

The role of transport and logistics in the globalized world is of increasing importance. Proof of this development are the high growth rates in internet commerce, container circulation, in airfreight and KEP service providers. Apart from the transport-wise dimension of these processes measurable for example

in the shape of worldwide increasing quantities of goods and transport flows - the hierarchic nodes of traffic and logistics networks are assuming a more crucial role. This pertains not only to the operative organization aiming at an augmentation of efficiency for these networks but also with necessary decisions regarding location and the resulting spatial network patterns. At the same time a certain dynamic pertaining the significance of logistics hubs shown for instance in the emergence of new transport and logistics centers. Exemplary for this are transport hubs in the nations on the Gulf, new port locations in China or KEP service provider's hub sites. Taking the Gulf nations as example, and in particular Dubai, the talk aims at illustrating · how the generation of new transport- and logistics sites can be controlled, · how an integration within international transport- and logistics networks runs and · what regional and supraregional site effects and spatial imprinting evolve. Taking the example of Dubai is it possible to show and analyze how a new location of the transport and logistics industry is designed in a multimodal fashion and as an effect draw further related commercial sectors close to transport and logistics. A real logistics cluster will develop based on a transport hub. Through the industry's worldwide networking and integration of these nodes within a globalized system, the logistic site structure will change on a global perspective. The talk is laid out to illustrate in the case of Dubai this metamorphosis of logistics nodes in their global interconnectedness, identify causes and discuss positive as well as negative site perspectives of logistics hubs

### Logistics Service Providers and the Transport Geography of Global Supply Chains

*Christopher Savage (Namibian German Centre for Logistics), Eric Lambourdiere (Université des Antilles et de la Guyane)*

Economic liberalisation of the global economic space has significantly increased the potential sales of companies that have embraced supply chain globalization. The companies that now have the major share of customers are those who, like DELL, ZARA or Wal-Mart, have organized their supply chains so that these potential markets are converted into real ones. In a short time, these companies have surpassed the competition in their respective fields. For example, DELL beat former number one selling computer hardware company, Hewlett-Packard; Wal-Mart overcame Sears in the retail business and Zara surpassed Marks & Spencer in the fashion sector. The success of these transnational companies is based on global supply chain management in which the logistics flow is based on integrated processes. In many cases, they chose to focus on their core

businesses and therefore have entrusted the management of the globalization of their business processes to outside companies. The core business of these companies is the administration of the movement and flow of physical goods and the associated information through space and time. The purpose of these third party companies, known as logistics service providers, is not merely to diminish the unique logistics costs engendered by the mobility of flow. Rather, they must construct global supply chains that are integrated to enable consumers to receive their goods at the right time, right place, as quickly as possible and at the right cost. This article is based on the concept of transport geography; on the one hand it seeks to show the evolution of logistics and transport in the management of the physical flows of goods as well as information in space and time. On the other, the role of support provided by the logistics service providers in the process of globalization of supply chains is highlighted. A case study of the logistics service provider APL Logistics will be used illustrate to this.

### **Dynamics of transport accessibility of the large cities of Ukraine as an indicator of "compression of space"**

*Nataliia Pashynska (National Academy of Sciences of Ukraine)*

The development of transport and communication infrastructure, of new technologies transportation, integration of transport systems (development of intermodal transport, transport corridors, terminals, hubs) leads to increased speed, reduced costs of communication, increased frequency of movement of goods and people. This increases transportation accessibility, distance transform and the process of "compression of space". At different territorial levels, this process has its own characteristics. For the global level "compression of space" in the first place out factors of technical progress, the development of maritime and air transport, ports, development of international transport corridors. For regional and local levels are important transport accessibility, the development of high-speed transport infrastructure, connectivity and mobility of the transport network. The process "compression of space" flows evenly, it travels at different speeds in different regions and countries and depend on their level of economic development. Dynamics of transport accessibility was studied on the example of changing the transport distance of regional centers of Ukraine. In particular, determined by the difference in time spent on travel by rail in 1989 and 2009. "Compression of space" (average reduction of travel time) was calculated by the formula:  $SP = TT/T$ , where  $TT$  - change of time traveling from one location to another.  $T$  - time period for which this process took place.

SP - "compression space" (minutes/year). Analysis of changes in transport accessibility to the regional centers of Ukraine, Kyiv during 1989-2009 was shown that the compression of space occurs between Kyiv and powerful economic centers - the city of Kharkov (-11.46 minutes/year), Dnepropetrovsk (-11, 56), Donetsk (-10.55), Lviv (-15.36), Zaporozhye (-9.51). This is due to the fact that between the capital and cities there are intensive economic, financial, business, information and cultural relations. However, socio-economic relations and transportation accessibility between regional centers of Ukraine is much weaker than the capital. The exception is the Odessa - the largest Ukrainian of port city, which operates as an international transport and logistics center. Thus, the greatest rate of "compression of space" occurs between the capital and powerful economic centers of Ukraine through the introduction of high-speed means of transport (in this case, increasing the movement of rail transportation). In addition to improving transport accessibility, speed compression space between the economic centers of Ukraine depends on their socio-economic development, including population (correlation coefficient is 0,69) and size of GRP (correlation coefficient 0,61).

## GCG 07-01 - Digital Earth: An opportunity for spatial citizenship 1

*Chair: Karl Donert, Michaela Lindner-Fally*

### Use of GI technologies in public participation as the key to responsible spatial citizenship – the Geoconsultation+ project for secondary school students

*Monika Rusztecka (UNEP/GRID-Warsaw Centre), Elzbieta Woloszynska-Wisniewska (UNEP/GRID-Warsaw Centre)*

Spatial management is one of key tasks performed by self-governments in Poland. As all spatial planning decisions have spatial reference, they can be presented with the aid of maps, geovisualization tools and 3D animations. These techniques help understand the concept of planned changes and hence are often used in communication between local authorities and citizens. Especially the young people should get to know them, as in a few years they will be deciding about the future of their "small homelands". Their ability of geo-understanding (including reading maps and geovisualizations, approaching with criticism geoinformation being presented, conducting simple spatial analyses, drawing conclusions and having reflections) is crucial for developing a spatially literate society. Need for rising spatial awareness among Polish youth gave rise to the project addressed to students aged 13-18 (secondary schools) entitled Dialogue, compromise, public participation - school education for sustainable development of local communities within protected areas (in short - Geoconsultation+) conducted by the UNEP/GRID-Warsaw Centre in the years 2010-2011 (<http://www.geokonsultacje.edu.pl>). The main goal of the project was to help students in 50 schools from all over Poland feel the "public spirit" and encourage them to actively participate in the spatial planning process. Each of Geoconsultation+ teams proposed their own "dream investment" to be carried out in the commune, e.g. construction of a new sports and leisure complex or revitalization of an old nature park. Students analyzed data (local spatial management plans, information about protected areas and sites, etc.), chose alternative potential locations for their object, marked them on a map, and created simple 3D visualizations. All these materials were used to prepare meetings with self-government and nature conservation authorities, local community members, etc. convoked to debate about the investment. Public consultation sessions were also conducted using specially developed geoportal (<http://geokonsultacje.edu.pl/geoportal>) with a module for placing "geo-

comments". Each comment could be referenced to a specific object/location - an existing one, or one newly drawn/marked on the map. Using GI tools helped present information in a reliable, comprehensible way, to gather comments of all actors involved in the public consultation process, and to analyze them quickly to avoid potential conflicts. The example of the Geoconsultation+ project showed clearly that spatial thinking and good communication could improve the quality of decision making in everyday life of any local community. During public consultations some of the investments proposed by students were considered to be quite important and feasible, received support from the citizens, and for that reason were brought to life by the local authorities.

### Telling Geo-Stories on Spherical Displays

*Sebastian Wintner (University of Vienna), Andreas Riedl (University of Vienna)*

Globes possess a long tradition in 'narrating' worldwide themes. In particular the information era with its manifold technical possibilities enables an enormous innovation potential for globes. A spherical display fascinates its viewers through its novelty and gives them a better understanding of earth's phenomena. Digital globes as spherical displays are one of the major subjects of research at the Institute of Geography and Regional Research (IfGR) at the University of Vienna. The display format of so-called material hyperglobes is suitable especially for schools, museums, science centers as well as for public relations. We think that it is worthwhile to present global issues in a more 'personal' way, rather than going on in producing them in the currently common manner. Therefore we consider Interactive Digital Storytelling as an eminent metaphor to communicating global themes to a broad audience. Thus, this contribution focuses less on technical preconditions rather than on the types of currently established geo-animations on spherical displays. The adoption of spherical displays as digital globes for knowledge transfer e.g. in education or within scientific public relations (e.g. in research facilities), uses diverse levels of complexity and (didactic) methods to visualize global issues. Besides imparting knowledge about topography, thematic contents play an important role. Their creation has to be based on a didactic concept and their presentation must be as user-friendly as possible. To reach these conditions, an appropriate editorial preparation of geo-data in terms of age group and target audience (to meet the users' level of education and standard of knowledge) is necessary. Furthermore with hyperglobes, in contrast to analogue globes, the opportunity arises to not only depict different static globe images but to show temporal changes in animations. Thus the evolution of spatial phenomena can be visualized



dynamically and leads to new insight. A professional implementation assumed an animated development process facilitates the cognitive processing and interpretation. Furthermore the paper will discuss a classification of Digital Global Stories. In order to ease the users' access to global issues, we developed an extensive system of topics/stories. Global stories exist in a manifold of varieties according to their grades of complexity and interaction. The main focus lies on the connection between Interactive Digital Storytelling and geo-animations in terms of combining different media together with a more emotional way of telling a story. This supports the advantages of digital globes and finally leads to better receptivity and understanding of our 'Mother Earth' amongst the viewers.

### **Near in the city (NIC) – an exercise package for GIS studies on urban environment**

*Virpi Hirvensalo (Department of Geography and Geology)*

This presentation introduces an empirical work under development; a web-based learning environment, which focuses on themes related to the urban environment. The aim is to produce a flexibly applicable toolkit for geography and sustainable development courses for Finnish students. It is intended for students from the level of secondary school to institutes of higher education, including also subject teacher education. NIC is usable in many kinds of course contexts from 15 minute teaching episodes up to whole courses. It strengthens students' environmental competence by providing guidance to act in various physical and web environments. From the viewpoint of GIS studies, NIC serves best as an exercise package, whose contents can be carried out for example in PaikkaOppi; a web-based learning environment for GIS studies in Finnish upper secondary schools. PaikkaOppi provides technical and methodological competences to process spatial information. NIC provides competence to understand spatial representations of society and a comprehension how to engage actively with the spatial activities of society (cf. Gryl, Jekel & Donert 2010). An understanding of a local environment and knowledge of its central concepts are the premises of an active urban citizenship. NIC provides socially relevant learning materials for students' own research projects relating to physical and social spaces of a city. Practically NIC familiarizes users with various kinds of places in a city, such as suburban area, urban brownfield, park and street. NIC acquaints students with meanings and power relationships relating to them. NIC contains also descriptions of methods which guide students to make field trips and practice various research methods. Finally there are also instructions for students to produce presentations of their practices. An

example of those is a new plan of a using an urban space, being realized with a web-based GIS application. NIC is an application of a progressive inquiry model, a version of a constructivist learning theory. Students are encouraged to find authentic, real world topics for their projects of their own interest. Projects will be realized in a local environment, for example in a suburb by interviewing its residents or by participating an urban planning process by launching an initiative. Exercises realized in everyday places inspire students. In addition to that, local themes bring global phenomena, for example urbanization, near to a students' own world view. Gryl, I., Jekel, T. & Donert, K. (2010). GI and Spatial Citizenship. In: Jekel, T., Koller, A., Donert, K. & Vogler, R. (eds.): Learning with Geoinformation V. Heidelberg, Wichmann.

### **Forward to Basics. Education for active citizenship in a spatially enabled world**

*Thomas Jekel (University of Salzburg)*

The use of geoinformation (GI) systems at the secondary-school level has been considered mainly as preparation to join the geospatial workforce and as a support tool to encourage spatial thinking. While this approach definitely has benefits in arguing for a wider set of competencies acquired by GI-based learning, it has frequently been linked to instrumental knowledge, and misses out on the societal consequences of GI use. In short, it links GI in secondary education to science education, but lacks reference to basic everyday social life influenced and possibly supported by geoinformation and relevant pedagogies using GI. The concept of spatial citizenship looks to avoid these deficits. This contribution presents a fundamental conception of an education for Spatial(ly enabled) citizenship that is based on the individual and collective appropriation of space and the role GI plays in these processes. This includes processes of consumption and lay production of GI in order to participate in society as well as an awareness of new tools of control and interferences with privacy. Spatial citizenship education is about learning how to navigate everyday life with respect to (a) the physical world, (b) the meanings attached to the physical objects and environment, and (c) the power relations involved in the production of meaning (including GIS instruments to naturalize meaning as well as new forms of collaboration and negotiation of meaning using Web 2.0 applications. Based on Bennet, Wells & Rank 2009, the paper presents an approach to citizenship education that is compatible with the web2.0/geoweb world and goes beyond an administratively bounded conception of citizenship and responds to spatially referenced community cultures. It looks at possible roles of GI in decision





making processes in everyday as well as political environments and develops a rough structure of competencies needed to successfully participate. These are competencies in the fields of: a) technology/methodology to handle spatial information, b) Evaluation, reflection/reflexivity regarding spatial information and representations, and c) Communication, participation, and negotiation with spatial representations. The presentation concludes with various real world examples from secondary schools showing paths towards the participatory and emancipatory inclusion of GI in secondary education based on the basic competence model. Central references: Bennett, W.L., C. Wells & A. Rank, 2009, Young Citizens and Civic Learning: Two Paradigms of Citizenship in the Digital Age. *Citizenship Studies* 13 (2), 105-20. Goodchild, M.F., 2007, Citizens as Sensors: The World of Volunteered Geography, *GeoJournal* 69 (4), 211-21. Gryl, I. & T. Jekel, 2012, Re-centring GI in Secondary education. Toward a Spatial Citizenship Approach. *Cartographica* 47 (1), 2-12.

## GCG 07-02 - Digital Earth: An opportunity for spatial citizenship 2

*Chair: Karl Donert, Michaela Lindner-Fally*

### Where is the place for GI skills in secondary school education?

*Elzbieta Woloszynska-Wisniewska (UNEP/GRID-Warsaw Centre), Monika Rusztecka (UNEP/GRID-Warsaw Centre)*

Modern society is fully dependent on information. An increasing amount of spatial information (geoinformation) available for us through different GI tools (geoportals, maps applications, virtual globes, 3D animations) forced the development of a new type of citizens - the "spatially thinking" ones, equipped with the ability of geo-understanding (including reading maps and geovisualizations, approaching with criticism geoinformation being presented, conducting simple spatial analyses, drawing conclusions and having reflections). Needs of this new generation require many changes in the education system - putting more attention to the development of specific student skills (GI skills) that give the ability to find appropriate (geo)information and use it in practice, instead of providing them with ready solutions. However, there are a lot of questions related to this issue. What is the list of needed skills? How and when (in what lesson subjects) the teachers should and can develop those skills among their students? Which GI tools may be used? An attempt to solve these problems gave rise to the project entitled The EduGIS Academy addressed to teachers in secondary schools. The project was conducted by the UNEP/GRID-Warsaw Centre in the years 2010-2011 (<http://www.edugis.pl/en>). The main goal of the project was to popularize the use of information and communication technologies (ICT), as well as geoinformation (GIS), in teaching science and in environmental education in secondary schools. To achieve this goal, the so-called EduGIS Working Group was created. It consisted mainly of teachers and methodological consultants from Regional Teacher Training Centres in Poland. In the frame of the project members of the EduGIS Group with the support of representatives of the Ministry of Education and experts in the field of Geographic Information Systems (GIS) from Poland and Norway: (1) developed their GI skills (use of geoportals, GIS software), (2) prepared a list of GIS skills that should be developed among students in secondary school education, (3) analyzed the place of GIS skills in Polish biology and geography core curricula (finding provisions obliging teachers to pay more attention on geospatial issues), (4) compiled a "GIS knowledge base" - gathered a list of different spatial data

resources to be used by teachers and students, (5) proposed different scenarios and ideas for educational projects showing possibilities of using spatial data and GI tools in the classroom. Ideas developed by Polish teachers were discussed with their Norwegian colleagues invited to take part in the project activities. This helped formulate pros and cons of different approaches to GI education in Poland and Norway, and specify some recommendations for teachers in both countries. All results of the project were also compiled in the guidebook "GIS at school" (available also in English).

### Chances of and constraints to GI(S) usage in the classroom – Selected empirical results from a teacher survey

*Steffen Höhnle (FAU), Jan Christoph Schubert (WWU Münster), Rainer Uphues (FAU)*

In the framework of a larger cumulative mixed-methods approach which aims at improving the implementation of GI(S) in the classroom by developing well-founded implementation strategies and concrete measures for implementation, we surveyed teachers of geography in Germany on the frequency of GI(S) usage, on their point of view of constraints to a wider implementation of GI-applications and the chances they see in the usage of GI(S) in the geography classroom (n = 410 teachers). The study on implementation strategies for GI(S) usage in geography education consists of several empirical partial studies: Partial study I: The frequency of GI(S) usage in German secondary schools was surveyed initially. Partial study II: The results of partial study I revealed the necessity for a follow-up study which deals with concrete implementation strategies for GI(S) usage in schools in a three-step development approach. Initially, the teachers were presented a battery of 21 potential constraints to GI(S) usage in schools which they had to rate individually on a five-level Likert-like scale ranging from 5 = 'true' to 1 = 'not true', as well as sixteen items about chances they see in the use of GI(S). Following a mixed-method approach the second step consisted of a cumulative follow-up qualitative study which consists of six group discussions. Thereby five homogenous groups of four to six participants with a similar background were created and one heterogenous group with different backgrounds. During the group discussions the results regarding the constraints to GI(S) usage of the quantitative survey were presented to the participants. In the course of the discussions, the groups developed concepts and ideas reflecting their perspectives on how to overcome impediments to and promote GI(S) usage in schools. Partial study III: After the end of partial study II another partial study will evaluate the strategies in an

intervention-based approach at various schools. In this paper we will provide a detailed overview of the study approach and of the complete results from the quantitative parts of the study (frequency of GI(S) usage in the classroom, constraints and chances from the point of view of teachers; n = 410 teachers).

### **PaikkaOppi – a Web Based GIS Learning Environment for Finnish Schools**

*Jukka Tulivuori (Finnish National Board of Education), Lea Houtsonen (Finnish National Board of Education)*

Usually the most important argument for incorporating GIS in the school curriculum has been its ability to enhance spatial thinking skills. It does not only support the students' understanding of the environment and stimulate sustainable ways of living but also develops professional skills for working life and enhances their digital literacy in GIS. In this paper, our aim is to present how a web-based GIS learning environment PaikkaOppi can support learning of spatial information in Finnish schools. Geography is a compulsory subject at all levels in Finnish schools providing general education. At the upper secondary school level teaching should help students to understand global, regional and local issues. They must be able to acquire, interpret and critically assess geographical information, such as maps, statistics and printed, digital and other media sources, and know how to make diverse use of information technology to present this information. All upper secondary schools in Finland should offer an optional course 'Regional Studies', which provides an introduction to GIS methods and their applications. The Finnish solution to offer support for GIS education in schools is called PaikkaOppi, funded by the Finnish National Board of Education. The idea was to combine spatial data of various topics with a pedagogic web-mapping interface. The data had to be so detailed that geographic inspections could take place in the school surroundings. The content had to be thematically extensive to allow multiple inspection angles to the environment. In addition, the service had to support active learning to enable personalized mapping exercises, sharing data and reporting to teachers. The service also had to be easy to use and technically stable to have teachers to adopt it. Data for the empirical part of this study was collected from 40 teachers by a questionnaire in 2011 by Jukka Tulivuori. There were also six thematic interviews to get more detailed and deeper information about the use of GIS in schools. The study showed that the Finnish teachers show high appreciation for a free web based learning environment for GIS. They also think that it is important to teach with GIS, not about GIS. There are also some challenges in

teacher training, both basic and in-service, because they can't really answer the need to train teachers in implementing ICT tools, and the level at which different schools are equipped varies highly. Dozens of schools around Finland have started to use PaikkaOppi to study Finnish geography on their geography lessons. The basics of GIS become familiar when studying the environment: Students work with different datasets, browse through them and their metadata, and using the overlays in the map service. Learning geography through discovery has been the basis for developing PaikkaOppi service for Finnish schools.

### **GIS teaching in a “junior university” – a report of an experience**

*Cristiana Martinha (University of Porto)*

It is our intention to present an educational project that aimed to introduce pupils (between 13 and 15 years old) to GIS. The project is developed in University of Porto inserted in its project 'Junior University' (see: <http://www.universidadejunior.up.pt/>). The project has the objective of be a practical implementation of the 'digital-earth:eu' network in our university and it has the intention also to give news points of discuss and development to the network, for example, asking about the role that the universities can have in the development of the implementation of GIS in Education not only in the level of teacher training, resources production or curriculum recommendations, but also in the direct action with the pupils through projects like juniors universities that are now very developed in Europe (see: <http://sites.google.com/site/eucunetevents/>). So, because of that, we will focus in some theoretical points: the importance of GIS to development of spatial citizenship and geographical education; the importance on the called 'juniors universities' to geographical education; the role of the universities and R&D centers to development of the use of GIS in Education (with connections with companies). It is our intention to present our activity in the 'junior university project' of University of Porto related to GIS to pupils in the next points: present quickly the project 'junior university' in our university and its internal organization and national impact; planning of the activity since the project submission to rectory to its implementation; obstacles and difficulties in the implementation (software; specific teacher training; computer labs); resources used (its choice and its construction); opinions of the teachers (monitors) and pupils obtained through an opinion survey about the activity. With this presentation, it is also our intention to listen all the comments of specialists in the session of the IGU congress and with them to improve our project to be implemented once again in



the next year. It is also our intention with this presentation to encourage other colleagues of other universities around the world to develop similar projects in their universities in order to improve the importance of the universities to teach and develop the use of GIS in Geographical Education. In conclusion, this project (and this presentation) is already a result of the work in 'digital-earth.eu' in our university and it is, at the same time, a practical product to the network. It is also a contribution to the development of GIS in Education in Portugal and in our university and our R&D center.

## GCG 08-01 - Ecosystem services: Its epistemology and relation to geography 1

*Chair: Xavier Arnauld de Sartre, Noel Ovono Edzang*

### Le Millennium Ecosystem Assessment (MA) or the introduction of a scientific concep into political arenas

*Monica Castro (SET- Université de Pau/ Centre national de la recherche scientifique), Xavier Arnauld de Sartre (Centre national de la recherche scientifique)*

The Millennium Ecosystem Assessment is the result of a science/policy making process of great magnitude, which lead to the widespread use of the concept of ecosystem service (ES) among policy makers, scientists, NGOs' related to biodiversity conservation and climate change. As part of an effort to understand such a process, our study assessed the MA in regard to the science use to justify the arguments it contains. Our aim was to identify the epistemic communities behind the different discourse used for building the concept of ecosystem service inside the MA. Using content analysis and bibliometrics, we build and analyze a data base which relates MA documents with its citations. We compared it with data extracted from a scientific data base. We identify the different actors leading the process and their disciplinary and geographical attachment. As well, we identify the main scientific arguments used to build the MA discourse about ES. Even though the MA was issue of a participatory process, it is a product of northern scientist with particular views of nature. We argue that disciplinary and geographic attachments of MA shaped the actual application of the ecosystem concept all around the globe.

### Uncertainties and controversies around ecosystem services: A review

*Cécile Barnaud (INRA), Martine Antona (CIRAD)*

The concept of ecosystem services (ES) is enjoying exponential success on both scientific and political arenas. However, this concept is increasingly being taken for granted and the strong uncertainties and controversies associated with it are rarely addressed. The objective of this paper is to demonstrate that a constructivist geography could contribute to an innovative approach to the concept of ES that acknowledges, analyzes, and even benefits from these uncertainties and controversies. One of geographers' main interests is indeed

the study of relations between people and nature, and constructivism considers people's perceptions of these relations as a key determinant of their practices. Drawing on a review of the literature, this paper identifies and characterizes five main domains of uncertainties and controversies associated with the concept of ES: (i) the multiple understandings of the concept of ES due to deep differences in the way people perceive the place of humankind in the ecosystems: Is humankind part of nature? Are ES produced by ecosystems or by people? Does the concept of ES contribute to an integrated or a segregated vision of human-nature relations? (ii) the different perceptions of the notion of value of ES : Is a human-based value of ES a non-sense, an ineluctability or a necessity? Should such values be objective and universal or subjective and negotiated? (iii) the scientific uncertainties related to the ecological dynamics that underlie the production of ES : scientists are indeed often unable to establish with certainty a causal relationship between the state of an ecosystem and the effective provision of an ES, either because knowledge is insufficient or because the systems considered are, by their very nature, unpredictable; (iv) the complex social interactions (conflicts of interests, power plays, scale issues) underlying both the valuing of ES (which services do different people value the most who benefits from which services?) and the choice of ES to be preserved in priority (individual, collective or public choices); (v) the controversies around the political tools derived from the concept of ES: Why are most incentives monetized and market-based? Is it inherent to the concept of ecosystem services? The paper also examines how these uncertainties have been dealt with so far. This review allows us to identify the need to develop approaches to ES that take into account the diversity and the complexity of local stakeholders' perceptions, interests and practices around ES, and that allow these stakeholders to exchange and confront their perceptions, i.e. to acknowledge and address collectively the key uncertainties associated to the concept of ES. We argue that a constructivist geography that would reconcile with environmental preoccupations and action-research practices could fill in this gap.

### Alien plants in tropical smallholder farming landscapes: Can the "ecosystem services" concept help evaluate their sustainability?

*Christian Kull (Monash University)*

Smallholding, household-based farm landscapes in the tropics contrast strongly with industrial mono-cropped agribusiness, fenced off protected areas, and state-owned forests. These landscapes contribute to food security, preserve a diverse array of crop varieties, embody local culture, have aesthetic appeal, and

contribute in certain ways to wild biodiversity conservation. A troublesome component of these landscapes, particularly in the eyes of some biologists, is the presence of plants introduced from other parts of the world. These plants can become crop field weeds, lower the water table, or invade 'natural' environments. Yet, alien plants are often the chief source of food, fiber, and construction wood for self-subsistence and cash income in these landscapes. They contribute to soil protection, land rehabilitation, and carbon sequestration, and they add colour, memories, and emotions to rural communities. How does one come to terms with and evaluate their role in the sustainability of these landscapes? One conceptual tool to do so could be that of 'ecosystem services' as popularized by the Millenium Ecosystem Assessment. It analyzes the benefits people get from ecosystems, and could easily be applied to tropical smallholder farming landscapes with alien species. The useful (though not very intuitive) categories direct attention not just at obvious benefits like food, fiber, and forage, but also services like nutrient cycling, water purification, seed dispersal and climate regulation. However, problems with this tool ensue at the conceptual and ideological level. Ecosystem services was originally conceived to describe the benefits humans receive from 'natural ecosystems', and thus the concept tends to be underlain with a neo-Malthusian critique of anthropogenic landscapes and not welcoming to introduced species. The tool focuses on services, but does not explicitly incorporate dis-services like opportunity costs, which would allow for a more balanced view. The concept facilitates an economic, neoliberal model where services rendered can be valued in monetary terms, which may or may not fit with the perceptions of communities living in the landscape. Finally it does not address the political and social consequences of environmental management interventions carried out in its name. The ecosystem services approach, as a result, might end up critiquing tropical smallholder landscapes with alien species, which appears counterproductive in terms of their obvious resilience and contributions to lives, livelihoods, and culture around the world.

### **Retheorising ecosystem services: A cultural landscape approach**

*Jessica Budds (University of Reading), Margreet Zwarteveen (Wageningen University)*

Originally proposed by ecological economists, the concept of ecosystem services has gained traction in demonstrating the importance of ecosystems for providing goods and services to society since the 2005 Millennium Ecosystem Assessment. Much work has sought to develop and operationalise the concept

as the basis of scientific research and ecosystem conservation. Yet, most thinking and practice around ecosystem services is based on a view of ecosystems as inherently biophysical systems that interact with, yet are separate from, people. In this article, we draw on insights from political ecology and science and technology studies to argue that the ontological separation of nature and society that underpins this conceptualisation is problematic, both in theory and in practice. Such an understanding of ecosystems overlooks the multiple ways in which ecosystems are shaped by social processes over different spatial and temporal scales. This, in turn, produces analyses that ignore the power relations that underpin the (re)production of ecosystems and their human populations, and enables the continued dominance of formal science in producing knowledge. We propose advances in two directions. First, we re-theorise ecosystem services as co-constituted by biophysical and social processes, both materially and discursively, and over space and time, by ontologically redefining ecosystems as cultural landscapes rather than natural environments. Second, we explore the epistemological implications of this re-theorisation: acknowledging that ecosystems are also social implies that human influences and meanings are not external to, but part of, ecosystem services. This raises important questions about the (often implicit) claims to objectivity that continue to characterise much knowledge about ecosystem services, the types of knowledge that are needed to better understand human-ecosystem interactions, and the nature and effectiveness of policy interventions. We suggest that these advances offer a more critical framework for researching ecosystem services and contemplating policy responses.

## GCG 08-02 - Ecosystem services: Its epistemology and relation to geography 2

*Chair: Xavier Arnauld de Sartre, Noel Ovono Edzang*

### **Contrasting “ecosystem services” with the concept of “landesque capital**

*Lowe Börjeson (Stockholm University)*

This paper will contrast the concept of ecosystem services (ES) and its epistemological foundations (e.g. its association to natural capital), with the concept of “landesque capital” (LC), which was launched into political ecology by Blakie and Brookfield (1987). Both concepts are efforts to approach society-environment relations from an economic angle, manifested by the metaphorical use of “services” and “capital”, and essentially represent counter notions to “land degradation”. They are both used as key concepts in studies of management-environment relations in agricultural landscapes, e.g. to articulate the recursive and dynamic interactions of management and biophysical processes. However, while ES is widely adopted in contemporary research and development projects, the use of LC is contained within a rather specialized field of scientific inquiry, dominated by geographers, anthropologists and archaeologists with an interest in the dynamics, history and intensification of agricultural landscapes. Interestingly, but not surprising given the different academic origins of the concepts, i.e. in ecology/economics (ES) and geography/agricultural economics (LC), there is virtually no reference to or engagement with LC in studies that take an ES approach. This paper aims to look beyond the overarching similarities mentioned above and explore to what extent LC can be useful to critical examinations of ES or possibly add an analytical dimension to studies structured on the concept of ES. This will primarily be done by discussing the analytical strengths/weaknesses, epistemological differences/similarities as well as more pragmatic considerations with respect to the use of these concepts. Since the 1980s, LC (defined by Blakie and Brookfield, 1987, as: “any investment in land with an anticipated life well beyond that of the present crop, or crop cycle”) has taken on a rather precise meaning as physical landscape elements that improve agricultural productivity (terraces, drainage and irrigation channels, stone walls etc.). Non-conspicuous investments in anthropogenic soils has also been conceptualized as LC, while more “green” conceptualisations of LC, i.e. trees and enduring patterns of vegetation and open fields are not as well developed. This clearly stands in contrast to the central role of biodiversity or “natural”

vegetation for the notion of ES, and thus partly explains why LC and ES remains analytically separated. The paper concludes that, unlike ES, the analytical power of LC lies in its ability to transcend the society-nature dichotomy in a productive way, and by doing so set the recursive character of labour-land-ecology relations at centre stage. However, a more explicit engagement with vegetation and biodiversity is probably needed to enhance the usefulness of LC as an analytical concept in studies of agricultural land-use dynamics.

### **When geography puts people “back in the picture”: Water management and ecosystem services in the Volta Basin**

*Jean-Philippe Venot (International Water Management Institute), Fred Kizito (International Water Management Institute), Sabine Douchamps (International Water Management Institute)*

A growing body of literature identifies Ecosystem Services as an innovative analytical approach that links social and natural sciences to better understand the relationships that societies nurture with their environment, in an era recently qualified as the Anthropocene. The promise for making economic argument about the importance of the environment for people and society as a whole - through for example payment for ecosystem services schemes- has notably stimulated interest among policy makers and researchers alike. But this also marks a tendency towards too great a focus on economic valuation, which could tend to obscure ethical and political issues in relation to the environment and ‘commodify’ nature. In a context of growing uncertainty over environmental dynamics, shying away from the political and social dimensions of ecosystem that are likely to assume greater importance than economic ecological ones has become increasingly untenable. This constitutes an opportunity for human geographers ready to engage with their physical counterparts and other biophysical scientists. This paper highlights the constructive tension that can emerge from considering the dynamics of decision making within an Ecosystem Services perspective, through a case study of water management in the Volta river basin, West Africa. The Challenge Program for Water and Food (CPWF) in the Volta Basin is a research-for-development program which aims, among others, at “enhancing efficient use of water for ecosystem services”. From this anthropocentric, utilitarian perspective, researchers have engaged in characterizing bundles of ecosystem services in relation to water through quantitative tools such as historical perspectives of land use/land cover and spatial hydrological models; these models will serve as a basis for scenario building in the view of the program’s objectives. But, as for landscapes,

waterscapes (i.e. where water is tapped and stored and how it is distributed to the different water users according to socially negotiated rules) have a social and political dimension. The research identifies actors, their values, livelihoods, knowledge, and networks and how these contribute 'and may be shaped by-ecosystem services. This understanding constitutes the first step towards identifying scenarios that are both socially and environmentally acceptable to all stakeholders. As in the field of political ecology where scholars debate on the relative importance of the 'political' and the 'ecological', human geographers have a unique role to play in the field of ecosystem services science, one of highlighting the inherent (rather than emergent) social dimension of environmental decision making and socio-ecosystems.

### **Mangrove Ecosystem Services in the Mekong Delta: Combining Socio-Economic Household Surveying with Remote Sensing based Analyses**

*Quoc Tuan Vo (German Aerospace Center), Claudia Kuenzer (German Aerospace Center), Quang Minh Vo (Can Tho University), Natascha Oppelt (Department of Geography)*

Mangrove ecosystems along (sub-) tropical coasts are threatened due to the conversion of land cover and land use. In the Mekong Delta - Vietnam, mangrove forests have been cleared especially for shrimp farming due to the high economic benefits of shrimp production. The value of ecosystem services can be quantified in many ways either by statistical methods or modeling approaches. In order to undertake an ecosystem services evaluation - a useful framework and applicable tool for environmental management and policy making - the values of these services first need to be quantified and visualized appropriately. Remote sensing has been widely proven as a useful tool for the derivation of ecosystem services, for example delivering inventory information of forest quality and quantity especially based on high resolution data. The objective of the current study is to design a framework for an economic evaluation of mangrove ecosystem services based on in-situ and remote sensing observations. Based on over 300 household investigations, the direct benefits of different mangrove ecosystems were calculated based on different ratios of mangrove and aquaculture combinations. Landuse classifications supplied the basis to transfer the finding into a larger area. The result shows that the quantitative direct value of different mangrove coverages ranges from 100 USD to 3000 USD a year for one hectare. This does only include direct economic earning from e.g. fish or shrimp production, but not indirect values,

such as storm protection or positive microclimatic influences. It will be discussed how direct ecosystem service value maps can be extended to derived the ecosystem's overarching value, considering different service-value components. This study presents the capabilities to study mangrove ecosystem services based on earth observation data and socio-economic household surveys.

### **Areas of permanent Preservation and their usage planning in the watersheds context: Methodology for legal pattern adjustments applied in a pilot area in Northwestern Rio Grande do Sul, Brazil**

*Sidnei Luis Bohn Gass (Universidade Federal do Rio Grande do Sul), Roberto Verдум (Universidade Federal do Rio Grande do Sul)*

Land usage and settlement process based on deforestation and unsystematic land management bears conflict between environment recovery and farmer's economic reproduction. This dichotomy is displayed in the effective application of the Forest Law (Federal Law 4.771/65) that deals with permanent preservation areas (APPs) in the marginal strips along water courses. We aim to present a methodology to define the waterside permanent preservation areas using elements of fluvial geomorphology and vegetal cover as an alternative to current legal patterns. We present an historical refurbishment of Northwestern Rio Grande do Sul settlement (Brazil), a theoretical interpretation of nature's conservation and discuss the permanent preservation areas in two analysis levels: the current juridical structure and the area usage in Northwestern Rio Grande do Sul. The discussion of the farm's social function is fundamental because farmers are responsables for preservation. We try to understand the public policies in the official agencies (Ibama, Fepam and Ministério Público Estadual) and how this agencies act. We chose three sectors of the Santo Cristo river to apply the methodology. In each sector, we assigned the floodplains levels and the levees by the cartographic analysis and evaluated the regional structures. As a result, we detected that the river influence areas varies from 20 up to 380 meters and concluded that permanent preservation areas can be 330 meters larger than the legal parameter. This shows the inefficiency of the metric definitions currently used. The main conclusion of the study is the need to take into account other ecological and geomorphological parameters for the definition of permanent preservation areas. We can say that conservation practices made by rural producers should be seen as positive impacts for rural property, as well as for the enrichment of biodiversity in small, medium and large properties.



## GCG 09-01 - Financialisation, marketisation and the environment: Towards 'alternative' economic geographies of finance? 1

*Chair: Hans-Martin Zademach, Tim Heinemann, Jane Pollard*

### Exploring sustainable finance in various contexts: Conceptual thoughts and insights from the energy industry

*Johanna Dichtl (Katholische Universität Eichstätt)*

The energy sector provides a field in which the growing influence of financial institutions and intermediaries on the environment and society become evident in a particular striking manner. Due to the extensive deregulation and privatisation of this industry in a large number of places around the globe, energy services are today mostly tied to market mechanisms, i.e. to the circulation and expansion of financial capital in its various forms. This paper aims to scrutinize this financialisation in light of the paradigm of sustainable development. It pursues a twofold target: First it suggests an analytical framework that enables an encompassing exploration of the interrelations and interrelatedness between financial, natural and social systems in varying geographical contexts, drawing on insights from both the sustainability discourse and the financialisation debate. Second, it presents empirical results gathered in an ongoing research project that illustrate the explanatory power of this framework. These results display the contradictions and potential contributions of the financial industry to sustainable development in a variety of different geographical contexts.

### Microinsurance for climate change: Performing risk and forming risk-bearing subjects

*Leigh Johnson (University of Zürich)*

This paper examines recent efforts to extend weather-based microinsurance products to rural agricultural and pastoralist households in the global South. Such products, which make small financial payouts to policyholders in the event of a prespecified weather trigger, are increasingly championed by development agencies, NGOs, and global (re)insurers as tools to bolster the resilience of households that are highly vulnerable to climate change. The creation of these new financial circuits for risk transfer in economic and geographic peripheries provides an opportunity to reflect on the insurance exchange, which is often

invoked as one of the most quintessential banalities of modern life. The extension of insurance products to households for whom the concept of commercial insurance is quite foreign demonstrates how other subjectivities unsettle the seemingly obvious sets of assumptions, institutions, and relations surrounding insurance. For instance, a number of pilot projects have encountered quite low demand within the target populations for the insurance products offered, despite households' high vulnerability to climate volatility and the apparently careful design of products. Here I consider practitioners' and researchers' explanations for low insurance uptake and their strategies for creating demand in the target populations. This process of market creation highlights not only how specifically bounded climate risks are performed as uniquely ameliorable via financial channels, but also how the economic institution of insurance depends upon the iterative creation of a very particular kind of subject that identifies 'risks' as such, and imagines them as transferable - ergo alienable - by means of a market exchange.

### The murky waters of green property investment

*Katia Attuyer (LATTS)*

In the last two decades, efforts have been made to devise legislative and policy frameworks that encourage the adoption of sustainable development options at all scales. The pertinence of the urban scale to address issues of sustainability is particularly recognized. There is increasing pressure from political circles and citizen's groups to ensure the production of urban built forms that can address both social and economic needs while respecting long-term environmental goals. Yet, the built environment has increasingly become a category of financial asset; and investors are often believed to give precedence to the maximization of return over the integration of social and environmental concerns. This paper will examine how the intensification of the sustainability agenda is impacting on commercial property investors. It will identify the main triggers that have led to changes in behaviour, and what obstacles remain to achieving sustainability objectives. We will show that the fear of financial loss is the main driver of change. The introduction of new legislative requirements and the potential passing of stricter laws in the near future are producing a certain greening of investors' portfolio. Nonetheless, we will stress that we have not yet reached a tipping point whereby green buildings investment would have moved from being a concern for a few to being common practice. The paper will document the variety of behaviours encountered within this industry and will characterize the



discourses and actual practices of institutional investors in the French business property market, by drawing mainly on qualitative data.

### **Carbon market financialization and time-space compression**

*Janelle Knox-Hayes (Georgia Institute of Technology)*

Countries around the world are developing carbon emissions markets as a governance mechanism to reduce greenhouse gas emissions. By mapping networks, market flows and proximity this article draws on the strengths of economic geography to illustrate the function and meaning of developing climate finance regimes. While climate change is an environmental phenomenon, the processes that drive it are economic. Carbon markets are representative of a growing emphasis on managing social and environmental problems through information governance and must be understood from the standpoint of financialization. This article deconstructs the notion that emissions markets are merely as system of pricing externalities, and considers the dynamics that create and underpin carbon emissions markets. I address two questions: 1) how does the compression of space and time facilitate the financialization of emissions markets? 2) what are the material implications of the financialization of environmental systems? I develop a theoretical framework to explain how financialization divorces resources from their materiality through time-space compression. The separation of resources from material context allows for the creation of distortions of value. I analyze how the architecture (including processes and agents) of the emissions markets contributes to three mechanisms of financialization: ownership, commensuration and mobilization. The article suggests that the architecture of the markets embodies a growing transition from material to information governance. The virtual nature of the markets and their ability to compress space and time enables them to operate globally and instantaneously, but threatens the integrity of natural systems embodied in materiality.

## GCG 09-02 - Financialisation, marketisation and the environment: Towards 'alternative' economic geographies of finance? 2

*Chair: Hans-Martin Zademach, Tim Heinemann, Jane Pollard*

### Mind the (financial) gap: Financialisation and the emerging spaces of 'older entrepreneurship'

*Thomas Wainwright (University of Southampton), Ewald Kibler (Turku University)*

Contemporary research in economic geography and the social sciences has attempted to examine the processes of financialisation, and the permeation of its politics into the 'real' economy, society and households (French, et al. 2011). This paper seeks to contribute to these debates by investigating the emergence of new economic spaces, as a consequence of the shift from defined benefit pensions, to less generous defined contribution pensions. Specifically, the paper uncovers the relationships between financialisation, pensions and their connections to household spaces, to examine how the failure of private pension provisions to meet the needs of older individuals, has begun to displace retirement with a work-retirement balance. This in-depth study of 22 older entrepreneurs, aged 50 years and older, provides new insights into a response to the effects of financialisation, where individuals have created new businesses in their later life, as they cannot afford to retire 'full-time'. While recent critiques of research on financialisation have argued that space is often treated as a passive container, this paper provides a theoretical contribution to financialisation by situating space at the centre of its analysis. Particularly, our paper argues that the household has become a socio-spatial fix of economic production, as older individuals are developing entrepreneurial activities at home, to overcome the inadequacies of an increasingly financialised economy, poor savings and pension returns. In doing so, the paper identifies the emergence of 'reluctant', alternative economic spaces, where households are reconfigured to form hybrid spaces of work and retirement.

### From bank- vs. market-based to local- vs. international-oriented financial systems: The case of German saving banks

*Stefan Gärtner (Institute for Work and Technology), Franz Flögel (Institute for Work and Technology)*

Comparative studies of financial systems often focus on contrasting of bank- vs. market-based systems (e.g. Allen and Gale 2001; Demirgü-Kunt and Levine 2001). In the light of this differentiation some authors view the global financial crises of 2008 as evidence for the homogenisation of the varieties of financial systems under the pressure of financialisation, because bank- and market-based financial systems have alike been affected by the crisis (e.g. Beyer 2009; Hardie and Howarth 2010). Especially the bailouts of some banks in Germany (quoted as typical bank-based system) demonstrate that also banks are highly intertwined in market-based activities. Without doubt international financial integration has reached a high level, but significant spatial differences can be detected by the causes and effects of the crises (e.g. French et al. 2009; Martin 2011), e.g. only some countries have witnessed the emergence and burst of a housing bubble and not all countries were affected by a credit crunch (Gärtner 2011). In spite of existing global trends there seems to be no single financial system, but territorial varieties which are not homogeneous but interlinked to different degrees. We propose a comparison of local- vs. international-oriented financial systems as an alternative approach for comparative studies of finance. Based on empirical material on saving banks and a review of previous studies we will discuss the proposed concept.

### Hybrid Neoliberalism, Hybrid Natures: Contested Borders in the Mexican National Payments for Ecosystem Services Programs

*Elizabeth Shapiro (Duke University)*

First implemented in 2003, the Mexican National Payment for Ecosystem Services (PES) programs pay rural communities for carbon sequestration, biodiversity conservation, improvement of agroforestry systems and hydrological services. The initial design of these programs was decidedly neoliberal, from their emphasis on the superior efficiency of market vs. state led environmental solutions, the attempt to institutionalize new property rights and the explicit goal of commodifying ecosystem functions. This article examines how the neoliberal notions of the programs' designers were hybridized by the intervention of national rural social movements, the inability of the down sized state to intervene at the local level and the continued strength of the rural collective in Mexico. The analysis is based on semi-structured interviews with members of thirty-two communities in which the PES programs had been implemented, intermediary organizations, and the actors involved in the design of the programs. The neoliberal framing of the programs' founders were first challenged and hybridized by members of a national coalition of rural social movements. These



actors introduced a conceptualization of PES as a societal recognition of the value of traditional rural stewardship and a source of funding to ensure its continuance. At the local level, there was a marked inability of the Mexican state agencies, down sized during successive rounds of structural adjustment, to articulate their own policy. Most participants believed that payments were a government subsidy and had little awareness of the intention that markets would be formed. Though true commoditization of ecosystem services rarely occurred, I found that the payments reinforced pre-existing environmental management, with the funds being used to support collective action for forest protection. I conclude that the programs designers' intentions to privatize conservation and commoditize ecosystem services, disentangling nature from its coproduction with rural stewards, were hybridized at multiple scales through the process of implementation.

### **New alliances against financialisation? The case of the German Mittelstand**

*Christoph Scheuplein (University Muenster)*

Until the global economic crisis in 2008, it could be observed that the coordinated market economies adopted gradually elements of the liberal market economies, particularly from the booming financial sector there. Even though the charges of the financial crisis occur in all economies and the financial market capitalism has not come to an end, new alliances and ways of thinking are observed in the coordinated market economies. German small- and medium-sized businesses, which a few years ago still used new types of finance in order to free themselves from the dependence of the banking sector, are an example for that. The presentation portrays the types of finance of the small- and medium-sized businesses since the financial crisis. According to that, the convergence between market economies appears to be stopped. Instead, a new scepticism of business owners and managers is observed towards financial innovations. Theoretically possible explanations are discussed for this new divergence in the light of the new concept of 'Varieties of Capitalism' and the regulation theory.

## GCG 10-01 - Focal points of the past – Historic-geographical dimensions of globalization

*Chair: Klaus Braun, Jacqueline Passon*

### Global Consciousness in the Early Nineteenth Century

*Alix Winter (Université de Versailles)*

In my dissertation project I attempt to challenge the assumption of a silence concerning global processes among the contemporaries of the early nineteenth century. The consciousness of global connections and dependence is an essential part of globalisation itself and could be considered as the criterion for demarcating epochal change. Given this, it becomes crucial to look at the historical debates about these processes in order to reason out the question of the beginning of globalisation. And I assume the early nineteenth century to be an important period of reflection on the world as a unity, increasingly spreading in the public sphere. One can hypothesise that a significant break in the development of a global consciousness occurred at the beginning of the nineteenth century. Whereas the perception of global commerce in the eighteenth century was above all concerned with theoretical claims for free trade and the contestation of outdated trade company monopolies, the discussion in the early nineteenth century was shaped by ongoing processes of an increasingly economically interconnected world. Accordingly, this discussion thus considerably anteceded the technical global communication boom. The foundation of globe-encompassing telegraph connections and steam ship lines did not give birth to the global consciousness of contemporaries; rather, this consciousness preceded it. A definite turning point relating to communicative interconnectivity can be placed in the mid nineteenth century, but the rise of a public global awareness can be dated back. This timeframe is in accord with theories of leading economic and social historians. Additionally, global political connections came to the realm of possibility by the mid nineteenth century as a result of this logistical revolution. The first three decades of the nineteenth century thus comprise a basic step between these two points of reference of the development of a global consciousness that has rarely been taken note of and that certainly deserves more attention for the sake of the intellectual history of globalisation and for the discussion about the beginnings of globalisation in general.

### From Empire to Nation – Egyptian Nationalists in Berlin during the Weimar Republic

*Nathanael Kuck (University of Leipzig)*

When studying the entanglement of Europe and the Arab world in the 19th and 20th century the attention has been predominantly directed at the imperialist European presence in those regions, less so on the presence of actors from those regions in Europe. Yet, analysing this presence could not only help shedding some light on the early history of migration that has profoundly shaped the diversity we today so commonly encounter in every big city. It can also offer insights into the discursive shifts that pre-dated the disintegration of colonial empires after World War II. In the first few years after World War I, several hundred Arab males, in their majority Egyptians, came to Berlin often to study at one of the city's well-known universities. There they found a capital that had lost its status as an imperial centre and saw its political landscape dominated by sharp social and political contradictions, yet provided a liberal atmosphere that allowed for subversive political activities. Apart from Arabs, Berlin also hosted migrants from China, India or the former German colonies in Africa and all of them started to form political groups to claim independence for their respective countries. This metropolitan anti-colonialism with its calls for self-determination challenged the predominant spatial order. Instead of the dichotomy of the national-imperial world order that divided a great part of the world in either imperial centres or peripheries the anti-colonialists wanted to establish a new territorial regime based on the equal exchange between self-determined nations. Being a part of this political milieu, Egyptian activists also formed political organisations, staged political events and published periodicals for their cause. The biggest journal called *Aegyptische Korrespondenz* was produced between 1920 and 1924 and will be at the centre of interest in this paper. It looks at the publishers, their political practices and alliances, but above all the debates in which they engaged. Of particular interest are the ways in which the articles negotiated national belonging and established a narrative of a national Egyptian history, how the authors conceptualised imperial rule, related to other anti-colonial movements and how they saw the relationship towards their host society Germany. By drawing on the Egyptian activists in Berlin during the Weimar Republic, the paper makes a case study of the early endeavours to dismantle the imperial structures as dominant forms of organising power over space and the demands to replace them with the nationalisation of political forms. The practical consequences of this demand for a comprehensive

transformation of the world were only felt decades later but are still very much reverberating in today's globalised world.

### **Rural Urban Migration, Maasai Pastoralist Youths and Globalization in Tanzania – Case of Ngorongoro Arusha & Dar es Salaam, Tanzania.**

*Emmanuel Munishi (Freiburg University), Axel Drescher (Freiburg University)*

The Maasais belong to the Nomadic Pastoralist groups in the arid and semi-arid regions of East Africa. Maasais have historically been considered backward, conservative to their cultural practices and thus less responsive to globalization. Studies however indicate that, starting from 1990's Maasai Pastoralists in East Africa and Tanzania in particular began to migrate to cities for wage labour due to intensifying poverty, droughts, and depletion of their livestock herds by diseases. Studies among the Maasai pastoralist communities indicate that Maasais have overtime developed different ways of coping with the changing world. These studies however have not specifically and systematically linked the factors and patterns of the Maasais' rural urban migration with globalization. Based on the various theoretical and qualitative primary data from the field, the present work employs a historical-dialectical materialism approach to establish that various explanations are responsible for the recent patterns of the Maasai youth rural urban migration, identifying that Globalization-related aspects right from the colonial to the contemporary times have significantly catalysed this process among the Maasai youth pastoralists. It therefore reminds various stakeholders to underscore globalization in different policy and development related issues while dealing with the Maasai rural urban migration. The paper first offers a comprehensive conceptualisation of the term globalization and presents a gist of the Maasais socio economic evolution since pre-colonial period. Then it offers a critical review of migration theories and literature to help us capture and analyse a portfolio of factors and specific globalization aspects responsible for the current rural urban migration of Maasais' pastoralists youth. Later the paper presents, empirical findings followed by a discussion and conclusive remarks that link migration and globalization. Key words: Rural urban migration, Maasai Pastoralist youths and globalization, Dar es Salaam, Ngorongoro.

### **Sanusiya's and Zaghawa's Trading Networks in Comparison: Past and Present of Trans-Saharan Trade between Chad and Libya**

*Meike Meerpohl (Ruhr-Universität Bochum)*

San's'ya's and Zaghawa's trading networks in comparison: Past and present of trans-Saharan trade between Chad and Libya Dr. Meike Meerpohl Through the centuries the Sahara has never been an impassable barrier separating the shores of the Mediterranean from inner-African societies. In fact, people have crossed the vast, waterless terrains for thousands of years and for various reasons. The fluctuations of power and control often entailed the transformation of trade routes and areas of interest. New regions were discovered, conquered or assimilated and new trade goods rose to prominence while other commodities lost their importance. This contribution pays specific attention to the Wadai-Benghazi trade route, which passes through south-eastern Libya and north-eastern Chad. It will focus specifically on the period between the late 19th century and the beginning of the 21st century. In the late 19th century the Wadai-Benghazi route became the most important long-distance trade route between the Mediterranean and the sub-Saharan regions in East Africa after trade had been disrupted for many years. The extension and growing importance of this route has been attributed to the abandonment of the darb al-arba'n between Darfur and Egypt and of other trade routes in Africa, as well as to the growing control and influence of the San's'ya in the region. The San's'ya brotherhood was established in 1837 and governed from its headquarters in Cyrenaica from 1843 until 1896. The Grand San's' established religious centres along the Wadai-Benghazi trade route, which were also used for commercial exchange. After the fall of the San's'ya, this trade route was abandoned. Crises, war and instability plagued the region for many years. Trade links finally re-emerged in a new form at the end of the 20th century. The semi-nomadic Zaghawa pastoralists managed to diversify their economic activities by entering the trading business. In doing so they could draw upon their wide family networks, result of the tribe's migration across the region. In this presentation I will try to compare San's'ya's and Zaghawa's commercial networks and strategies. Especially the case of Zaghawa's trade management will exemplify how dynamics of globalization have entered the trans-Saharan trade through the use of technical innovations and the integration into international networks at the beginning of the 21st century.

## GCG 11-01 - geo@web. Geography production and its lifeworld consequences in the era of the web 2.0

*Chair: Inga Gryl, Tobias Nehrdich*

### Prosuming images in the web 2.0: the end of critical constructivism or its implementation?

*Antje Schlottmann (Goethe-Universität Frankfurt)*

Recent critical constructivist theories on visual geographies include the idea of perception as a productive practice. In contrast to a mimetic understanding, images are understood as products that come into being (and evolve) in the very act of viewing. They are hence conceived as being continuously re-shaped against the background of a certain cultural context. Images, in this view, are no longer consumed only, but at the same time produced, in other words: they are "prosumed". The new ways of inter-action offered by web 2.0 constitute an interesting situation in this respect: they put theory into practice in consideration that provided maps and images appear explicitly as user generated contents. But what is this practical turn of the theoretical concept of "making geography" about? The paper deals with the question of whether the web 2.0 can be seen either as a new reflective stage of visual practice inasmuch as it discloses the productive part of the consumer, or whether it rather produces "users" instead of prosumers because its tools render any reflections regarding the role (and construction of) the involved subjects obsolete. In this context, the contribution also engages with the educational program of media competence. Critical reflection of the social, i.e. particularly medial, construction of reality has just recently entered educational standards. Arising web 2.0 habits among children and adolescents could lead to either a rather indifferent attitude regarding the programs underlying constructivist criticism ("sure we produce our own world, so what?"), or they could lead to a rather engaged critical attitude and to new movements of empowerment ("now we know that we produce our own world, but how can or should we deal with this responsibility?"). The paper theoretically discusses arguments for both prospects by referring in particular to educational work with geographical images.

### Digital geodata traces and locational privacy: New challenges for geographic education

*Kim Pascal Miener (WWU Münster), Steffen Höhnle (FAU Erlangen-Nürnberg), Romy Hofmann (FAU Erlangen-Nürnberg)*

Young people in modern societies consciously (e.g. Facebook) or unconsciously (e.g. some Google services) produce a vast amount of geodata using web services. In doing so people not only produce their own geographies by attaching meaning to locations and communicating about it, they also often unconsciously produce geographies valuable for other societal actors. Using relational databases it is possible to create very precise profiles of the individual user and his spatial practices from the produced data (e.g. for private companies). This almost inevitably prompts questions regarding data protection and privacy issues. In this paper a conceptual approach is presented on why students have to develop competencies regarding their personal geodata management, how they can do so and which challenges this subject matter implies for research in geographic education.

### Mapping together: On Collaborative Cartographies, their discourses and space construction

*Christoph Fink (University of Salzburg)*

In 2012, maps are everywhere. Web mapping and mobile mapping have become killer applications on smart phones and Web 2.0. Many, and with them the most popular, cartographic tools and widgets were not created by cartographers. Among these 'implicit' or 'undisciplined' cartographies (cf. Hruby & Miranda Guerrero 2008:9; Crampton & Krygier 2006:12f) a special position is taken by community driven projects, and mapping efforts strongly relying on user input. This includes Goodchild's (e.g. 2007) VGI, but also covers 'soft' geographies, such as geo-tagged photos, Facebook comments, Twitter messages, or Wikipedia articles. 'Implicit' cartographies provide distinctly different conditions than traditional mapping environments: They are characterised by a vast absence of the normative standards set out by the cartographic research community over the last century, and typically feature a seemingly Fordist division of labour; traditional cartographic actors are replaced by advertisers planing and deciding, software programmers designing maps (and their looks), and users contributing to the maps's content, to name just a few. Collaborative cartographies above all add a sheer unbelievable multitude of contributors (and opinions) to the discourses of mapping. The research to be



presented approaches the topic from two angles: First, on a meta-theoretical level, the development of implicit cartographies is traced, their importance for a contemporary understanding of cartography is underlined, and reactions of actors of an opposed 'explicit' cartography are discussed. Second, the differences in the conditions of map (and space) production applicable in collaborative cartographies are explicated; consequently case studies are carried out: in great parts following the approaches of Schlottmann (2005) and Gryl (2009), the discourses of 'map edit wars' (cf. Maron et al. n.Y.) in OpenStreetmap are evaluated from the openly available changelog data. -- References: Crampton, J. W. & J. Krygier (2006): An introduction to critical cartography. *ACME: An international e-journal for critical geographies*, 4(1), 11'33. Goodchild, M. F. (2007): Citizens as sensors: the world of volunteered geography. *GeoJournal*, 69, 211-221. Gryl, I. (2009): Kartenlesekompetenz. Ein Beitrag zum konstruktivistischen Geographieunterricht (=MDGW 22). Wien: IfGR Universität Wien. Hruby, F. & R. Miranda Guerrero (2008): Kartographie im Spannungsfeld expliziter und impliziter Kartographien. *meta-carto-semiotics*, 1. Maron, M. et al. (n.Y.): Disputes - OpenStreetMap Wiki. - available from: <http://wiki.openstreetmap.org/wiki/Disputes> (last accessed 2012-01-08 ) Schlottmann, A. (2005): RaumSprache. Ost-West-Differenzen in der Berichterstattung zur deutschen Einheit. Eine sozialgeographische Theorie (=Sozialgeographische Bibliothek 4). Stuttgart: Steiner.

### **The Neocartography of the Geoweb: On the Pathway to Mapless Locative Media?**

*Tristan Thielmann (University of Siegen)*

Neocartography claims to be the cartography of the everyday person using Web 2.0 techniques to create and overlay their own locational information on media platforms such as Google Maps. Rather than making claims on scientific standards, methodologies of Neocartography tend towards the intuitive, expressive and personal, but may just be idiosyncratic applications of traditional mapping techniques. However, does this also mean that these practices are of no use to the geosciences? Or can we say that the numerous distributed geotagging platforms and applications like Flickr and Google Latitude have given rise to a new genre of 'Maps 2.0'? Will geobrowsers become the basic layer for any kind of information we are looking for, and may thus maps and satellite imagery become a dominant way of interacting with networks as claimed by apologists of the Geoweb? To answer this, we have to be aware that at every major juncture of conceptual or technical geographical breakthrough, the term

Neogeography has been invoked. More than that, many mapping practices now labeled as Neocartography are well represented in pre-literate cartography. As a consequence of that, the map mashup phenomena should motivate the geospatial community to think more deeply and broadly about the true meaning of spatial representations. Therefore, this paper not only gives an overview of apostrophized next generation mapping interfaces, but also how these examples integrate geographic data with non-cartographic interfaces and dynamic data with a static grid. For instance, with augmented reality smartphone applications as Layar or Wikitude, a new generation of users is able to browse data directly as it is represented on the screen within their spatial context off the screen. Mobile locative media converge the practices of touring, tagging and navigation by layering geocoded data onto the grid of tracked video camera images. These developments indicate that digital technologies have reconfigured the experience of mapping into navigational platforms. This has far-reaching epistemological consequences for the geosciences. It was and is always the case that the graticule acts as a sign system that organizes geographical knowledge into visual schemes which depend on culturally accepted misrepresentation of abstracted territory. However, how can the format of the map still shape mobile media and its contents? How do navigational screens fixate the relationship between on-screen and off-screen space? And under which circumstances is way-finding actually mapless? If, as Tim Ingold phrases it, 'we know as we go', and if the basis of all knowing and mapping lies in bodily movement, it might be that we are in the process of moving towards a navigational essentialism. This would imply a fundamental change in the understanding of the Geoweb, with the consequence that we have to think about the mobile Geoweb, and moreover any network, independently of a map.



## GCG 12-01 - Geography, complexity, and information dynamics: Addressing real-world challenges of the new millennium

*Chair: Cristian Suteanu, Beate Ratter*

### Complexity, Conflict and Resilience in Climate-Society Interaction

*Jürgen Scheffran (University of Hamburg)*

With global warming, the world is facing complex interactions between climate stress, environmental change, human responses and social conflicts that could significantly shape the future geography of risk and conflict. Changes in the climate system (such as variations in temperature and precipitation) affect natural resources (e.g. soil, water, ecosystems, forests, biodiversity). Depending on vulnerability, environmental changes will stress basic human needs and values (such as the availability of water, food, energy, health and wealth) which may lead to social disruption through instability events, such as migration, riots, insurgencies, urban violence or war. The stability of this interaction depends on the sensitivities between crucial variables which determine how events spread in the network of interconnections. Due to non-linear effects, an increase in global temperature above a certain threshold may trigger instabilities, tipping points and cascading sequences that could exceed the viability of natural and social systems. Human perceptions and responses shape the evolution of the social networks under environmental change. A key challenge for regional and global governance structures is to develop new cooperative approaches, conflict resolution mechanisms and institutional frameworks that stabilize the interaction. Adaptation and mitigation strategies allow societies to apply technology, physical, human and social capital for adjusting the economy, the energy system and human behaviour. Concepts of adaptive complexity and stability provide guidance to influence the multiple decision points and adjust the actions along the causal chain to protect human security, develop social livelihood and strengthen societal resilience. Agent-based approaches are adequate to analyze multi-level decisionmaking under uncertainty, the micro-macro formation and breakup of coalitions and the transition between conflict and cooperation. The integrated framework will be specified for comparing selected climate hot spots in Africa and Asia.

### Utilization of Remote Sensing and GIS for Annual Soil Erosion Measurement In Lake Tondano Catchment Area, North Sulawesi Indonesia

*Agus Santoso Budiharso (Nusantara University)*

Lake Tondano in North Sulawesi Province has very important role in providing clean water for Manado City, and other purposes for human life. It has been issued that high erosion in the Lake Tondano catchment area is the cause of many problems regarding with the reducing the capacity of the Lake Tondano. Since year 1999 the Tondano Watershed has been designated as high priority watersheds to be addressed. There had been many erosion studies had been done. This paper will present the result of erosion studies in this area by using Hazarika and Honda method to map soil erosion based on Normalized Difference Vegetation Index calculation and Slope parameter. The objective of this research is to predict soil surface erosion in Lake Tondano Catchment Area using remote sensed data especially Landsat imagery and slope. The applied methodology encompasses image processing and calculation of erosion, field observation and secondary data acquisition; GIS analysis and mapping by using ArcGIS software. Field observation was done to verify the tentative land cover map also for recognizing erosion appearance in the field relating to landform and land use. The result shows that land cover from 1991 to 2007 was changed, especially the existence of forest tended to decrease from 3.89% in year 1991 to 2.2 % in year 2007, while dry land farming had tendency to increase from 16.35 % (1991) to become 26.02 % (2007). This causes to the increase of quantity in annual soil erosion rate. In general, the study area has been dominated by very low level of annual erosion rate to low level. In the steep slope area both in the hill and in mountain the erosion from moderate level to very high level become available and tend to increase significantly from 1991 to 2002 and after that decline gradually from 2002 to 2007. The biggest area, where moderate level to very high level of erosion happen taking place in dry land farming and in clove plantation. The biggest percentage area where moderate level to very high level of erosion happen taking place in the landform of upper slope of mountain, The second largest of landform with moderate to very high rate of erosion is in the upper slope of Mount Manimporok .The third rank of medium-eroded landforms occurs in the landform of Lower Slope of Mount Tampusu. All moderate to very high level of erosion were happen in steep to very steep slope where dry land farming and in poorly treated of clove plantation exist. In accordance with management and conservation practice, most the study area has no conservation practice if any only in traditional way.



Thus, in the landform with steep slope occupied by dry land farming and clove must be conserved immediately with contour terraces to prevent the further worsen in the future. Key word: Remote Sensing, GIS, NDVI, Landuse Change, Landforms and Annual Soil Erosion Rate.

### **Spatial Factors in Planning Mass Events: Planning Pilgrim Flows for the Hajj**

*Sven Müller (University of Hamburg)*

There is a growing number of mass events throughout the world. At the same time these mass events get larger and larger. Typically examples for mass events are the FIFA world cup and the olympic games. The management - particularly in terms of security - of these events become more and more relevant: Crowd disasters as witnessed at the german Loveparade 2010 in the city of Duisburg or at the Great Pilgrimage to Makkah (aka hajj) force authorities towards a security based planning. With more than 3 million pilgrims the hajj is known as the largest pedestrian problem in the world (<http://www.trafficforum.ethz.ch/crowdturbulence/>). During hajj several rituals have to be performed by the pilgrims. One of the most dangerous ritual in terms of crowd disasters is the stoning of the jamarat at the jamarat bridge in the mena valley. In this contribution we propose a management approach based on a mathematical program in order to schedule and assign pilgrims to pre-defined routes. The schedule and the route plan yield a good balance of pilgrim flows in space and time as shown by simulation and revealed data from several years.

## GCG 13-01 - Global change, criticality and tipping points: globalised trends, disasters and resilience

*Chair: Alexander Fekete, Jörn Birkmann*

### Criticality of infrastructures: Global changes or local trends? – Assessing the vulnerability of infrastructure systems

*Claudia Bach (United Nations University)*

Critical infrastructures (CI) and particularly electricity supply systems build the backbone of highly developed societies and have gained importance in a variety of them. Here, they are in general defined as those infrastructures whose disruption would lead to major social consequences. In developing and threshold countries instead, criticality of infrastructures rather defines the importance of certain sectors for development. However, the criticality of infrastructures in the "highly developed sense" plays a major role in the context of infrastructure vulnerability assessments by defining the effects of a potential shortfall. In order to increase societal resilience, it is thus important to assess infrastructure vulnerability towards natural hazards also considering their level of criticality. Accordingly, the physical assessment has to be accomplished by the assessment of infrastructure significance. Whereas in highly developed countries, an almost uninterrupted supply leads to unawareness, thus unpreparedness of the population and a societal vulnerability to such shortfalls that is comparatively high, threshold and developing countries instead, are struggling to increase their supply levels which are close to zero in some areas. The population however, is used to the lack of e.g. electricity, better prepared and less vulnerable to shortages. Vulnerability assessment methods thus have to take into account the vulnerability of the infrastructure system, supply levels as well as the degree of dependency of the population. Resulting, the contribution will outline infrastructure vulnerability assessment methods and the inclusion of secondary effects on society. It will deal with their application to different contexts, including the population dependency on certain services. According to several vulnerability components that will be outlined, potential adaptation and development potentials will be discussed. This is especially important for infrastructures as investment in this field tends to be high regarding amount and persistence.

### Assessment of social vulnerability using spatial multi-criteria analysis (SEVI model) and the Social Vulnerability Index (SoVI model). A case study for Bucharest city, Romania.

*Alexandru Gavris (Academy of Economic Studies), Iuliana Arma' (University of Bucharest)*

This study investigates two vulnerability algorithms through a spatial exploration model of social vulnerability in the city of Bucharest. The research examines social vulnerability in the light of three dimensions: "Social", "Economic" and "Housing quality", obtained by applying the factorial reduction procedure on the 2002 census data at tract level of Bucharest city. The social vulnerability index (SoVI model) followed the steps indicated in 2003 by Cutter et al. Using the spatial multi-criteria social vulnerability index (SEVI model), we aggregated the scores of the indicators in which the selected factors were saturated, and introduced them as multidimensional indicator maps in the spatial multi-criteria analysis (SMCA) module of Ilwis software. The final index score was obtained by weighting sub-indices in a complex social vulnerability index (SEVI). We applied spatial statistics tools of the Open Geoda software for exploring geographic clustering of results. The study highlighted that social vulnerability is a major spatial urban process in Bucharest city, with a tendency toward extending clusters. The main result was a significant clusterization pattern in the 2002 census units, with overlap among the clustering areas affected by high social vulnerability. The results were constrained by some limitations of the methods used, analysed in the last part of the study.

### Critical Infrastructures as Hybrid Networks. An Actor-Network Theory Approach to the 'Hybrid Geographies' of Critical Infrastructures.

*Florian Neisser (Bonn University)*

The discourse about societal security in the context of the general principle of human security and vulnerability established a growing interest in critical infrastructures. The dramatic events and cascading effects of risk in Fukushima, Japan made clear that the topics of risk and vulnerability of critical infrastructures bear central questions for today's society. Although it is a topic which is widely discussed from public and private stakeholder perspective as well as from scientific point of view it is lacking a thorough theoretical foundation. Recent studies addressed the interdependencies of critical infrastructures and the network structure of infrastructures. The notion of increasing interdependencies

between infrastructure sectors is broadened by the acknowledgement of a proceeding interconnectedness within different sectors of critical infrastructures. This raises important questions about the network structure, network security and internal and external risks. In studies about risk, security and vulnerability either a perspective focused on social practices and institutions or a view with a technocratic stance are the prevailing frames of analysis. The conception of infrastructures is predominantly seen as technical structures with humans as builders and consumers. These common categorizations and perspectives imply certain roles and attributions with implications on operation, maintenance, management practices and therefore addressing the question of causality of failures. A new and different approach would mean to avoid these a priori distinctions and dichotomies without focussing on one element of the network. In this regard the Actor-Network Theory offers an alternative view by emphasizing the hybridity and heterogeneity of human and non-human interrelations. In this sense, critical infrastructures are heterogeneous entities, assemblages of the material and non-material. Therefore it is crucial to understand, what Aradau stated, that 'infrastructure plays an agential role, both constraining and enabling' (Aradau 2010: 493). From an ANT perspective, critical infrastructure is at the same time an actor and itself an actor-network consisting of a multitude of heterogeneous elements forming this network. To understand risks and contingencies it is necessary to analyse and understand these assemblages which process John Law calls 'heterogeneous engineering' and the configurations of enabling and constraining. The application of Actor-Network Theory for the observation of the 'hybrid geographies' (Whatmore 1999) of critical infrastructures with its complex heterogeneous constellations and contingencies is a promising, logically consistent and consequent approach which pursues current research and broadens it with a sound theoretical foundation. The speech will elucidate the approach, its concept and benefits for a better understanding of critical infrastructures and disaster risk management.

### Continuing Challenges to Quantifying Terrorism Risk Management

*David Weinberg (Practical Risk, LLC)*

After the attacks of September 11, in an effort to supply resources to the nation as a whole, the US Dept. of Homeland Security created a nation-wide program meant to reach out to states, cities, and various infrastructure sectors in an effort to help them 'harden' themselves against future attacks. A consensus was developed to base the grants on some computation of risk, and the basic formula of risk being the product of consequence, vulnerability, and threat came

into being, and became the foundation upon which several years' worth of grants would be distributed. In the paper, some of the more obvious traits of each of the three variables will be examined, but some of the less obvious and, perhaps, more problematic issues that arise from a careful investigation will also be discussed. Primarily, the importance of physical infrastructure will be addressed and the different kinds of consequences that could result from terrorist attacks on these infrastructures. Some issues inherent in trying to perform geographically-based risk as opposed to simply individual infrastructures will be addressed along with various parameters that were considered and used; some clearly influential in risk analysis, while others being far more esoteric. Having set this stage, some of the less well-understood aspects of risk analysis and management will be discussed, along with the challenges they present to the analyst. Infrastructure interdependencies and second- and third-order effects of attacks in some cases could easily dwarf the immediate impacts of a deliberate act of terrorism. There is a strong caveat for all risk analysts that forces them to take into account the quality and quantity of data needed for reasonable analysis. While the challenges of performing robust quantitative risk analysis and management are considerable, there is much to be gained in the journey. Mathematical approaches force the analyst to appreciate the logic of the assumptions and the methodology employed in making the necessary calculations. It is largely in this often difficult struggle that insights can be gained that would otherwise be simply overlooked or ignored. Analysts must realize that regardless how good the numbers may be, resource allocation decisions in the public sector will always be subject to political wrangling. Final results will always be decided by what is most palatable to the broadest community of politicians, and may bear little resemblance to strict numerical analysis. While often unsatisfactory to the purist, the analyst must understand two absolute realities. First, all models are wrong; some are more useful than others in providing insight into what are largely wicked problems. Second, whenever allocation of public resources is involved, politics must trump analysis. It is in finding the most useful balance between risk analysis and risk management that real progress must be measured.

## GCG 14-01 - Global complexity: From theoretical thought to geographical evidence

*Chair: Christina West, Heike Egner*

### A pattern that has passed its sell date

*Samir Rihani (University of Liverpool)*

In almost all societies a management pattern emerged early in humankind's development and has endured to this day. The pattern is simple: an individual supported by a close-knit elite at the top of a steep hierarchy. In politics as in business the inspired leader; qualified through education, natural talent, auspicious birth, or even divine powers, is seen as the obvious person to manage the affairs of others that circumstances have deposited into their care. There is a technical dimension to the above concept. Hierarchical leadership implies a definite view of how most situations should be managed. The ruthless leader and his or her supporting elite is seen as the ideal shaker and mover that achieves results quickly and efficiently. The picture that goes with this style of management is easy to visualise: end-state plans to be executed successfully according to a set schedule implemented by command-and-control. Those at the top tell others what to do, how to do it, and when. This management style, sometimes referred to as the waterfall, is appropriate for many mechanistic situations such as an industrial assembly line or the launch of rockets into space. If only life were that simple! However, in the distant past and in some primitive societies today politics and business does present "tame" problems for which a steep hierarchical setup might be appropriate. This is of course not the case nowadays as both business and politics become more and more complex over time. Most situations fit into the category of "wicked" problems. Sadly, intentionally or otherwise, most current leaders seem blissfully unaware of the existence of complex adaptive systems and their peculiar modes of behaviour that require radically different styles of management. This disconnect between complex reality and linear fiction is now becoming a major source of instability that is beginning to affect social cohesion and the foundations of consensual democracy. The problem is seen at present in the context of quality of leaders rather than the need to recognise the existence of increasing complexity that requires a radical shakeup of the existing management architecture. Stakeholder engagement and active popular participation are not a band aid that could be simply grafted onto the current model of political and business management.

### Phenomenon of geoculture: Interpretation and urgency

*Yuri Mazurov (Moscow State University)*

The early 21st century was marked by significant development in areas of applied geography, and often - at the junction with the other branches of science or human activities. Among them such active demand in the world practice areas as geographic information systems, global positioning systems, geotourism, geoart, etc. These and many other areas of modern human activity suggest that an adequate level of geographic knowledge and skills or, in other words, geographic competency of their users. Geographic component will play an important role in environmental and cultural policies, in the formation of a "green economy", and so on. The presence of the respective geographical competence of specialists, becomes an important and indispensable factor in sustainable development. Geographic jurisdiction, which together form a professional geographical culture (geoculture, GC) - a culture of professional specialists whose work is related to geographic space. However, the phenomenon of GC manifests itself in everyday life, being an important attribute of the modern lifestyle. Visible manifestation of the GC is the transition from chaos to the spatial organization of the life of society to a more or less orderly fashion. Called the procedure is often manifested in the differentiation of space activity in society, his main functions: residential, industrial, communications, conservation, sacred, etc. The results of this differentiation are functional zones - relatively stable certain areas of specialization. The desire to optimize the functional zoning of the space is a universal attribute of ethnic and inherent in virtually the entire history of human civilization. A striking illustration of this is, in particular, the ancient "ideal city of Adrian" near Rome. In the same series of the British idea of "a "garden city", a brilliantly realized in the projects of the capitals of Australia and Brazil - Canberra and Brasilia. Among the recent examples can be called the project of Hammarby Sjord in Sweden. However, all the above cases as examples of local manifestations of GC are clearly inadequate to address contemporary issues of sustainable development. The urgency of finding these solutions on a global level for the first time was identified in the documents of the UN Conference on Environment in Stockholm in 1972. Even more clearly reflected in the documents it had found the World Summit in Rio de Janeiro in 1992. Period after these two summits convincingly demonstrated that the human race has no alternative other than "fitting in" in a space of our planet. It seems that to solve this global problem will solve mankind by means of a "green economy" in the ideological baggage which must occupy an important

place GC with its potential best organization of life space for the benefit of all countries and peoples.

### **Critical Infrastructures – reducing hidden societal vulnerabilities towards natural hazards**

*Claudia Bach (United Nations University)*

Critical infrastructures (CI) and particularly electricity supply systems build the backbone of highly developed societies. But not only depends the functioning of societies on these services. Infrastructures such as information and communication technology, water supply, or transport today are so interconnected that the failure of one of them could lead to cascading effects into a variety of sectors. Additionally, the organization of infrastructure sectors is becoming increasingly complex with an increase of actors due to the liberalization of markets and privatization of formerly state-owned companies. Although research on coupled CI-population systems has been conducted, an approach to increase resilience based on qualitative and quantitative assessment methods is still lacking. Besides the growing interdependency of infrastructures in highly developed countries, the level of supply is also increasing. An almost uninterrupted supply security leads to a lack of awareness of potential shortfalls and thus unpreparedness of the public. Nevertheless, in case of disruption e.g. through natural hazards, a lack of supply has secondary effects on society. Critical infrastructures can thus be considered as hidden societal vulnerabilities which need to be considered in comprehensive risk assessments. This includes on the one hand the development of vulnerability indicators of CIs towards different (slow and sudden onset) hazards. On the other hand, the inclusion of hidden vulnerabilities also requires broadened assessment frameworks encompassing several levels to analyze interdependencies of human and infrastructure systems. The contribution will refer to these needs and introduce potential assessment methods towards the vulnerability of critical infrastructures on the example of electricity supply. It will further deal with the idea of hidden vulnerabilities and introduce methodological approaches to feed secondary effects of natural hazards towards society into vulnerability assessments.

### **Super New Economic Geography: Theory and Possibilities for the Analysis of Global Change and Globalisation**

*Alexey Skopin (National Research University)*

The 90-ties was a period of forming the two types of New Economic Geography. The first type was forming by western scientists: P. Krugman, M. Fujita, A. Venables, etc. It was based on the transformed principles of neoclassical economics. The second type (SuperNEG) was forming in Russia by the author of this article based on his own "Theory of the Earth Existence" (TEE). This theory and its applications were used for research of the problem of Aral Sea (1983-1987), explanation of the strategy of development of Kazakhstan (1987-1993), explanation of the strategy of development of Russia (1994-2005) and the complex explanation of the transformations of the Earth surface (2004-2008). The main results of these investigations were summarized in the monography "Common Geography: Global Synthesis" (in cooperation with Peter Haggett, Pearson Education, 2007). But previously all these materials were published just in Russian. Now it is possible to present them for the global geographic society. The main composite parts of the TEE are: 1. Understanding of the earth surface as the only really limited resource for social and economical activities. 2. Understanding of the complication of the structure and behaviour of organisms, social groups, nations and corporations as the only method of victory in the competition for the spatial resources. 3. Understanding of technics of the territories development (TTD) as: a) the practical result of complication of economical, social and cultural life of societies b) metodological and analytical base for forecasting and proyecting of the development of states and regions 4. Differentiation of nine main types of TTD: 1) Primitive economy (hunter-gatherers, approx. 25 sq. kilometers of territory per person), 2) Nomad economy (pastoral nomads, approx. 2,5 sq. km per person), 3) Nomad plant cultivation (approx. 0,25 sq. km per person), 4) Dryland farming (approx. 0,025 sq. km per person), 5) Irrigation farming (approx. 2500 sq. meters per person), 6) Extractive industry (approx. 250 sq. m. per person), 7) Manufacturing industry (approx. 25 sq. m. per person), 8) Service economy (approx. 2,5 sq. m. per person), 9) Informational economy (approx. 0,25 sq. m. per person). Thus the Informational economy TTD allow to use the Earth surface million times more efficient than the Primitive economy TTD. 5. All the variety of the economical, social and cultural phenomenons on the Earth surface could be explained using nine types of TTD including demographic structure of society, economic development and institutional organisations. 6. We can do rather precise forecasts for the amount of population on the Earth, macro regions, states and towns basing on the



knowledge of TTD used there. 7. Replacement of TTD of the concrete territory allows to do well founded conclusion about the complication or simplification of social economic systems of that territory.

## GCG 15-01 - Globalization and the re-making of rural place 1

*Chair: Birte Nienaber, Michael Woods*

### The Impact and consequences of globalization on economic sustainability in urban-rural fringe

*Hassan Afrakhteh (Tehran Tarbiat Moallem University)*

Globalization is an on-going process by which markets grow and expand into a network that reaches around the world. In this sense, globalization is not new. The process was fairly well developed in the ancient world and has evolved almost steadily since about 1400. But huge drops in transport and communication costs have taken place in the last quarter of the twentieth century, and that has allowed the globalization process to move rapidly in our time. Huge blocks of market information move at the speed of light and at very low costs to any place on the globe. Few places are able to isolate themselves from the impacts of economic change anywhere in the world. Sustainable development is development that meets the needs of present without compromising the ability of future generation to meet their own needs. The goals of sustainability are to enhance people's well-being. Sustainability is a concept allows a comfortable way of living by balancing the resource demand of technological, economical and social requirement with the environment's ability to meet present and future needs. Two terms of urban and rural can and must be treated together because they deal with one single geographic concept. Urban and rural are labels applied to different parts of space based upon its uses. Rural is that space which is not urban. We can define an urban area as being one where the land uses from customary and traditional urban activities produce higher returns than from traditional and customary rural activities. The urban fringe, therefore, is the frontier in space where the returns to land from traditional and customary urban land uses are roughly equal to the returns from traditional and customary rural land uses. In theory, such a frontier should always exist, although its exact location on the ground may not be easily fixed. In times of major economic change, that frontier will be very fluid as changing market conditions cause changes in the returns to land at any given place. Hence, rapid globalization of the sort occurring in the current century must inevitably impact the sustainability of urban- rural fringe. Study area of this research is urban rural fringe of Tehran metropolis. The main aim of this research

is understands the process of globalization, its impact and consequences on rural-urban fringe economic sustainability.

### Globalisation processes in the Dry Chaco of Argentina. The expansion of soybean and its human consequences.

*Julieta Krapovickas (ISES- Instituto Superior de Estudios Sociales)*

Under the influence of globalisation processes, for several decades the Argentine Chaco region manifests intense changes, both environmental and human. Among the former, it should be noted the advance of deforestation and forest degradation, main causes of carbon emissions and global climate change generators. Among the latter, migrations, changes associated with access to land and common pool resources by the local population, and the growth of the productive and business sectors result of global market entry, are the most prominent. In the context of a country clearly urban (according to the latest data available 89% of Argentina's population was defined as urban) the Chaco region represents a unique case of high rurality, isolation, poverty, and high proportion of indigenous people (who still uses the forest resources freely for their survival). The most important territorial manifestation of globalisation in there is the change in land use. High deforestation rates are associated with the expansion of the agrarian frontier, which is resulting from good prices of certain commodities (e.g. soybeans) in the international market. Thus, these globalisation processes have led to the coexistence of two worlds within the rural areas of Chaco: by one side, the local rural population with their traditional lifestyles, and by the other side producers and entrepreneurs often foreign or extra-regional, who used capitalist logics and productive models very different from the local ones. In this paper it is proposed a first approach to the logic and the model of soybean production in localities in the south and north of the Salta province (i.e. Las Lajitas and Joaquín V. González in the South, Orán and Tartagal in the Nord). It will be used primary information from semi-structured interviews with producers, entrepreneurs and with national and provincial production institutions operating in the area. It will be analyzed the incorporation of local labor in soybean production, the role of the activity as a catalyst for the economy in the localities as well as the environmental effects of new production model, specifically its implications for deforestation, always from the perspective of a social actor: the producer of soybeans.





### Security of Property Rights and Land Use Transition in Ukraine

*Scott Loveridge (Michigan State University), Denys Nizalov (Kyiv Economics Institute), Suzanne Thornsby (USDA Economic Research Service), Mollie Woods (Michigan State University), Olha Zadorozhna*

Risk and uncertainty over the results of agricultural production were always considered as impediments for the development of agricultural sector and rural areas. Besides traditional weather and market related sources of uncertainty, agriculture in transition economies has to face one more major factor of risk - changes in institutional protection of property rights. This paper illustrates how such institutional changes affect the land use and crop mix patterns in Ukraine. Ukraine is a country with some of the richest arable land in the world and is among the largest agricultural producers. The country, however, went through the major change in the institutions regulating and protecting the property rights for land. In 1990, at the beginning of transition, all land belonged to the state and was operated by state enterprises. By 1995, the ownership for about 40% of land has been transferred to collective farming enterprises. The individual property right for land, however, was almost nonexistent till 2001. At that time, individuals were granted a right to withdraw their parcels from the collective enterprises. The rental market for land was established at the same time. Over a short period of time, collective ownership has practically disappeared. However, sales of agricultural land are prohibited till now. Establishment of market for agricultural land has been postponed several times. Moreover, the rights of tenants remain uncertain once the free market for land is established. This institutional uncertainty of property rights of tenants vs. owners creates different incentives to invest, particularly into perennial crops. This paper tests the validity of the above statement using annual data on land use patterns of the universe of farming entities in Ukraine during 2001-2010. The identification of the property right effect is based on the differences in the investment patterns into perennial vs. annual crops by owners vs. tenants. The results of this study have important policy implications. First, the uncertainty makes the tenant to deviate from the 'optimal' crop mix reducing the productivity of tenant farms. Taking into account that about 95% of agricultural land is rented in 2010, Ukraine faces significant losses in agricultural production and GDP in a short run. Second, the uncertainty leads to underinvestment into new technologies including adaptation to the climate change. Such underinvestment affects productivity and vulnerability of Ukrainian agriculture in the long run.



### GCG 15-02 - Globalization and the re-making of rural place 2

*Chair: Birte Nienaber, Michael Woods*

#### **The role of tourism in rural economy (case study Harsin, Kermanshah, Iran)**

*Shahbakhti Rostami (PNU), Amirali Zolfaghari (Bonyad Maskan Kermanshah)*

Rural migration is a main problem in Harsin, Kermanshah. To come up with this problem, it is necessary to consider a comprehensive solution. The special attention should be paid to potential possibilities of the region and diversification of rural jobs by planners and relevant authorities. As an option, rural tourism can play an important role to diversify rural economic activities, to introduce rural products to tourists, and to increase in come levels of rural residents. The present thesis is an attempt to introduce rural attractions of Harsin from tourism viewpoint. Then, it discusses the role or tourism in rural economy of Harsin. To confine the study area, eleven villages which have some kind of physical or historical attractions are selected as the case study for this research. Using documentary and field study methods (i.e. interview, questionnaire, observation) relevant data about tourism and rural economy are collected, classified and analyzed. Geographic Information System (GIS) have been applied as a powerful tool to create spatial database and also to map and to visualize the relevant data. As a result, the final analysis of the present thesis shows that rural Harsin has a considerable potential of tourism attractions, however, the role of tourism in rural economy of Harsin is not a reasonable and effective one. Therefore, the public and private authorities must pay more attention to rural programs and different tourism plans.

#### **Individual agency, relational political economy and catalysts for globalization-related restructuring in rural regions**

*Michael Woods (Aberystwyth University)*

This paper will examine the role of individual actors as agents of change in rural regions. Drawing together the relational political economy literature than has emphasized the importance of global relations to regional economies and the rural studies literature on neo-endogenous rural development, the paper argues that greater attention should be paid to the role of individual agents in the social and economic restructuring of regions. Employing an interpretative model

developed through the FP7 DERREG project (Developing Europe's Rural Regions in the Era of Globalization), the paper proposes that individual actors, such as business entrepreneurs, corporate executives and social activists, act as catalysts in converting the potential effects of globalization processes into actual impacts in specific rural regions. Furthermore, individual actors are also important as animateurs in initiating and organizing regional development responses to globalization pressures. The argument will be illustrated by examples from case study regions in Europe, relating to business networks and innovation, international migration, sustainable development and regional learning.

## GCG 16-01 - Knowledge, networks and innovation in China's development

*Chair: Ingo Liefner, Susan Walcott*

### FDI Networks, Innovation and Embeddedness in China

*Yehua Wei (University of Utah)*

This paper analyzes foreign invested enterprises (FIEs) in Suzhou Municipality, known previously for its local state-led Sunan model of development based on township and village enterprises. However, Suzhou has been remaking its development model through state-centered efforts to attract foreign direct investment (FDI) and make itself an innovative place. We argue that the local state plays an important, yet diminishing, role in location decisions of FIEs, while the effects of industrial agglomeration have been increasingly important. However, FIEs tend to network among themselves and remain thinly embedded with local economies, and embeddedness is limited by a series of technological, institutional, and spatial mismatches. Strategic coupling rarely exists between FIEs and local firms. Suzhou's development path requires development of endogenous capacities.

### Networking Dynamics and Space: The Case of China's Biotechnology Research System

*Arman Peighambari (Justus-Liebig-University Giessen), Stefan Hennemann (Justus-Liebig-University Giessen)*

The growth dynamics, reasoning, and spatial organization patterns are strongly related to the structure of the respective industries that cause different regional growth models. Moreover, theory predicts that the collaboration activity is showing distinctive features concerning the resulting network patterns. While the industrial activity and networking in export-oriented industries in China is mainly driven by global production chains with low local network embeddedness (type 1), especially science-driven industries, where basic research and economic application is intertwined, the chance for intra-country networking is much higher (type 2; e.g. public research agents are an interesting cooperation partner for the industrial sector). This has consequences for the potential upgrading paths of the respective industries and the state and prospect for the regional development in China. Industries of type 1, such as the electronics sector, are strongly making use of knowledge from their cooperation with global buyers.

However, they face difficulties of upgrading their low-end activities and move towards higher requirements regarding their capabilities and, hence, a higher value-added. In contrast, industries of type 2, such as biotechnology, are making use of their strong relations with the public research sector in China. They are more seen as equal partners in global knowledge networks. Still, they face difficulties that are related to the immediate economic valorization of their inventions, yet offering a regional growth path of great potential. A survey of 300 PRD-based SMEs from the electronics industry, conducted at the end of 2011, is serving as an example for type 1 industry surveys in China. For the type 2 industries we use a large bibliographic dataset (SCI-Expanded and China's Chongqing VIP) to evaluate the regional collaboration activity in the Chinese biotech system. We will discuss aspects such as the different ability of companies to absorb and incorporate external knowledge into the organization, the willingness of collaboration partners to transfer this knowledge, and the potential consequences from different types of knowledge transfer processes for the regional economic development. Further, we propose a comparison of investigating both industries with different empirical approaches and discuss the necessity for a comprehensive empirical toolset.

### The Problems of Beijing in the Process of Striving for World City by Technological Innovation

*Jie Fan (Chinese Academy of Sciences), Dong Chen (Chinese Academy of Sciences), Wangshu Hu (Chinese Academy of Sciences)*

Beijing is implementing technological innovation strategy to reconstruct itself from an industrial city to a world city with developed service industry. This paper analyzes the changes of employment structure and the population migration in the process. The employees are surveyed in those new urban areas. The result shows that the majority of new jobs are occupied by people from other provinces who have better education and stronger competitiveness than the ones from Beijing. But it is noteworthy that only a few native residents leave Beijing because of the high quality of public services, e.g. the lower test scores required to get into the universities, the convenient access to the best hospitals. For the native residents, the government has to develop some low-value-added industries around the inner city. The agglomeration of the new residents and the non-leaving native residents leads to the increasingly expanding of the city and some serious urban diseases, e.g. the traffic jam, which unfavorably influences the construction of the world city. Therefore, the achievement of upgrading depends on whether Beijing can emigrate the native residents and decrease the

population. Fortunately, the enterprises such as Shougang, a steel company, have started to move out of the city and the workers have also begun to emigrate along with the companies.

### Technological Learning, Industrial Catch-up, and the Dynamic Evolution

*Changhong Miao (Henan University), Wenying Shang (Henan University)*

The fast rising of China is undoubtedly one of the most concerned but controversial academic topics in the rapidly-changing global political and economic system. Through more than 30 years's reform and opening up, especially since China's accession to the World Trade Organization, China has become the world's biggest exporter and second-biggest importer. However, China's economy is also at a significant crossroads, because its long-term sustainable economic growth is faced with increasingly severe constraints such as resources, environment, market demand and social inequality. Thus, building an innovative country, changing from "Made in China" to "Innovated in China" and "Created in China", from a follower to a leader in technology and industry, is considered as the only way of shifting China's mode of economic development. In this process, technological learning and industrial catch-up is the most important strategic issue. Technological learning and industrial catch-up is nurtured, developed and embedded in the "learning field" which is formed by the interaction of technology, organization and territory at a global-local networks, the process of technological learning and industrial catch-up is also the dynamic evolution of the "learning field". In this paper, based on institutional economic geography, relational economic geography and evolutionary economic geography, a dynamic theoretical framework of "learning field" is constructed to analyze the case of industrial development of super-hard materials in Henan Province which plays a more and more important role in the global market. We found that the nature of technological learning and industrial catch-up is the process of relationship-building, institutions-constructing and dynamic evolution of the "learning field". It shows that technological learning and industrial catch-up is driven by the interaction and coordination among companies, governments, research institutions, universities, financial institutions, industry associations and other key actors at local, regional and global scales. The case of Henan super-hard material industry reveals that technological learning and industrial catch-up is a complex dynamic evolution system in which the strength of the collaborative innovation and global-local networks among key actors and the capability of technological innovation of

focal companies are key factors, and the government's industrial policy to promote technological innovation and industrial upgrading plays a very significant role as well.

## GCG 17-01 - Labour geography: Workers interventions in the global economy

*Chair: Martina Fuchs, Andrew Cumbers*

### Gender and Fairtrade

*Janet Momsen (University of California)*

Fairtrade is an alternative trading mechanism for commodities involving the payment of a guaranteed price that covers the cost of production and a social premium to be invested, usually in communities. Fairtrade certification is available for groups of small farmers and for workers on large scale farms. The Fairtrade Labelling Organization (FLO) is currently working to mainstream gender in Fairtrade. Farmers may work with Fairtrade as individuals or in cooperatives. The success of women and men Fairtrade farmers and their attitudes to Fairtrade, in different types of groups, will be assessed from field data gathered in Nicaragua and the Caribbean. The importance of local environmental issues such as hurricanes and droughts and of the global economy on these small farmer groups will also be examined, especially in relation to gender.

### Trade unions strategies on climate change: Varieties of green new dealism

*Romain Felli (University of Manchester)*

The paper discusses International Unions' strategies on climate change. Whereas the International Trade Union Confederations, and the various so-called "Global Unions", are relative newcomers to the field of international climate policy, they are developing very specific strategies, focussing on the link between socio-economical phenomena and environmental policies. I analyze some of their strategies (such as the incorporation of the concept of "just transition" in international agreements, or the promotion of "green" or "sustainable jobs") by drawing on the literature on "labour geography" as well as on historical materialist's understandings of international relations. Based on an empirical study, this paper argue that all international unions basically share the same green keynesian vision (or green new deal perspective). However differences in the objectives and the means towards the achievement of these objectives vary widely across sectors, countries and unions. These variations are mainly related, I will argue, to the forms of (class) consciousness embedded in the various unions, and hence in the definition of strategies and tactics. This relation

between consciousness and strategies has been relatively understudied in the "labour geography" literature.

### Are financial investors being pushed off the road? Defensive strategies of employees in the automobile industry

*Christoph Scheuplein (University Muenster)*

In the last decade, the acquisition of industrial enterprises by financial investors has also become widespread in Europe's continental countries. From the outset, employees resisted this because acquisitions often entail a higher pressure on working conditions. In recent years, however, the impact of private equity has been viewed more critically in the discourse of civil society and in legislation. Using the example of the automobile industry in Germany, the presentation shows how the increase of financial investors has been stopped in this branch of industry in recent years. Trade unions and works committees played a significant part in this by establishing information networks and intervening restructuring processes. Gradually, the ideological consensus of the corporate management was successfully separated from the financial investors. Initially, managers thought of private equity as a fitness program for the company but in the meantime negative effects on human resources are being considered. The results of qualitative interviews are represented, which analyze employees' actions based on the branch of industry and on business examples.

### The potential of collective power in a global production network: Unicom and Metro Cash & Carry in India

*Martin Franz (Fachbereich Geographie)*

## GCG 18-01 - Management Geography – Embedding COPs in changing global urban networks

*Chair: Rolf D. Schlunze, Elmar Kulke*

### The geography of work in knowledge intensive service firms

*Kristina Trygg (Stockholm University)*

This paper aims to understand the geography of work in knowledge intensive service firms. Geography of work refers to the location where work is conducted. This can be at the office of the employer, the office of the client firm or in a third place including the home of the employees, meeting places like seminars, restaurants, hotels etc. The empirical data in this paper is derived from nine different firms in management and in PR/ communication consultancy. The firms are knowledge intensive and located in Stockholm. The empirical data is interview data from interviews with nine persons responsible for the Human Resource management of the organization. Most of the interviewees are CEOs, partners or owners of the firms. I have also done interviews, time diaries and questionnaire survey at two of the firms with the employees. This means that the data gives the perspective from the side of management of the firms and from the side of the employees. The results indicate the importance to be at the office for meetings, gain information both informal and formal. This may be interpreted both as, on one hand, an effect of the learning and knowledge and working process in such firms to be strongly relying on interactive communications where face-to-face contact is seen as important. On the other hand, the arguments of the importance of presence at the office can also be interpreted as an effect of power relations and the managements aims to control the main resources of the firms and that is the human capital, i.e. the employees. Physical presence and 'shoulder-to-shoulder' work are important means to support 'team building', sense of belong and commitment to the company's visions. Most of the persons in the management team were reluctant to let employees work at home more then necessarily, for example when the kids where sick but all firms said that the employees hade the opportunity to work from home. The paper considers the role of information technology for the geography of work. It is found that information technology is a tool helping the employees to structure their working life. Here smartphones have been a helpful implement. I have also seen that intranet such as jammer are important for the employees. Technology is used to communicate and coordinate the employee's work, not to make them work from distance.

### The location of the creative class and US-subsiidiaries in Germany

*Moiria Conway (CUNY Graduate Center), Marlies Kluike (University of Tübingen)*

Germany is a very attractive target for US-investors for endeavors for which a very specifically skilled workforce is required. However, within Germany there are considerable differences regarding where specific types of workforce reside. Therefore, areas of Germany where foreign subsidiaries could utilize the right local talent, due to its higher concentration, should be especially attractive to certain US-investors. Recurring on Florida's creative class Index applied to Germany, we endeavor to establish whether US-subsiidiaries that can draw competitive advantage from the creative class are drawn more to creative locations within Germany and differentiate between specific characteristics, such as subsidiary ownership structure. Focusing on US-subsiidiaries that have recently established a presence in Germany to ensure that they have indeed been drawn to the creative class location and not the other way around, we test our propositions with the help of database information regarding US-subsiidiaries in Germany, controlling for factors such as subsidiary headcount. From our findings we draw conclusions regarding foreign investors, locational decisions and regional planning initiatives.

### Is finance ready for inter-firm collaboration? Insights from the automotive sector in a global production network perspective

*Hans-Martin Zademach (University Eichstätt-Ingolstadt), Christian Baumeister (University Eichstätt-Ingolstadt)*

The proposed paper is concerned with the circulation of financial capital and cooperative means of firm finance in global production networks. Taking the emerging body of literature in the field of supply chain finance (SCF) as conceptual point of departure, it argues that cooperative forms of firm finance increase the competitiveness and resilience of global production networks towards external shocks as occurred during the most recent financial crisis or due to changing legal regulations (e.g. Basel III). With regard to empirical work, the SCF literature states that the collection and description of more detailed case studies is still an open issue. The present contribution intends to help closing this gap with insights into the concurrent practices and limits of intra-firm finance within the production networks of the German automotive sector. These insights draw on preliminary results from an ongoing research project that aims to explore the motives, success factors and constraints of cooperative finance practices in and between different locations in varying development stages by



dint of both quantitative and qualitative work. The paper concludes with an outlook on the research agenda and a discussion of possible implications for both the firm level as well as regional development. Keywords: Global production networks, firm finance, supply chain finance, automotive industry, Germany

### **On Management Geography**

*Päivi Oinas (University of Turku), Lech Suwala (Humboldt Universität zu Berlin)*

The emerging research field management geography calls attention to its foundations. Management geography is a new approach which seems to have close connections to three established fields, namely, (1) geography of the firm, (2) aspects of economic sociology with emphasis on embeddedness, and (3) the broad literature of management studies. Nevertheless, the connections between these research fields and their role in management geography remains to be scrutinized and established. Moreover, the precise meaning of the spatial environment of management activities has not been fully elaborated in the various theoretical frameworks. Management geography should not be just management studies attempted by geographers but should be defined as an eclectic framework taking a genuine geographical perspective on studying management. Management is taken as the activities that coordinate the operations of firms towards its goals. Managers - as individuals or in teams - hardly determine strategies alone but they are key agents in the strategy process. Our attempt in this paper is to outline a distinctively geographical perspective on management. This involves, first, distilling the valuable complementary insights from the three research fields mentioned above. Secondly, it involves the introduction of three distinct aspects of the environment providing environmental conditions for management, namely economic conditions, socio-cultural conditions, as well as managerial perception of the environmental conditions. This allows us to focus on how various aspects of the spatial environment influences management as well as how management takes the geographical environment into account in evaluating the external impact of the activities of the firm.



## GCG 19-01 - Mapping the emergence of change: Future European perspectives

*Chair: Karl Donert, Daniela Schmeinck*

### **Students' perception of Europe and European Identity: PAM-INA Project**

*Aikaterini Klonari (University of the Aegean)*

This paper aims at configuring school-children's notions, feelings and understandings of Europe and at exploring the ways in which these affect perceptions of their identity. We attempt to draw this profile of pupils' European identities through ethnographic research, based on interview questionnaires in schools at eight European countries. The study takes place in the broader context of the PAM-INA European research project, investigating common lay perceptions of European identity. Specifically, the children state that they speak often more than one foreign language, have traveled abroad fairly extensively and carry a sufficient knowledge of Europe through school curricula (with an emphasis on the course subject of Geography). However, they exhibit a rather insufficient knowledge of European geography, history and symbolism and seem to think of themselves mostly as national rather than as European citizens, while exhibiting certain indifference as to their European identities. PAM-INA aims at creating Tool Kits for students in Europe. The implementation of the Tool Kits will enable them to achieve an awareness of Europe in their daily lives, deal with cultural issues and promote an active European citizenship. In order to create worthwhile, up-to-date teaching material, which is relevant to each national context, a scientific approach has been chosen to understand the current situation at schools in Europe. Firstly, school curricula in the 8 countries have been compared to examine how the idea of 'Europe' is manifested and expressed. The data collected has been evaluated to reveal relationships between the teaching of 'Europe' and syllabi goals (book forthcoming). Furthermore, PAM-INA has proceeded with the help of qualitative and quantitative research among students. A questionnaire was developed, critically discussed and eventually filled in by 2080 students. Both the results of the school curricula analyses and the results of the questionnaires enabled the consortium to create a very much needed Tool Kit A ('daily life') in order to fill a gap in the school curricula of the participating countries. Momentarily this first Tool Kit is trialled at schools and evaluated by the local feedback groups of all the participating countries. Each of these Tool Kits (A, B and C) consists of a

teacher manual, a student activity book along with a learning journal as well as the usage of the PAM-INA webpage. At the end of the lifetime of the project all three Tool Kits will be designed in the above mentioned way. Thus the Tool Kits aim at deepening the students' awareness, perception and knowledge of Europe, strengthening media literacy and promoting Content and Language Integrated Learning (CLIL).

### **The Future of Illegal International migration in Europe**

*Yilmaz Ari (Balıkesir University)*

Migration has emerged as a significant research topic in recent years because of the importance of changes migration causes in both in home country and host countries. Illegal migration raises a number of legal, economic and social issues. Although strict measures have been taken to reduce the illegal migration, estimates show that illegal international migration has increased and there is no indication that this trend will reverse in near future. This study looks at, by using Turkey as a case study, policy issues of international migration and tries to investigate how policies of countries and intergovernmental bodies deal with these migrants. In certain cases the policy aspect of international migration makes it even more complicated to deal with illegal migration. Therefore the policy aspects of migration should be treated seriously to provide a more humane solution to international illegal migration.

### **Strategic Planning and Sustainable Development in Spanish Cities**

*María Jesús González González (Universidad de León), María Luisa Lázaro Torres (Universidad Complutense de Madrid)*

The paper investigates how decision-making processes relating to strategic urban projects are framed in order to achieve innovative urban sustainable development and contextualize the problems which appear in the ten cities chosen as models (those with the highest populations). A sustainable city is one that has undertaken a coherent path towards not only strictly environmental topics but also themes like economic growth models and citizens' rights, addressing fundamental issues that are interconnected. The aim of this work is to discuss these clearly related themes from a standpoint of sustainable development and strategic planning. In recent years there has been a growing interest in sustainable development as a guiding principle to allow the integration of economic development and the environment within policy and strategy.



### **Impacts of spatialisation: The sustainability of the dehesa landscape**

*María Luisa Lázaro Torres (Universidad Complutense de Madrid), María Jesús González González (Universidad de León. Departamento de Geografía y Geología)*

The landscape of dehesa is one of the most abundant of the mountain formations on the Mediterranean Iberian Peninsula. In the natural environment of dehesa there is a combination of human use and a difficult environment, both provide the balance of the ecosystem sustainability. Current problems threaten the economic viability of the traditional use of these beautiful landscapes of indisputable environmental and cultural values. As a result, it is only possible to ensure their preservation, if it is still possible, through good management. The sustainability of the dehesa is being threatened by the fact that many of its traditional elements of its environmental balance are now in decline or are non-existent such as extensive livestock, transhumance or the cork working. The high cost of the forestry work adds difficulties for the forest upkeep. There is a permanent fight against the constant threat of fire from the parched pasture (withering of the grass). All products that come from the dehesa are in crisis today. So, the only way to conserve is by avoiding leaving the land. Giving up the land is a traditional fact in Spain, which means the Spanish countryside has been abandoned over the last years. In a landscape, such as dehesa, in which the work done by man is irreplaceable to keep it in balance with the environment, both, neglect and over-exploitation of the land are the two extremes that can make these Mediterranean landscapes disappear. Only proper management of these landscapes can preserve them and contribute to rural development in the area. We are going to research and identify the existent problems in this landscape through fieldwork study of two regions, in Andalusia and Extremadura, that are designated as less-favoured areas by the EU and they are the two Spanish autonomous communities with most extension of dehesa landscapes in the peninsula. Then, we will try to detect those elements that contribute to the environment, economic, social and cultural balance as well as to seek integral and sustainable alternatives of management the dehesa landscape. It is necessary to detect actions that can be qualified as good practices in order to help the Common Agricultural Policy (CAP), the development of the recent dehesa law in Andalusia and rural development. In order to fulfil the objectives of the research, it begins with a brief introduction on the importance, significance and the state of affairs of the dehesa landscape in Spain. It continues by explaining the objectives and the methodology of the work. The methodology intends to make a situation diagnostic in both regions in

order to enumerate the existent problems. And at the end we will give different alternatives for the global and sustainable management of this landscape and finally the general conclusions and the bibliography used.

## GCG 20-01 - Morphodynamic response to episodic disturbances of coastal systems

*Chair: Max Engel, Hervé Regnaud*

### Records of Mediterranean tsunamis: The importance of geologic archives to complete historical catalogues based on examples from Cyprus and Mallorca Island

*Anja Scheffers (Southern Cross University), Dieter Kelletat (University of Duisburg-Essen)*

Historical catalogues of tsunamis in the Mediterranean Sea extent over the last 4000 years and list several hundred events. For only few of those records, coastal scientists were able to attribute geomorphic or sedimentologic signatures with a specific event, excluding the mega-tsunami caused by the Santorini collapse during the Bronze Age. In contrast, research on geologic archives has unearthed tsunami events which were not recorded in historical or archaeological sources. The presentation will concentrate on such geologic evidence for the eastern and western part of the Mediterranean (Cyprus and Mallorca). On both islands the most significant tsunami deposits are coarse clast archives as boulder clusters or ridges. Numerical dating ( $^{14}\text{C}$ , U-series) of the time of dislocation (= the event date) is often challenging as it relies on the presence of marine or littoral organisms associated with the deposits. Often these organisms are absent and researchers have to apply indirect or relative dating methods to establish the likely time period of the events. The attribution of a geologic deposit to a palaeotsunami event requires a thorough differentiation between other possible depositional scenarios such as storms or the so called 'Medicanes' (Mediterranean hurricanes). On Cyprus, key evidence exists in form of an excellent preserved inundation timeline. On Mallorca, the boulder deposits could be compared with the transport energy of the Medicanes of December 2001, the strongest on record in this part of the Mediterranean Sea. Its transport energy of boulders was about 10-50 times less than that of two palaeo-tsunamis.

### Dating tsunami-induced transport of coral reef megaclasts on Bonaire (Leeward Antilles): A cosmogenic nuclide dating approach ( $^{36}\text{Cl}$ )

*Gilles Rixhon (University of Cologne), Helmut Brückner (University of Cologne), Max Engel (University of Cologne), Simon Matthias May (University of Cologne), Tibor Dunai (University of Cologne)*

Coastal hazard assessment depends on reliable information on the magnitude and frequency of past high-energy wave events (tsunamis, storms). Thereby, onshore sedimentary records represent a promising geo-archive for the Holocene. In comparison to fine sediments which have been subject of detailed sedimentological studies in the recent past (especially after the 2004 Indian Ocean Tsunami), supralittoral megaclasts are less investigated. Firstly, in most cases, it is difficult to distinguish between tempestites and tsunamites. Secondly, the dating of the corresponding event remains highly problematic. On Bonaire (Leeward Antilles, Caribbean), the transport of huge coral reef debris and boulders (up to 130 t) is, at least for the largest boulders, attributed to Holocene tsunami events. Although a large dataset of  $^{14}\text{C}$  and electron spin resonance (ESR) ages shows some age clustering, it remains unclear whether these data reflect the time of the transport event(s). Dating the dislocation of supralittoral megaclasts still is a major challenge in the research on extreme wave events. In this pioneering contribution we aim to apply in situ-produced cosmogenic nuclides in order to date the transport event(s), i.e. the inferred tsunami(s). This dating technique was successfully applied in glacial contexts using erratic boulders as sampling material; however, hitherto it has been disregarded in the coastal environment, particularly in the context of supralittoral megaclasts. Along the eastern coast of Bonaire (Spelonk), megaclast deposits were torn from the cliff edge of the last interglacial coral reef platform (3-5 m a.s.l.) and transported further inland (up to a distance of >100 m) by high-energy waves. Five boulders were sampled for cosmogenic nuclide dating. Analyses are in progress. The following characteristics of the megaclasts are fundamental for the success of the presented approach: 1) Given the material lithology (calcitic/aragonitic coral reef), concentration measurements of in situ-produced  $^{36}\text{Cl}$  will be performed; 2) only large boulders (min. 50 t) for which tsunami transport was inferred were sampled; 3) as the boulders stem from the edge of the coral reef platform, they had been exposed to cosmic radiation prior to the transport event(s) and had already accumulated a certain amount of cosmogenic nuclides. To avoid this problem of inheritance, we only sampled (i) the thickest boulders (at least 1.5 m), and (ii) boulders that had experienced a  $180^\circ$  overturn

during transport; thus having exposed a "blank" side to cosmic radiation only since the transport event. The complete overturn is indicated by former surface rock pools, now located on the bottom side of the boulders, and by bioerosive notches, now exposed on the topside of the boulders.

### **Assessing and evaluating rapid coastal change due to catastrophic events: Key messages for non-academic stakeholders**

*Adam Switzer (Nanyang Technological University)*

The use of coastal geology to reconstruct palaeo-overwash caused by tsunami and storm events now incorporates not only geologists and geomorphologists but scientists, coastal planners and engineers of many disciplines. Coastal sandsheets and other overwash features can be used to define the long-term recurrence interval of catastrophic overwash events. Such studies must always be conducted within a framework of assumptions on the pre-event geodynamics of the system. Recent studies on coastal change and the morphodynamic response and the recovery of coasts from modern storms and tsunamis have provided new insights into how systems respond to catastrophic events. This last decade of work now presents the research community with a good opportunity to reflect on the progress made in the field, evaluate some recent criticisms and highlight knowledge gaps for future study. For example, there remain no globally applicable sedimentological criteria for differentiating between tsunami and storms in the geological record. Although a suite of sedimentary features or commonalities can be compiled such commonalities can only be attributed to an event type through careful analysis of spatial features such as the elevation, lateral extent and run-up of the deposit along with sedimentary features such as grading, the presence of intraclasts, and particle size distribution of the sediments. Such analysis may point to storm or tsunami as the likely depositional agent. This stated, there remain many cases in the literature where a tsunami or storm origin is stated with little consideration given to alternative interpretations or the interpretation of palaeogeography prior to the event. This hinders the usefulness of the field and although work continues on the differences between tsunami and storm deposits, their preservation and recognition in the geological record remains subject to much uncertainty and conjecture. Unfortunately this debate and the uncertainties underlying it can undermine the true take home message for coastal managers. This presentation draws on experiences from Australia and Asia in particular from China, Vietnam and the Philippines where rapidly developing coasts are in areas equally susceptible to tropical cyclones (typhoons) and tsunami.

### **Geographical variation of the gradient of outer reef slopes and its significance relating to the Quaternary sea level change**

*Nobuyuki Hori (Nara University)*

The author proposed an explanatory model on the formation of coral reefs based on the morphometrical method using by hundreds of charts in the world in 1977. In this paper, the coral reef formation sea is divided into the two type seas. One is the core zone, which was permitted coral reef formation during the glacial age, the other is the peripheral zone, which is permitted coral reef formation during the inter-glacial age. Based on this model, fieldworks were carried out using by the small echo-sounder in Ryukyu Archipelago, Guam, New Caledonia, Indonesia, Tonga, Fiji, Pohnpei, Hawaii, Rarotonga, Tahiti, Port Sudan and Kenyan coast. A number of the echo-sounding data on the outer reef slope were collected. The results of analysis shows the geomorphological importance of outer reef slope to know the process of coral reef formation relating to the sea level changes between the glacial age and the inter-glacial age. Besides, the gradient of outer reef slopes geographically varies from showing very steep slopes in the core zone to showing more gentler slopes in the peripheral zone. The distributional tendency of the gradient of outer reef slope show a geographical rule. The author's explanatory model proposed in 1977 re-proposed as the integrated model adopted the geographical gradient rule of the outer reef slope.

## GCG 21-01 - Post-development and postcolonial studies: Research on inequalities as a challenge for Geographical Development Studies (GDS)?

*Chair: Martina Neuburger, Tobias Schmitt*

### Post-Development Methodology

*Aram Ziai (University of Bonn)*

A part of the resistance that post-development approaches have encountered in development studies can be related to the unwillingness to give up the ideal of ameliorating the misery and inequality in the world which has been closely linked to the discourse of 'development'. How, then, could this undertaking be reformulated without reproducing the Eurocentric and depoliticizing implications of this discourse? The article, building on Gibson-Graham and 'indigenous research', attempts to provide an outline of how the methodology of post-development studies could look like, how we can assess global social inequality and social change and devise policies to overcome it through alternative concepts, indicators, practices and research methods, even alternative epistemology. This entails overcoming the dichotomies between North and South as well as between 'development' experts and laypeople.

### Post-Development: Empirical findings from Chiapas, Mexico

*Dominik Gilgenbach (Libertarian Deconstructions Corp.), Bettina Moser*

Ziel dieses Beitrags ist es, das stark Theorie-basierte Post-Development-Konzept empirisch zu unterfüttern, da dieser nach Alternativen zu „Entwicklung“ suchende Ansatz oft mit der Kritik konfrontiert wird, keine Handlungsmöglichkeiten für soziale Veränderungen anzubieten. Wir haben uns daher mit der zapatistischen Bewegung in Chiapas, Mexiko auseinandergesetzt, um das Verhältnis zwischen der zapatistischen Autonomie und dem radikal-demokratischen Post-Development-Ansatz zu untersuchen. Dem zugrunde liegt die Frage, ob in den zapatistischen Gemeinden in Chiapas eine Alternative zu 'Entwicklung', wie sie vom Post-Development-Ansatz skizziert wird, entsteht. Dazu analysieren wir zunächst, welche konstruktiven Alternativen der Post-Development-Ansatz aus seiner Kritik an „Entwicklung“ ableitet. Weiterhin wird es darum gehen, inwiefern diese in der zapatistischen Autonomie eine Entsprechung finden. Zunächst wird dazu der Entwicklungsbegriff dekonstruiert und die Post-Development-Kritik an „Entwicklung“ nachgezeichnet. Im nächsten

Schritt werden verschiedene Aspekte des zapatistischen Autonomieprojekts untersucht. Zunächst wird die politische Autonomie betrachtet, die sich durch lokale, dezentralisierte und basisdemokratische Organisationsformen charakterisiert. Anschließend untersuchen wir die autonomen Strukturen im ökonomischen Sektor sowie die Wissensaneignung und -produktion, was exemplarisch am selbstverwalteten Bildungs- und Gesundheitssystem nachgezeichnet wird. In allen genannten Bereiche lässt sich feststellen, dass lokale kulturelle Praktiken und indigenes Wissen eine wichtige Rolle spielen, obwohl gleichzeitig stark auf Wissen von außerhalb der Gemeinden Bezug genommen wird und die zapatistische Bewegung ihre Einbindung in globalisierte wirtschaftliche und politische Strukturen als Herausforderung anerkannt hat. Diese Hybridisierung, die ein wesentliches Merkmal des zapatistischen Autonomieprozesses darstellt, wird im von uns untersuchten zapatistischen Diskurs über 'Entwicklung' unterstrichen, der die so genannten Errungenschaften der Moderne nicht per se ablehnt, gleichzeitig aber Universalismus, ExpertInnenwissen und eine lineare Weltauffassung in Frage stellt. Anhand dieser Kriterien soll eine Abgrenzung zum hegemonialen Entwicklungsdiskurs herausgearbeitet werden, die eine Einschätzung des zapatistischen Autonomieprojekts als Alternative zu fremdbestimmter Entwicklung rechtfertigt. Der Vortrag basiert auf einem Artikel, der 2012 im Journal für Entwicklungspolitik erscheinen wird.

### „The end of the North-South one-way street?“ – Post-Development and international solidarity

*Bettina Moser, Dominik Gilgenbach (Libertarian Deconstructions Corp.)*

Wird von Post-Development gesprochen, ist in der Regel - quasi den Entwicklungsdiskurs reproduzierend - der 'Süden' im Blickfeld. Dafür, dass es aber unvermeidbar ist, in diesem Zusammenhang auch den globalen Norden zu betrachten, wollen wir mit folgendem Beitrag plädieren. Wir gehen davon aus, dass emanzipatorische Veränderungen nur möglich sind, wenn diesbezügliche Kämpfe weltweit und vernetzt stattfinden. Daraus ergibt sich auch die Notwendigkeit, den Solidaritätsbegriff neu zu denken. Zunächst muss der Frage nachgegangen werden, welche Gefahren aus postkolonialer Perspektive auch die klassische Solidaritätsarbeit von Nord-Süd-AktivistInnen beinhalten kann. Anschließend soll skizziert werden, unter welchen Bedingungen Solidarität und Kooperation unter postkolonialen, herrschafts- und entwicklungskritischen Vorzeichen realisiert werden kann. Wir plädieren dementsprechend für einen global vernetzten zivilgesellschaftlichen Kampf auf Augenhöhe, der sich gegen



das hegemoniale Entwicklungs- und das damit einhergehende Wirtschaftsmodell mit seinen zerstörerischen Auswirkungen auf die Umwelt, auf soziale Gemeinschaften und alternative Wissens- und Produktionsformen richtet. Die Beziehungen, die die zapatistische Bewegung in Mexiko mit der internationalen Zivilgesellschaft geknüpft hat, sollen uns als empirische Grundlage dienen, anhand derer wir den Rahmen für eine neue internationale Solidarität im Sinne des Post-Developments abstecken möchten. Dabei ist uns bewusst, dass dieses Vorhaben hier aufgrund des begrenzten Umfangs nicht umfassend erfolgen kann. Der Beitrag wird zunächst allgemein das Phänomen der internationalen Solidarität (mit dem Schwerpunkt in den deutschsprachigen Ländern) untersuchen, davon ausgehend wollen wir herausarbeiten, wie diese im Sinne des Post-Developments transformiert werden kann. Anhand verschiedener Beispiele werden wir zunächst das zapatistische Verständnis von Solidarität nachzeichnen und die zapatistische Solidaritätsbewegung in einen Post-Development-Kontext einordnen. Veranschaulicht wird diese neue Form der Solidarität durch die Beispiele des Hamburger Kaffeekollektivs Cafe Libertad und des deutschlandweit organisierten Ya-Basta-Netzwerks.

### **Postcolonial relations between three continents – lusophony as link between countries in the beginning of the 21st century**

*Julia Richter*

## GCG 22-01 - Spatial network science and complex systems – Methods, data, and application

*Chair: Stefan Hennemann, Franz Huber*

### Integrated Spatial Network for Sustainable Territorial Development in Romania

*Vasile Surd (Babes-Bolyai University), Vasile Zotic (Babes-Bolyai University), Diana-Elena Alexandru (Babes-Bolyai University), Viorel Puiu (Babes-Bolyai University)*

The concept of integrated network in spatial planning represents a basic operational component with guiding role in defining and establishing the location of various categories of territorial-geographic systems, whether natural or anthropogenic, current or future. Many theories and reference models have developed as premises for the development of this concept and they all meant to push forward the thinking, understanding and building of territorial structures. Among the classical models we mention those of Von Thünen, Weber, W. Christaller, and V. J. Reilly and the contemporary models of J. Forrester, B. Rodoman, B. Mandelbrot. Contemporary authors have taken over the classical ideas/theories about modelling the territorial structures, which exclusively emphasize the anthropogenic structures and adapt them in the light of modern theories (systems theory, fractal theory, spatial polarization theory, the synergy concept, the chorem-based approach), in order to shape territorially complex geographical systems, mainly determined by the fusion of the natural systems with the anthropogenic ones. We can find several approaches of this concept in the Romanian literature. Some of the most known specialists that have had such preoccupations are G. Gusti (1974), A. Molnár, A. Maier, N. Ciang' (1975), and more recently I. Iano' (1987, 2000), who have developed this concept for the national territory. The authors mentioned above have approached the development of anthropogenic systems, however without carrying out an analysis of the relationships established between natural and anthropogenic systems and how they would spatially develop. Hence, our research tries to attain a fusion pattern in modelling the complex territorial distribution of the two broad categories of territorial systems, natural and anthropogenic, and eventually apply it to the entire Romanian territory. Thus this pattern could represent the operational support for rethinking the spatial planning of the national space in order to identify the most favourable sites for future anthropogenic development, yet without eliminating the natural structures,

particularly the ecosystems, which are now subject of the greatest impact as result of development. Chaotic large-scale spatial development in the absence of long-term basic valid territorial pattern could damage the efficiency of spatial planning at all smaller territorial scales. Romania's integration into the European Union in 2007 and the globalization process involve and require more stringently on the one hand, to increase efficiency of spatial planning and to bring spatial radical alterations of the spatial orientation of the major axes of development on the other hand. All of these conditions require the elaboration of a new basic territorial pattern for long-term spatial planning.

### Co-evolution between SCN and TCN of China's biotechnology: Towards open innovation?

*Tao Wang (Nanjing Normal University)*

In the era of open innovation, the capability to conduct collaborative research and development has become a key indicator of absorptive capacity and innovation competitiveness. However, the literature addressing open innovation has a focus on developed economies. The open innovation process in developing country, such as China, is still unclear. The level of development of science and technology is an important indicator to measure innovation ability, and scientific papers and patents are main output results of science and technology. Therefore we explore the relationships between science and technology through science-based paper and technology-based patent of China's biotechnology. By using papers published in VIP (the Chinese Science & Technology Journal Database/Chongqing VIP (<http://www.cqvip.com>)) and SCI-Extended (the Thompson Reuters' Web of KnowledgeSM database (<http://apps.isiknowledge.com>)) as scientific paper data sources, and patents applied in China intellectual property rights net (CNIPR) as patent data sources, we build scientific cooperation network (SCN) and technology cooperation network (TCN) from co-published papers and co-applied patents in 2000-2009. We take centrality, density, average path length, Gini coefficient and other indicators to analyze provincial cooperation network structure and its spatial-temporal evolution at the macro level, and explore the role and position of different innovation actors at the micro level. Our study shows that: (1) Network structure becomes more complex as the cooperation between provinces increases, but SCN is much more complex than TCN. Moreover, differences among provinces in SCN reduce, but there still exist a huge gap in TCN. (2) Interregional cooperation is much higher than intraregional cooperation in SCN, but this phenomenon is reversed in TCN, which means scientific papers are

outgoing cooperation and patents are introverted cooperation in biotechnology field. (3) The main cooperation is university-university and university-public research institution in SCN. In TCN the main cooperation is firm-university, and firm-public research institution. (4) The correlation of betweenness centrality and degree centrality are higher between SCN and TCN, which suggests that provinces in an higher position in SCN are also important in TCN. In addition to discover the open innovation process of China's biotechnology, our research is also useful for the policy makers to understand the current situation and problems of biotechnology innovation in China, and provide advice for making regional innovation policy.

### **The heart of a network is regional**

*Sidonia von Proff (University of Marburg), Anja Dettmann (University of Marburg)*

The paper at hand studies the development of innovation networks with a focus on the spatial distribution of the network partners. This dynamic view is rather underexplored in the literature up to now. We combine socio-psychological and economic insights for arguing that innovation networks are not only mainly regional in the beginning but have also a tendency to become even more regional over time. A complex activity like an innovation project is very difficult to carry out over long distance and even though there might be partner anywhere there is something like a regional heart of a network. In the empirical part, interviews with 49 publicly funded innovation networks in the eastern part of Germany are exploited. Data is available for three points in time: the formation of the network, the end of the funding period, and today, i.e. one to ten years after the funding. This unique dataset reveals a lot of insights. First of all, if a network has survived up to now, it has gained new members - regional and non-regional ones. If the networks lost non-regional partners, in half of the cases they state distance a reason for the breakup. Only a part of the network members are involved in concrete innovations projects and these projects have a regional core, i.e. more than half of the project members are located in one region. So, the project groups are more regionally limited than the whole network, which is more loosely connected so that distance may be overcome more easily. Overall, the empirical study supports our theoretical reasoning and gives new insights into the dynamics of innovation networks.

### **Word city network, change, 2000-2010: A complex network approach**

*Stefan Hennemann (Justus-Liebig-University Giessen), Ben Derudder (Ghent University)*

This is an empirical paper that measures and interprets changes in intercity relations at the global scale in the period 2000-2010. To this end, we draw on the network model devised by the Globalization and World Cities (GaWC) research group, in which intercity relations are inferred from the location strategies of advanced business services firms. The paper has two purposes: first, there is a methodological purpose in that we apply a fully-fledged complex network approach (whereas most previous analyses in this literature have remained at the level of guesstimating network patterns based on mere connectivity rankings); and second, drawing on this refined and arguably more appropriate methodological approach, we aim to enhance our understanding of shifting patterns in the world city network in roughly the last decade.



## GCG 23-01 - The emergence of China's regional economies in the global economy: A new perspective on upgrading and innovation in global-local networks

*Chair: Daniel Schiller, Javier Revilla Diez*

### Initial Discrepancy and a Dissimilar Process Become Globalized: A Case Study of Guangzhou

*Kai Huang (Technische Universität Berlin), Desheng Xue (Sun Yat-Sen University)*

Initial Discrepancy and a Dissimilar Process Become Globalized A Case Study of Guangzhou Kai Huang<sup>1</sup>, Desheng Xue<sup>2</sup> <sup>1</sup>Technische Universität Berlin, Germany <sup>2</sup>Sun Yat-sen University, Guangzhou, China Drawing on Manuel Castells' and other scholars' view, their research achievements provide a perspective that globalization can be understood as a process with various "flows" and leads to a modification of certain factors of urban development. Meanwhile, it also has been considered as a process with seldom or no governmental intervention. However, authority can currently play a crucial role in such process under a certain background, especially in the megacities of developing countries. In this article, taking Guangzhou as a case study, it will begin with a review of its urban development history of modern time, especially focusing on the innovations in various spheres (e.g. fiscal system, taxation system and urban land use system). Then, a series of crucial government innovations, which considered as milestones, will be marked and further anatomized. By different research methods, direct or indirect influences and chain reactions from innovation results to urban forms and urban spaces and the results will be highlighted. These specialties of urban development will be further compared and linked with current globalization process. It is proved that a dominant government-oriented development model can equally benefit a city's globalization process. It also reveals how indeed a series of local administrative behaviors contribute to its connection with globalization. Furthermore, it is concluded that the track of globalization could be different from the very beginning. Keywords: globalization, government-oriented, innovation, Guangzhou

### Urban Networks from the Perspective of Producer Services Linkages: A Case Study of Guangzhou

*Yun Zhong (Jinan University)*

Urban networks are mirrored in the linkages of producer services, which means the exportation of producer services from one city to the others can be regarded as an index of urban linkages. To study the urban networks of a metropolis from the perspective of producer services linkages can be helpful to understand the new growth drivers of China's metropolis and provide hints to the impact of producer services on future urban development during globalization. In this paper, the focus is on the exportation of producer services from Guangzhou, a central city in South China and also a most developed city in China. Important facets of this exportation are the range, the strength and the direction of the linkages as well as the factors affecting them. The way to find out the characteristics of the linkages is to analyze the behavior of the producer services corporations located in Guangzhou. Based on questionnaires and interviews, the paper analyzes the characteristics of Guangzhou producer services linkages. As to the range of linkage, it is found that: (1) The spatial linkages of producer service ranges from the hinterland of Guangzhou to oversea markets; (2) The linkages with oversea markets will be extended considerably in the future; (3) The proportion of linkages to the faraway cities will increase faster than that to the nearby cities, which means, along with the increase of exportation capability, the urban network of Guangzhou will also change in the future. As to the strength of linkage, another finding is that: The corporations' managers prefer to devote more energy to exploit one market place than to exploit several. On this basis it can be stated that not only large manufacturing corporations but also large producer services enterprises, will play an important role in the urban network buildup in the future. As to the direction of linkage, it is found that the metropolises are the most tight linkage direction than the medium size cities or the small cities. Regarding the factors affecting the linkage it is found that: '1' Not the distance between two cities, but the client's capacity to pay is the biggest barrier to the linkage;'2'It can be shown that the dominating ways to export the service is by means of business trips by the supplier of services, so a good infrastructure is very important for constructing a larger urban network. As to the characteristics of Guangzhou producer services linkages, several conclusions can be drawn:



### Regional Inequality of Higher Education in China and the Role of Unequal Economic Development

*Wan-Hsin Liu (Kiel Institute for the World Economy), Frank Bickenbach (Kiel Institute for the World Economy)*

In light of increasing global competition and rising labour costs the Chinese government, by the end of the 1990s, recognised innovation and upgrading of production processes crucial for the Chinese economy's ability to sustain its high-speed economic growth in the future. And it also recognised the importance of a highly qualified labour-force for the success of innovation and upgrading strategy. To increase the provision of highly qualified labour, the Chinese government has continuously reformed the higher education system. It attempted to transform the higher education system from the one focusing on elite education to the one promoting mass education through a substantial scale expansion of higher education. Between 1998 the last year before the expansion and 2008 the number of newly enrolled students grew six-fold. Along with the massive increase of higher education opportunities in general, the Chinese government intended to narrow the gap between the differing higher education opportunities across Chinese provinces as part of its regional development strategy. Using a provincial panel dataset from 1997 to 2008, we empirically analyse the level and development over time of the inequality in the distribution of higher education opportunities across the Chinese provinces in general, and across groups of provinces with different development levels in particular. To do so, we calculated a series of generalised Theil indices, which allow us to explicitly consider the heterogeneity in the provinces' sizes and structural development levels. Our empirical analysis shows that, during the period of rapid expansion of the higher education system, the inequality in the distribution of higher education opportunities across different provinces in China decreased, when taking into account the substantial differences in the sizes of provinces. It shows, however, that the inequality in the provision of university places per capita relative to GDP per capita between the poor and rich provinces increased. But this increase was in favour of the poor provinces, which realised an increasing advantage over rich provinces with respect to the number of university places relative to GDP (and a corresponding decline in their disadvantage with respect to the number of university places per inhabitant). These results are largely consistent with the announced (regional) development priorities of the Chinese government, which intended to massively expand the scale at the higher education system and at the same time reduce the inequality of higher education opportunities in favour of backward provinces. The results

may further imply that, assumed human capital is key for further innovation and upgrading activities in China, a more balanced starting point w.r.t. more comparable human capital endowments for sustaining long-term growth for different provinces seems to be better provided now than a decade ago.

### The Governance of Economic Upgrading within Textile Clusters in China: A comparative analysis of regional economies in Keqiao and Guangzhou

*Michael Waibel (University of Hamburg), Philipp Zielke (Universität Hamburg)*

The textile and apparel industry in China was a key sector in the development of the backward Socialist country from the early 1980s to the mid-2000s. Currently, China is the biggest exporting country for textiles and apparel products. Against the background of rising wage levels in China and increasing global competition, however, the exclusively export-driven growth model is no longer valid. Therefore, the national government supports the shift towards approaches that generate more added value: For example, more emphasis should be placed on designing textiles for the domestic and global markets. Finally, 'Made in China' should be replaced by 'Designed in China'. This paper analyses the governance of the economic upgrading policies of the two most important textile clusters in China over time, which are embedded in this structural context: The China Textile City ('??????') in Keqiao, Zhejiang province and the Zhongda Textile district ('????') in Guangzhou. In the past, both regional economies have made significant efforts to re-structure their economic growth models. Within our research approach, governance theory is understood as an analytical concept rather than as the expression of a supposed globally changed reality. Our research is based on recent comparative empirical case studies. We will show that the restructuring and innovation strategies of both clusters are significantly different: Whereas Keqiao is focusing on international textile markets in North America and Europe, textiles from Guangzhou are mostly delivered to mainland China and Southeast Asia. We will show that Keqiao implemented upgrading strategies earlier and served as the role model for the upgrading of the Zhongda textile district. Furthermore, we will demonstrate that the interactions among the spheres of industry and local governments are highly disparate. The adaptation of the China Textile City to global competition is overwhelmingly dominated by a single state-owned enterprise, whereas in Guangzhou, the stakeholder landscape is much more heterogeneous. Here, private company actors are involved to a much higher degree within a specific brownfield restructuring and upgrading process. As a consequence, decision-



making processes in the regional economy of Guangzhou seem less authoritative than in Keqiao. Further, we will demonstrate that in Guangzhou, the transformation of land from urbanized villages to real estate developers and wholesale mall operators became one critical success factor. Finally, we emphasize that while analysing the governance of regional economic upgrading processes in China is a major empirical challenge, it provides complex insights into regional decision-making processes towards upgrading and innovation in global-local networks.

## GCG 24-01 - The Land of Indigenous Traditional Knowledge

*Chair: Paula Smith, Mirjam Hirsch*

### Understanding the Geography of Water and Sanitation Health Issues in Nigeria: The Traditional Ecological Knowledge Perspectives

*Emmanuel Akpabio (University of Uyo)*

For many years, tremendous efforts attempting to link important diseases epidemics to water supply and sanitation practices often mobilize around the strategic disruption, interruption or weakening of the chain of contamination cycles. Such purely scientific logic, largely based on biological and epidemiological understanding of the pathways of disease etiology, do not provide easily grasped and intelligible framework for understanding realities that have deep cultural intersections most especially among indigenous people in Africa. In the research, I am developing a Traditional Ecological Knowledge (TEK) framework as a basis for capturing both the spatial and temporal dimension of cultural, socio-economic and environmental factors that pose heavy constraints to intervention efforts at addressing the water and sanitation challenges in Africa. Through extensive case study in Nigeria, local senses and ideas around water and sanitation were correlated with the various TEK-anchored contextual factors to determine commonalities and differences. The results show that understanding environmental health issues around water and sanitation depend on a range of ecological, socio-economic and cultural factors mostly mediated by the traditional ecological knowledge. The practical implication about the result translates to the need for more place and locally sensitive programme intervention. Given the promise offered by the TEK framework, the paper calls for more empirical studies to validate some of the assumptions discussed.

### The tree which is quarreling with the sky: Utilization and spirituality of *Faidherbia albida* in Africa.

*Nobuyuki Hori (Nara University)*

*Faidherbia albida* was known as the synonym of *Acacia albida*. This tree is widely distributed through savanna zone in Africa. Farmers in savanna notice of a curious phenology of this deciduous tree which is fallen leaves in wet season, and grow thick in dry season. They call the tree is quarreling with the sky, or the magic tree. The farmer use its phenology to advantage in their agriculture. Fallen

leaves in wet season become fertilizer. The crops around this tree vigorously grow up without shade. Many kinds of insects are existing in the flourishing tree in dry season, and thus various birds are making a nest on thin tree, and producing a lot of droppings around the tree. The shade of this tree is attractive for the villagers and domestic animals seeking for the rest place. Many kinds of organic matter are produced around the tree. Villagers call it the magic tree after the above mentioned phenology. They think and image a kind of spirits living in this tree. Especially the tree experienced thunderbolt is become the sacred tree. Such the tree is called as the special hidden name. These results are obtained from field works in mainly Niger and Cameroon.

### The indigenous trap: On the construction of traditional knowledge and the question on modern practices.

*Peter Koch (Leibniz-Institut für Länderkunde)*

At many past and also present occasions Sámi and environmentalists have supported common goals (e.g., Alta, Nellim). In the recent decade, however, Norway has faced a serious conflict loom over Sámi reindeer herding in newly established national parks. Suddenly two nowadays unquestioned moral values - the preservation of indigenous cultures and livelihoods and the protection and conservation of large natural areas - have come into conflict with each other. First the local Sámi herding cooperatives were in favour of the establishment of national parks on their grazing lands as they could expect other land-use competitors such as mining and forestry companies to be displaced. But soon they found them selves in a less desirable atmosphere in which areas of interest to some businesses have been excluded from the national parks, novel and eventually more restrictive regulations to reindeer husbandry have been implemented, the relevance of local Sámi in decision-making processes has been decreased, and reindeer herders have been blamed for causing damages to endangered vegetations. How did this situation come about? We must consider that reindeer husbandry nowadays is an extensive and efficient industry that both operates with modern technologies and is integrated into the domestic - capitalist - economy. Let us have no doubt about it: The presence of modern practices in Sámi reindeer herding has demonstrated this community's ability to adapt to social, technological, political, economic and environmental changes. However it both challenges the idea of Sámi as the natural people to their homeland in which they live in complete harmony and it contrasts the image of indigenous people and their traditional knowledge and livelihoods as it exists in society. Traditional knowledge - as any other social phenomenon - is not simply

a given truth, unchangeable and incontestable. Instead it is an imagination, something that has been constructed. It is delivered from the elder to the young; it is objective to permanent negotiation in powerful settings; it is of great political relevance; it is by no means static but something very dynamic. At this point we then must critically ask who is in the position to define what indigenous traditional knowledge is, how indigenous communities must act - or do things in a traditional way - in order to be regarded 'indigenous' and what indigenous people in turn shall not do under any circumstances. In this paper I want to unfold these issues and share my material with you. I have gained it from extensive interviews that I have conducted during my various field trips to Norway - especially to the region of Nord-Trøndelag - in the period from 2009 - 2011. I have talked to local reindeer herders and Sámi representatives, local, regional, and national government officials, environmentalists, and members of other interest groups.

**Preserving traditional knowledge against external pressures:  
Assessing the opportunities of Ecological Engineering in Ifugao,  
Philippines**

*Vera Tekken (University of Greifswald), Susanne Stoll-Kleemann (University of Greifswald), Monina Escalada (Visayas State College of Agriculture)*

Against the background of global change and globalization unique cultural landscapes increasingly attract the attention of science and nature conservationists. The efforts to preserve these particular socio-ecological systems are reflected in the World Cultural and Natural Heritage list of the UNESCO. Included in this list are the mountainous rice terraces in the Ifugao Province, Northern Luzon, Philippines. The area is characterized by extensive subsistence rice cultivation which is mainly based on traditional indigenous farming techniques with associated rituals applied at each stage of the rice crop cycle. This synergetic interaction has been evolving over the past 2000 years, has until recently represented the main basis of household income, and has been shaping the social structures of local communities. The indigenous land'use practices are perfectly adapted to the environmental conditions and due to their multi-functionality they are as well appropriate to partly offset disturbances like, e.g., extreme weather events and pest invasions. However, recent external influences (increasing livelihood costs, climate change) have severe consequences for the social structures of communities. In particular the traditional knowledge preservation and transfer to future generations are at risk. The low opportunity to earn a living in rice agriculture leads to increasing

emigration of young people to the cities. This loss of work force in the rice terraces leads to their abandonment and degradation. But still, the region is dependent on agricultural production which requires a comprehensive knowledge on appropriate farming techniques. In the Ifugao Province, a qualitative data collection was conducted to assess the role of traditional farming methods for the socio-economic development. Traditional knowledge and its role for the cultural landscape was evaluated. With the techniques of Ecological Engineering for biological pest control as an addition to traditional pest management it is tested if rice yields can be stabilized to support the farmers' incomes. The main long-term purpose is to support local livelihoods, to archive traditional indigenous farming methods, and to complement those with environmentally compatible techniques. In search of more sustainable farming methods, traditional knowledge will play an ever more important role. It is important to preserve cultural landscapes as next to being the basis for livelihood they contribute to the heterogeneity of societies.

## GCG 25-01 - Urban climate and air pollution in a changing climate

*Chair: Christoph Schneider*

### Investigating spatial variability of urban particulate matter concentrations

*Hendrik Merbitz (RWTH Aachen University), Gunnar Ketzler (Geographisches Institut)*

The population exposure to air pollutants like particulate matter (PM) remains one of the major environmental challenges in cities. Currently, exposure assessments are rather difficult because they require precise information about the spatial and temporal distribution of these contaminants. The low number of PM measurement locations and the high spatio-temporal variability of particulates make a continuous mapping of the concentration difficult. However, concentration maps are necessary both for the estimation of the total population exposure and for the identification of 'hot spots' with highest pollutant concentrations, which require measures immediately. Due to the anthropogenic climate change, summer heat waves and dry episodes might have additional negative effects on urban air quality. Especially the combination of heat stress and poor air quality impinges on the well-being of urban population groups. The presentation analyses results from studies within the interdisciplinary Project 'City2020+' at RWTH Aachen University covering the field of urban climatology and air pollution. The spatial distribution of PM10 and PM2.5 concentrations in the city of Aachen, Germany (population 250,000) is investigated by mobile measurements. Results from geostatistical investigations are presented which allow the identification of air pollution hot spots and the responsible drivers. A geostatistical model is presented, which creates maps of PM10 and PM2.5 levels over the city area at a resolution <10 meters. Further on, the exposure of vulnerable population groups towards particulate air pollution is addressed, combining the results with other studies from the interdisciplinary project City2020+.

### A GIS-incorporated database of urban surface parameters for high-resolution meteorological models

*Pavel Konstantinov (Lomonossov Moscow State University), Evgenia Kukanova (Moscow State University), Samsonov Timofey (Lomonossov Moscow State University)*

This work presents a universal method of generating the meteorological database using GIS technology designed for detailed description of the thermo-physical characteristics of the underlying urban surface. Some of the characteristics that are most appropriate for this aim have been selected. It has been done according to two principles: universal applicability and frequency of use in studies of urban climate around the world. The chosen set of characteristics includes: · Sky view factor [Proportion of sky hemisphere seen from bottom of the urban canyon.] · H/W ratio [Ratio buildings height to weight streets between them.] · Surface fraction [Proportion of surface covered by constriction, impervious, pervious materials.] · Albedo · Thermal admittance [Ease with which zone takes up and releases heat.] · Anthropogenic heat flux [Heat flux density from combustion processes.] · Geometric average, expectation function and standard deviation of height. It is proposed to carry out the calculation of these characteristics within each cell of regular grid covering the study site. This allows providing data that can be easily assimilated by any atmospheric boundary layer model. Also this allows changing the size of grid cell during investigation. In other words, universality of the calculation method will be ensured. Our study area for testing universal method of generating the meteorological database is Moscow, Russian Federation. GIS (Geographical Information System) extension is created for calculating all thermo-physical characteristics based on ESRI product - ArcGis 10. GIS technology is used in order to ensure flexibility and efficiency method. Also the advantages of GIS technology provide a wide range of tools for spatial and mathematic analysis and results visualization. Nevertheless, the two values of characteristics set (thermal admittance and anthropogenic heat flux) are currently difficult to assess even within well-studied cities in developed countries. In Russia these estimates have not been carried out yet. In order to solve this problem, study area has been zoned using newly created classification by Stewart and Oke. (Stewart I.D., Oke T.R., 2010) Also the applicability of the local climate zone classification for East-European type of building has been assessed.

### Urban climate mitigation strategies in a regional climate modelling context

*Matthias Demuzere (Katholieke Universiteit Leuven), Andrew Coutts (Monash University), Nicole P.M. van Lipzig (Katholieke Universiteit Leuven)*

Urban climate models provide a useful tool for assessing the impacts of urban land surface modification on urban climates. It provides a mechanism for trialling different scenarios for urban heat island mitigation. Only recently, urban land surfaces have been included in global and regional climate models. Often they represent a trade-off between the complexity of the biophysical processes of the urban canopy layer and the computational demands in order to be workable on regional climate time scales. This study employs the Community Land Model (CLM) which was recently extended with a single layer urban canopy scheme (CLM-U). And although it is primarily developed as a tool for regional climate scales, we intent to extend its reach and use it for local (neighbourhood) scales in a changing climate context. Hence, an off-line validation is performed using meteorological observations for Toulouse (France) and multiple medium density urban areas in Melbourne (Australia). Model results are evaluated against observations of the surface energy balance from flux towers, including evapotranspiration, and show that the model is able to correctly address (urban) energy partitioning including high urban heat storage, and low evapotranspiration rates. Furthermore an investigation was undertaken to explore first of all the capacity of the model to incorporate Water Sensitive Urban Design (WSUD) features, mimicking vegetated and non-vegetated infiltration systems, open water bodies and other green infrastructure. In a second step, the effectiveness of WSUD integration scenarios are also compared with other common mitigation strategies such as increasing albedo and controlling urban morphology.

### Effect of Air Pollution on Human health & Urban Management system in Tehran, Iran

*Gholamreza Taleghani (University of Tehran), Seyed Esmaeil Asgharpour (Islamic Azad University Shahre Rey)*

The biggest environmental problems which occur in metropolitan area of the world is air pollution. It is a global tragedy for human society .A large number of people are being died by air pollution in the megalopolis every day. Rapid population growth and urbanization which associated with industrialization has caused environmental problems, especially, in the metropolitan cities of the less

economically developing countries ,in the recent years. Tehran, the capital city of Iran located between 35 to 36 degrees N. latitude and 51 to 52 degrees E. longitude over 10 million populations ,is one of the most polluted cities in the world. Recently, air pollution has been getting worse annually .A great mass of pollutants are emitted to the atmosphere by motor vehicles, and different factories. It is a very serious and lethal crisis. Hadi Heydarzadeh director of Tehran clean air committee stated that Tehran's environmental situation as a 'collective suicide'. 'Air pollution has killed more than 3600 people in just last month October 23 to November 23, 2010. Tehran's air pollution is made even worse by geographic location which surrounded by Elborz mountain range in the north, causing the increasing volume of pollutants to become trapped. About 1.5 million tons of pollutants are produced in Tehran annually, carbon monoxide from car exhaust making up a large percentage of these pollutants. When high level of carbon monoxide and other pollutants engulfed Tehran for several weeks, it resulted a cloud of smog hovering over Tehran. It happens when the blowing of wind is not strong enough to take pollutants far away .The combination of natural and man made factors has caused this city to be counted one of the most polluted metropolitan cities in the world, ranking with Mexico city ,Beijing, Cairo, Sao Paulo, Shanghai, Jakarta and Bangkok [3]. So, governmental authorities and urban managers have to put a lot of effort in dealing with this crisis. It is a good idea to use experiment of other countries in this field and contribute and cooperate in activities to fight against air pollution. The recent pollution crisis in Tehran forcing governmental authorities to take serious actions in protecting the health of its citizens .Tehran's air pollution is a complicated issue, so it needs that new strategies to be taken before this increasing environmental problems reaches to a critical stage .The study based on collected data which were analyzed to reach a favorable result. Key words: pollution, urban, industry, smoggy, strategy, metropolitan, global, transparent, environment

## GCG 26-01 - Vector-borne diseases and climate warming

*Chair: Carl Beierkuhnlein, Markus Neteler*

### The vector, the landscape, the ecosystem: the multiscale character of vector-borne diseases

*Sophie Vanwambeke (Université catholique de Louvain)*

Vector-borne diseases and zoonotic diseases are well known for the complexity of their transmission systems. These systems are influenced by a broad spectrum of environmental factors. However, these environmental factors influence the spatial distribution of the disease at various scales. Climate, for example, essentially homogeneous at a broad scale, affects the distribution essentially at the regional scale. Locally, a number of global change-relevant factors are also significant. Land cover is an important determinant of habitat suitability for vectors and hosts. Land use in fine determines areas of contact between vectors and humans, by favouring or limiting access to areas with high densities of infected vectors or host. Land cover and land use can be highly spatially heterogeneous at a fine resolution. Geographers are well equipped to document these spatial heterogeneities at multiple scales, and to collaborate with biologists, epidemiologists and other disciplines involved in understanding the spatial heterogeneity and multiscale character of vector-borne disease transmission systems. Results of such successful collaboration will be presented, emphasizing the multiscale character as well as the efforts on bridging methodological approaches that have remained essentially separate in the field of disease ecology, i.e. empirical-statistical and process-based approaches. Cases presented will cover tick-borne diseases in Europe and mosquito-borne diseases in the tropics.

### Water-related vector-borne diseases in eastern Africa: Present and future risks

*Stefan Kienberger (University of Salzburg), David Taylor (University of Dublin)*

Environmental change, such as climate change, will affect and impact human health, which is a major concern for the global community. The effects will however be felt most acutely among the poorest members of society. Much concern has focused on the future distribution and spread of infectious diseases, and in particular the negative health impacts of changes in transmission and outbreaks of vector-borne diseases (or VBDs) as a result of

climate change. The impacts may be direct, in terms of outbreaks of disease among human populations, or indirect, in the form of outbreaks of diseases that affect domesticated animals or plants, and therefore jeopardise food security, agriculture-based economic activities and trade. Activities and preliminary outcomes relating to the HEALTHY FUTURES project, funded under the EC FP7 research program, are the focus for the presentation. The HEALTHY FUTURES project, which started in January 2011, is motivated by concern for the health impacts of environmental changes. HEALTHY FUTURES aims to respond to this concern through construction of a disease risk mapping system for three water-related high-impact VBDs (malaria, Rift Valley fever and schistosomiasis) in Africa, accounting for environmental/climatic trends and changes in socio-economic conditions to anticipate future risk. Concentrating on eastern Africa as a study area, HEALTHY FUTURES comprises a comprehensive, interdisciplinary consortium of health, environment, socio-economic, disease modelling and climate experts in addition to governmental health departments. To achieve its aims, HEALTHY FUTURES deploys a bottom-up, end-user/stakeholder-focused approach combining field-, laboratory- and library-based research. Within this paper results of the first one and a half years of the project are presented, especially first insights on disease-environment relationships in the study area, disease outbreaks in the historic past, and a preliminary risk-vulnerability framework and associated mapped hot spots for eastern Africa. Additionally, results from down-scaled climate models will be presented and their integration into disease models will be discussed. Given these first results, the way forward to integrate relevant risk information within a Decision Support Tool in the context of climate change adaptation will be outlined.

### Transmission of Schistosomiasis in Africa and its vulnerability to climate change

*Yvonne Walz (University of Wuerzburg), Martin Wegmann, Stefan Dech*

Schistosomiasis is a chronic human disease caused by parasitic worms and affects approximately 800 million people worldwide. 90% of the 250 million infections are currently concentrated in sub-Saharan Africa. The transmission of the disease requires the presence of specific freshwater snails as intermediate host to release human pathogen species. In Africa, the presence of *Bulinus* spp. snails is necessary to shed *Schistosoma haematobium* parasites and *Biomphalaria* spp. to shed *S. mansoni*. The potential spatial distribution of freshwater snail species can be described by environmental factors such as

temperature, soil moisture, vegetation density, water bodies and water flow velocity, which are to some extent related to the risk of acquiring the schistosomiasis disease. Scenarios of global climate change predict warmer temperatures and are further accompanied by perturbations in precipitation, hydrology and water availability. The major question associated with global climate change and schistosomiasis is whether temperature, water, and other conditions adequately support the snail and the schistosome parasite. However, the nature and extent of climate change on the transmission of schistosomiasis remain still poorly understood. The spatial distribution of schistosomiasis shows a very heterogeneous pattern, both on the continental scale of Africa and on the local scale. Disease prevalence can vary between neighboring villages and between regions. In this research, remote sensing data with different spatial resolutions (Rapid Eye, Landsat, MODIS) are investigated for hot spots of disease transmission in different ecological settings to assess the effect of environmental factors in relation to the disease distribution at different spatial scales. The study area in Burkina Faso represents savanna, which is predominantly infested by *S. haematobium* infections, whereas the study area in Ivory Coast represents tropical rain forest that hosts mainly *S. mansoni*. Following a field trip to the study area of Burkina Faso, bi-temporal analyses of high resolution Rapid Eye data showed that very small potential snail habitats are heterogeneously distributed in the study area and represent different suitability as snail habitat. Whereas differences in temperature have no relevance on the local scale, this heterogeneous pattern of disease transmission sites is not captured by large-scale analyses using moderate resolution data of the MODIS sensor. Furthermore, potential snail habitats in the savanna region of Burkina Faso are predominantly man-made water reservoirs versus natural ponds in the tropical rain forest of Ivory Coast. We could show that remotely sensed environmental factors provide valuable information for disease mapping and prevention and that the spatial distribution of the disease at different scales and in different ecological settings are fundamental to assess disease transmission vulnerabilities with respect to climate change scenarios.

### The potential effects of climate change on malaria in tropical Africa using regionalised climate projections

*Volker Ermert (Institute of Geophysics and Meteorology), Andreas H. Fink (Institute of Geophysics and Meteorology), Heiko Paeth (Univ. of Würzburg), Andrew P. Morse (Department of Geography)*

The projected climate change will probably alter the range and transmission potential of malaria in Africa. The potential impacts of climate change on the malaria distribution is assessed for tropical Africa. Bias-corrected regional climate projections with a horizontal resolution of 0.5° are used from the Regional Model (REMO), which include land use and land cover changes. The malaria models employed are the 2010 version of the Liverpool Malaria Model (LMM2010), the Garki model, the *Plasmodium falciparum* infection model from Smith et al. (2005) (S2005), and the malaria seasonality model (MSM) from the Mapping Malaria Risk in Africa project. The results of the models are compared with data from the Malaria Atlas Project (MAP) and novel validation procedures for the LMM2010 and MSM lend more credence to their results. For climate scenarios A1B and B1 and for 2001-2050, REMO projects an overall drying and warming trend in the African malaria belt, that is largely imposed by the man-made degradation of vegetation. As a result, the malaria projections show a decreased malaria spread in West Africa. The northern Sahel is no more suitable for malaria in the projections. More unstable malaria transmission and shorter malaria seasons are expected for various areas farther south. An increase in the malaria epidemic risk is found for more densely populated areas in the southern part of the Sahel. In East Africa, higher temperatures and nearly unchanged precipitation patterns lead to longer transmission seasons and an increase in the area of highland malaria. For altitudes up to 2000 m the malaria transmission stabilises and the epidemic risk is reduced but for higher altitudes the risk of malaria epidemics is increased. The results of the more complex and simple malaria models are similar to each other. However, a different response to the warming of highlands is found for the LMM2010 and MSM. This shows the requirement of a multi model uncertainty analysis for the projection of the future malaria spread.





# Society & Environment

## SE 01-01 - Analysis of linked social-ecological systems 1

*Chair: Tillmann Buttschardt, Anna-Katharina Hornidge*

### **Institutional change and transformation of water governance regimes in South Africa: The role of fit and interplay**

*Elke Herrfahrdt-Pähle (German Development Institute)*

Since the end of the apartheid era South Africa is undergoing a comprehensive political and economic transformation. Among other things the water legislation has been completely revised, featuring goals such as equitable access to water, sustainable water use and the introduction of basin management. The latter represents an effort to align the spatial fit of the boundaries of the water body and the social institutions and organisations administering it. It requires the introduction of new management units. This paper seeks to examine the issues of fit and interplay arising between the ecological system and the old and new management units of the social system and their influence on the resilience of the social-ecological system. It examines mismatches arising through new institutional arrangements and governance structures at various levels of the spatial, jurisdictional and institutional scales. A possible result of such mismatches is the mismanagement of natural resources and a subsequent loss of adaptive capacity and resilience in the social as well as in the ecological system. The paper firstly develops a framework which allows integrating different scales and levels of analysis both from the ecological and the social system. This framework allows identifying mismatches within and between scales. Secondly, the framework is applied to water governance reforms in South Africa. The example of the introduction of basin management illustrates the advantages of hydrological boundaries for adapting governance structures to ecological conditions but it also highlights some institutional mismatches and trade-offs. The paper concludes that even though aligning water governance institutions to the biophysical system and thus increasing their fit produces frictions within the social system, basin management has the potential to improve water management outcomes. However, it suggests that in addition to a static understanding, the concept of fit should be framed in a dynamic sense. An institutional setup which fits the biophysical conditions such that it is similarly flexible and able to adapt to ecosystem dynamics would probably benefit the resilience of social systems more than merely a focus on mimicking ecosystem properties at a certain point in time.

### **Rural-amenity landscapes: Social-ecological interactions shaping private land management**

*Benjamin Cooke (RMIT University)*

Rural landscapes in many parts of the post-industrial world have become increasingly multifunctional in recent decades, as people with lifestyle-orientated land use objectives migrate to regions once the domain of productive agriculture. In parallel to this phenomenon has been an increasing interest in private land as a site of biodiversity conservation, to complement the protected area system. As land use transitions have gained pace, debate has emerged as to whether rural-amenity landscapes present an opportunity or a challenge to biodiversity conservation on private land. Despite the increasing awareness of conservation value in these regions, we have little knowledge of what actually influences the biodiversity management practices of landholders. This research aimed to explore how landholder interactions with the physical landscape and with other social actors might shape their management. The site for this study was the hinterland regions of Melbourne, Australia. An ethnographically influenced methodology involving in-depth interviews with 24 landholders was the primary source of data collection. A key component of the process was walking the properties of participants with them during the interview encounter, allowing the physical landscape to elicit past management interactions and contextualise their ecological knowledge. This methodology was inspired by a desire to explore conservation behaviour at the site at which human-nature interactions occurred, to better understand how practices emerge. Interviews were also conducted with five extension staff involved in the delivery of private land conservation schemes, to provide an external, institutional perspective on landholder management practice. This methodology brought to light a number of social-ecological interactions that influenced how landholders pursue management. The landscape often served as a dwelt-in-ecosystem that embedded knowledge of ecological processes to the place and duration of residence. Also pertinent was the process by which management practice passed between generations of property owners in the form of social-ecological legacies. Material nature like trees or the artifacts of abandoned agriculture embodied a history of practice that influenced the actions of current landholders. This research highlights the potential contribution of fine-grained qualitative research in contributing to understandings of landscape management across regions of dynamic land use transition. This is especially pertinent for informing policy interventions for biodiversity conservation in such a context. Exploring management practice at the site of human-nature interaction can prove

beneficial in determining the relationships between social and ecological phenomena in preserving, creating and re-creating landscape ecologies over time.

### Frameworks for the analysis of coupled social-ecological systems

*Claudia Binder (University of Munich), Jochen Hinkel (Potsdam Institute for Climate Impact Research (PIK))*

The growing relevance of complex environmental problems, such as climate change, bio-diversity loss, and resource scarcity and degradation (e.g., water, energy, minerals), have led to the insight that these problems have to be dealt with in an integrative, inter-disciplinary way that takes into account the interaction between social and ecological systems. Within the last decade significant progress has been made with respect to interdisciplinary investigation and modeling of coupled social-ecological systems (SES). While a great number of studies on SES have been conducted, the comparison of results, and the derivation of general implications are difficult not only because case studies are conducted in regions having different cultural, environmental, and behavioral structures, but also because of the diversity of the methods and concepts applied. In this contribution we compare 11 established frameworks for analyzing social-ecological systems. We limited ourselves to frameworks that were explicitly designed to be used by a wider community of researchers and practitioners. Although all these frameworks seem to have emerged from the need for concepts that allow for structured, interdisciplinary reasoning about complex problems in social-ecological systems, they differ significantly with respect to contextual (e.g. time, space specification, disciplinary background, theoretical foundations) and structural (e.g. conceptualization of social, environmental system and their interactions) criteria. It appears that three main aspects suffice to produce a classification of frameworks that may be used as a decision tree when choosing a framework for analysis. These criteria are (i) whether a framework allows for static or dynamic analysis; (ii) whether it takes an anthropocentric or an eco-centric perspective; and (iii) whether it is applicable to any social-ecological system or only to specific ones. Finally, we discuss to which extent these frameworks might contribute to managing complex social-ecological systems.

### Nulture: Conceptualising the mutual nurturing between nature and culture

*Janet Stephenson (University of Otago)*

There is abundant evidence that both indigenous and non-indigenous communities engage in stewardship practices crafted to support the wellbeing of local ecologies. The benefits however do not just flow one way, and human interactions with natural systems can be highly influential in personal and collective wellbeing. Such two-way flows have resulted in a wide variety of locally distinctive nature-culture interrelationships. These coupled human-ecological systems can be rich in both cultural and ecological diversity (Pretty et al. 2009). From a resilience perspective, such heterogeneity offers a better basis to respond to future shocks than one-size-fits-all management systems. Stewardship of the local environment is crucially important in helping to realise a sustainable future, and can help achieve a 'reduction of moral distance between actions and consequences' (Adger et al. 2010, p 547). Awareness of the contribution of natural systems to personal and collective needs is also crucially important in creating environmental citizens who will 'care for the earth' (IUCN 1991). There is clearly great benefit to be had from heightening awareness of the confluences between nurturing of the environment and nurturing from the environment. Western discourse largely couches this relationship using terms such as conservation, environmentalism or guardianship - concepts that suggest nurturing is a one-way flow. In contrast, the mutually supportive relationship between nature and culture is overt in the worldview and language of some indigenous cultures: in M'ori for example, one is genealogically related to all parts of the environment; whenua means both 'earth/landscape' and 'placenta'; and kaitiaki (environmental guardians) can be both human and non-human. While various aspects of dual-direction nature-culture flows have been explored in western scholarship, a mind-map or model that presents the mutuality of these relationships is lacking. Social-ecological systems approaches have begun to explore the 'cross-sphere linkages that constitute the core of human-nature relations' (Glaser 2006, p131) but I argue that a more intimate framing of human-environment interactions is also needed - one which highlights the existence and possibilities of the mutual nurturing between nature and culture at a locally specific level. This paper introduces the concept of 'nulture' to describe this set of relationships. By giving prominence to locally distinctive and mutually nurturing interactions, nulture aims to promote wider consideration of the possibilities inherent in sustained, located, nurturing and mutually interdependent nature-culture interactions.



## SE 01-02 - Analysis of linked social-ecological systems 2

*Chair: Tillmann Buttschardt, Anna-Katharina Hornidge*

### Urban watercourses as key socio-ecological link in Santiago de Chile?

*Alexis Vásquez (University of Chile), Ulrike Weiland (University of Leipzig)*

Urban watercourses such as streams, canals and rivers are structural components of the Santiago landscape. Our hypothesis is, that they have the potential to serve as key links between urban social and ecological natural systems and to provide environmental services, helping to reduce socio-environmental problems and to stabilizing the link between social and ecological systems in an urban setting. Analyzing environmental characteristics and functions of riparian zones as well as exploring opportunities and constraints to develop multifunctional riparian greenways, helps to assess their potential to serve as key link between social and ecological dimensions - as multifunctional riparian greenways - and to set priorities in urban decision making. For two watercourses - Mapocho river and Zanjón de la Aguada' integrative analyses of the socio-ecological systems have been carried out. As key features for the analysis social pattern, transport infrastructure, flood risk, land use/cover, public green spaces, native woody species distribution as well as air temperature and wind patterns have been addressed. Local stakeholders were interviewed to identify opportunities and constraints to develop multifunctional riparian greenways. Zanjón de la Aguada and Mapocho rivers have been heavily affected by the urbanization process that has a much higher impact close to the stream. More than 50% of riparian zone population lives in the flood prone area. The most important opportunities to develop multifunctional riparian greenways are related to: -These watercourses flow through 12 and 9 municipalities, they have the potential to link the social and urban fragmented landscape. -In some segments they still are providing cooling effects, harbouring native woody species and acting as wind corridors. -An increasing number of social movements strive for urban greening, agriculture, and ecology. On the other hand, the most important constraints are: More than 20% of Mapocho and Zanjón de la Aguada riparian zones are covered by dense residential areas. There is a high administrative spatial fragmentation due to a missing authority for the metropolitan area. Awareness of the complexity and necessity of greenways on the part of political actors and the local communities is missing. In order to link better the urban social and ecological systems, to benefit the

opportunities and to overcome the constraints mentioned above at the best, a 'Riparian-Zone-Multifunctional-Greenway-Strategy' should be developed covering the built-up areas as well as the catchment areas of the watercourses investigated. In this contribution, 1) an integrative socio-ecological system analysis of the selected urban riparian zones will be presented. 2) Opportunities and 3) constraints to develop multifunctional riparian greenways will be discussed, and finally 4) conclusions how to link better the socio-ecological system will be drawn.

### Zoning of Regional Environmental and Socio-Economic Systems of Ukraine

*Anatoliy Kornus (Sumy State Pedagogical University), Olesya Kornus (Sumy State Pedagogical University), Vladimir Shishyk (Sumy State University)*

Socio-ecological-economic zoning of Ukraine can be attributed to the scientific search for ways and mechanisms for solving problems of regional development. Given the incomplete readiness of socio-ecological-economic zoning of large areas, it is important to find effective approaches for its implementation. This determined the aim of our study, which was making such zoning for the North-Eastern region of Ukraine. Implementation of socio-ecological-economic zoning took place in several stages. The first phase was carried out analysis of natural resources, demographic and economic potential of the administrative districts of the North-Eastern part of Ukraine. At the second stage of our study was the estimation of the balance of resource potential administrative districts, which are a North-Eastern region, which allowed based on an index of socio-economic sustainability and ecological sustainability index to identify the most problematic areas and regions as socio-economic and environmental development, and rank all the studied region for tension problems in their development. Administrative districts of the North-Eastern region of Ukraine where there are major regional industrial, organizational-economic, cultural and living centers usually have complex environmental problems and the peripheral territory have problems mainly in the socio-economic terms, that each region can be seen as problematic territory. Number of districts where there are no pronounced problems of socio-economic and environmental development is minimal. In the third stage of our investigation, based on the spatial distribution of above mentioned sustainability indices, was carried out the socio-ecological-economic zoning of the North-Eastern region of Ukraine. Each socio-ecological-economic area (SEEA) - this is not virtual space design, but real space systems are closely intertwined and interacting nature, economy and population. Each such system

performs certain functions that are entire system configurators. Village periphery provides the industrial centers of raw materials and foods, urban centers provide the periphery of industrial goods and serve as social and cultural services to the population of the province. Thus, the pattern within the SEEA is reproduction of socio-economic, natural resources and the demographic potential of the territory. In Ukraine there are no administrative units that could perform similar functions; the municipality (administrative districts and cities of regional subordination) is very small such purposes, and administrative regions or economic areas are very large and spatially heterogeneous. But each SEEA in perspective can be considered as a potential unit of administrative-territorial division designed to ensure the successful implementation of regional strategies for sustainable development. Such a strategy should have each region, as sustainable development of any country provided by sustainable development of its regions.

#### **How social aspects need to be considered in small-scale ecological research projects**

*Jenny Schmidt (Institut für Landschaftsökologie)*

Mankind is facing increasing challenges with sustaining a healthy living environment on planet earth. While many phenomena like climate change, scarcity of water, soil erosion, desertification and the finiteness of natural resources are well known, the need for rapid action seems overshadowed by political, social and economic constraints. If scientific research in the field of landscape ecology and physical geography wants to produce applicable results, scientists need to inform themselves about linkages between the ecosystem and the society they work in and how the interaction of people with their natural environment works. Using an example of a small-scale research project on pollination of rooibos in South Africa, it is shown, how knowledge exchange can be successfully incorporated into the research setup without the need of additional resources. The benefits for local stakeholders and the scientist are laid out. A few general considerations about knowledge exchange and how we use it is provided. Also, some insights are given into the discussion about a paradigm extension which is taking place within the discipline of landscape ecology. While some people are looking to extend pattern and processes with design, others are emphasizing place and people to be included. The presentation aims to encourage scientists' reflection on their self-concept and their professional relationship to society.

#### **Landscape Ecological Assessment of the Bakreshwar River Basin, Birbhum District, West Bengal, India: A Micro-Level Study**

*Druheen Chakraborty (Visva- Bhatari, Santiniketan)*

Landscape ecology relates the relationships between sustainable development and ecological processes in a particular ecosystem. Landscapes are spatially heterogeneous geographic areas characterized by diverse interacting patches or ecosystems, ranging from relatively natural terrestrial to human-dominated environments including agricultural and urban settings. It is measured within a variety of landscape scales, spatial patterns, and organizational levels of research and policy. The landscape ecology includes ecological flows in landscape mosaics, land use/land cover change, scaling, relating landscape pattern analysis with ecological processes, and landscape conservation and sustainability. Land use planning based on the landscape ecological approach and design can be effectively used as most appropriate method to restore the landscape ecologic equilibrium in degraded land for solving the society's sustainability problems. In this paper, an attempt has been made to identify the patches and analyse the patch dynamics. In fact, patches are the basic unit of the landscape that change and fluctuate (horizontal and vertical processes). The Bakreshwar River Basin, located in the south western part of the Birbhum District, West Bengal, has been selected for the present investigation. Topographical sheets (1970-71) and Satellite Imageries (IRS-P6, LISS III of 04 December 2006 Precision Geocoded FCC), field information and GIS techniques have been used to analyse the patch dynamics of the study-area. Each micro-level Landscape Ecological Units (LEU) have been assessed in this paper. Some specific remedial measures have also been suggested for the management and planning of land resources in the study-area.

## SE 01-03 - Analysis of linked social-ecological systems 3

*Chair: Tillmann Buttschardt, Anna-Katharina Hornidge*

### The Social Ecology of Californisation & Littoralisation in Mediterranean France

*Christophe Neff (IFGG, Karlsruher Institut für Technologie), Julia Baum (IFGG, Karlsruher Institut für Technologie)*

Both californisation and littoralisation are two of the main drivers of landscape changes in Mediterranean ecosystems (Neff & Frankenberg 1995, Neff & Scheid 2005). These processes can also influence the quality of ecosystem services of Mediterranean ecosystems. In Mediterranean France - the littoralisation of coastal areas has widely changed the coastal geography - "real wilderness" is restricted to very small parts of the coastline (Calanques coast, part of the Camargue, coastline between la Clape Massif and Cap Leucate). Furthermore, the californisation of the coastal hinterland - the term californisation as used in francophone geography describes the process of suburbanization of large landscapes - provokes a new frontier line of urban/forest interface, which in case of forest fire can create a tough challenge for firefighters. The progression of settlements into the "wild" - and the progression of the wild into settlements can create a new social ecological system, with changing ecological service capacities. In a case study (Masterthesis J. Baum, Baum 2011) we analyzed how these processes actually restructure the landscape cover/geography of the Leucate area - one of the remaining rare areas of wilderness on the french Mediterranean coastline (Neff 1998) - and how these processes influence (reduce or reinforce) local ecological services. This study, which is one of the first studies analyzing ecosystem services in a spatially explicit approach in Mediterranean terrestrial ecosystems, provides some interesting "insight views" of connectivity of local & regional societal systems and local & regional land cover dynamics. We also try to show how to integrate the results of the Leucate case study in a large theoretical framework - using the approach of G.S. Cumming (2011a+b). Literature: Baum, J. (2011): Land Use Change causing local Land Cover Change in mediterranean France and its Impact on Biodiversity and Ecosystem Services. Unpublished Masterthesis, IFGG-KIT. Cumming, G.S. (2011a): Spatial Resilience in Social - Ecological Systems. Dordrecht. Cumming, G.S.

### Knowledge of adaptation – Adaptation of knowledge. Mapping the adaptive capacity of a social-ecological system.

*Simone Beichler (HafenCity Universität Hamburg), Maria Hagemeyer-Klose (HafenCity Universität Hamburg), Sonja Deppisch (HafenCity Universität Hamburg)*

How can adaptive capacity of an urban region be characterized and evaluated in the face of climate change? The authors present conceptual considerations about adaptive capacity in social-ecological systems emphasizing the handling of correlated, highly dynamic and fast changing variables, in particular knowledge. A case study in Germany investigates such correlations via vulnerability analyses combined with scenario planning as an integrating inter- and transdisciplinary method. In climate change research, adaptive capacity is seen as a key element of vulnerability besides sensitivity and exposure (IPCC 2007). There is an increasing demand for tools that allow spatial representation of vulnerability to implement adaptation measures, to inform actors and to prioritise actions. Knowledge as basis for decisions and actions in adaptation to climate change is the crucial prerequisite for all adaptation efforts. Therefore knowledge can be seen as one decisive variable of adaptive capacity (Berkas et al. 2002). Mapping vulnerability, possible consequences of measures and resulting interventions need to be considered. Hence, clear cause-effect relations should be taken into account, but the correlations between sensitivity and adaptive capacity measures and their dynamics are still under acknowledged. Moreover, a social-ecological system permanently transforms its structure, dependencies and feedbacks, because the system incorporates properties like knowledge alongside with social networks and communication practices, which are permanently changing. Consequently, the overall results suggest that the adaptive capacity of a social-ecological system is highly dynamic, contrary to the fact that a spatial explicit evaluation of adaptive capacity can only show a snapshot at a given time. In order to cope with these challenges the case study of our project plan B:altic firstly uncovers correlations and dynamics of adaptive capacity in vulnerability assessment. Here, interactions between humans and their environment are presented. On the one hand, society depends on ecosystem services especially in the face of climate change. On the other hand society takes actions that influence ecosystems. Secondly, the paper presents an integrated approach using scenario planning, which consciously incorporates change.

## Participant observation as a tool for holistic agroecosystems research

*Imogen Bellwood-Howard (Kings College London)*

Social and ecological concerns interact nowhere more than in agroecosystems. It follows that agricultural research must use interdisciplinary methods. This paper assesses the benefits of participant observation, an ethnographic technique, in agroecosystem analysis, illustrating its use in soil fertility management (SFM) research in the Ghanaian savanna. The research used qualitative and quantitative methods to explore how farmers' socioeconomic assets influenced their access to environmentally appropriate SFM techniques. Soil nutrient and moisture tests on 59 farmers' fields found that the water retention qualities of composts added to the sandy soils raised maize yields. Yet farmers explained how financial constraints limit their access to vehicles with which to convey compost to the field; also to fertiliser and to traction for early ploughing that allows them to benefit from the first rains of the short farming season. To tackle this they used and compared, through assay, survey and interview, six compost carriage methods. Participant observation was invaluable in identifying the institutions and management practices they developed to work within social and ecological boundaries. Accompanying farmers as they carried compost to the farm, I observed synergy resulting from their use of multiple vehicles to maximise labour efficiency in the limited time they had with a hired or shared donkey cart. Using the donkey allowed them to get compost to the fields on time, as it had more stamina than the more traditional and expensive bullocks. When labour for compost carriage was unavailable, other locally developed methods, such as double ploughing and coppicing, maximised the amount of organic matter incorporated into the soil. Living in the community, I observed unreported examples of hire, borrowing and sharing. These illustrated how institutions acting at individual, household, community and national scales governed access to resources, especially the carts used to carry compost. Participant observation gives researchers insight into participants' worldview. Farmers' holistic view of agroecosystem functioning led me to describe it and the management practices within it as a complex, self-defined system rather than an arena where discrete social and ecological processes collide. Participant observation is not, however, infallible. An extended period in the field is necessary to appreciate the importance of seasonality. Linguistic fluency elucidates the nuances of actors' practice; in its absence good working relationships with participants and interpreters are essential. Finally, researchers' positionality prevents them becoming full 'participants'. Participant observation

must therefore be triangulated with qualitative and quantitative methods. Together they constitute a powerful set of tools for understanding local management practices and developing them for resilience to environmental change.

## Socio-ecological resilience and vulnerability in the high Andes – a bio-cultural approach

*Dorothea Hamilton (Universität Marburg)*

The antagonisms resilience and vulnerability are concepts that require a more systemic and holistic approach towards the human-environmental interaction. That the holistic nature requires seeing the worldview as the fundamental bases of the system is obvious. The bio-cultural approach includes all tangible and intangible aspects for understanding the resilience, seeing spirituality as one of the aspects in understanding the system. The Andes region is a highly fragile ecosystem with high climate variability. The human-environmental co evolution has created a place-based system that has shown to be resilient to the social and environmental shocks it has been exposed to. The base is a bio-cultural system which links traditional knowledge on the ecosystem with everyday practices and spirituality. The knowledge of the interlinkages with spiritual beliefs and values has to be seen as the bases for the continued existence of the socio-ecological resilience of the area. In the Andean terminology this system is called Ayllu, meaning the interaction and interchange of all beings as the principle for survival. As the Andean worldview is cosmocentric, therefore the realms of exchange include as well the exchange of goods between the people as well as the exchange with other living beings and nature itself by ritual acts. The principle of exchange is the bases of the traditional Andean landscape management and implies the continued respect of all beings and a non-exploitive view on nature. Nonetheless the traditional Andean resilience is being threatened by many aspects, turning it into a vulnerable area. So-called development projects are threatening to destroy the bases of the Andean bio-cultural system by undermining the fundamental principles of their worldview. At the same time ecological threats such as the increase of extreme events need a stable human-environment-interaction in order to continue to be resilient. This study focuses on results of an action research conducted in six Quechua communities near the city of Cusco, Peru. Together the communities form the Potato Park, a project to strengthen the traditional Ayllu system in order to increase resilience. The human-environmental linkages in this bio-cultural system are explored as well as the impact of actual tendencies on this, giving insights





into the resilience and vulnerability in the high Andes. Empirical evidence shows that there are effective measures in order to support the traditional Ayllu system in order to enforce socio-ecological resilience.

## SE 01-04 - Analysis of linked social-ecological systems 4

*Chair: Tillmann Buttschardt, Anna-Katharina Hornidge*

### Potential economic interest for urban future in Hukawng Valley, Kachin

*Seng Aung (Myitkynia University)*

Aloe (local name is Thithmwe and Mura Hpunsau in Kachin), plant by Lord (Number 24:6), which can be studied as many names for the resinous, fragrant and highly valuable plant species in Kachin State. It is known as tropical plant, Aquilaria and it occurs in 16 countries from Bhutan and northeastern India across to southern China through Southeast Asia and as far as the Papua New Guinea. A shade-tolerant under evergreen and semi-evergreen forests, Aquilaria occurs throughout Myanmar from Tanintharyi rain forests to hill evergreen forest of Putao with exception of the central dry zone. According to Aquilaria hunters, species grown naturally in Hukawng Valley is the best quality resin in the whole Myanmar. These natural non-timber trees were overexploited due to attractive price of its resin as illegal trade since 1970s in Kachin State and also in the whole Myanmar. The natural growth in the wild of Aquilaria is getting rare and endangered throughout its range in Kachin State and also in Myanmar. Aquilaria had been almost neglected in forest and distribution status of the wild agarwood species is very little. Aquilaria reflects its widespread and varied use as medicinal products, cultural and traditional and it is used as a perfume has been recorded in the Old Testament and uses continue today. According to interviewed local Aquilaria hunters, agarwood oil and incense are used for their fragrant properties, notably in the Middle East. Nowadays, Aquilaria domestication and plantation is being carried out in Kachin State and also in Myanmar from 6 years ago. Sustainable use not only emphasizes sustained yield, but also embraces sustenance of ecological, socio-economic and cultural services of the species. To achieve sustained yield, and the regeneration characteristics of the Aquilaria, sustainable socio-economy for urban future population under different ecological setting and environmental position, it is important to study for development of long-term objectives of eco-based farm research and technological development and seeking local people' participation and international networking in Kachin State. Aim and objectives Major aim of this study is development of sustainable socio-economy for urban future population by means of non-timber forest resource management in Hukawng Valley, Kachin State. Objectives - to seek the way of poverty of local people - to develop

sustainable livelihood - to cooperate in the fields of research and technology for Agarwood plantation toward urban future development in Kachin State

### Capturing a multidisciplinary approach – Integrating ecosystem services and social impact analysis for sustainable land use management in Krummhörn (German North Sea coastal region)

*Leena Karrasch (Universität Oldenburg), Thomas Klenke (Universität Oldenburg), Johan Woltjer (University of Groningen)*

The coastal lowlands and estuaries of North-West Europe are particularly vulnerable to climate change. The need for adaptive strategies leading to a more sustainable development and focusing on human well-being to meet the changing conditions is obvious. Related informal processes on regional climate adaption strategies and schemes have started in the area of Krummhörn (Northwest Germany). Here, stakeholders want to cover the structures of both, the community and the ecosystems, in a process dealing with the development of new options for sustainable land use management. There is, however, a lack of knowledge concerning the relationship between ecosystem services and social impacts in particular. Decision-makers together with scientists have to deal with the challenges of an integrative approach. We developed and applied a method for participatory planning based on an integrated assessment of the ecosystem service approach in combination with a social impact assessment. Both concepts constitute the foundation to analyze complex socio-ecological systems and activities within the regional society. Capturing the knowledge of local stakeholders and using the multiple trade-off analysis from other scenarios, ecosystem services are evaluated in a socio-economic and socio-ecological framework. Indirect and direct social impacts and ecosystem services are included in the strategy development. Putting the method into practice of planning sessions, stakeholders express their experiences and needs in social terms without the need to understand the scientific background of the ecosystem service approach which is often not easy to communicate. E.g., the provisioning service "green energy production using crops" is determined by the direct social impact "fear of increasing monocultures". In addition, indirect social impacts strengthen the ecosystem service, like the dependence on market prices or the fear of competing land use. Another example is provided by the cultural service "recreation and tourism". This service relates directly to indicative landscape impacts and indirectly to the security of income or the economic prosperity and resilience of the region. The combined framework optimizes decision-making as well as evaluation processes and leads to a better

understanding of human well-being. It reduces complexity and encourages stakeholder participation. Scientific and practical implications contribute to new courses of action leading to a sustainable and multi-functional land management. This provides a trans-disciplinary approach of natural and social sciences negotiating the separation between humans and environment.

### **Wetlands of Göksu Delta: History, Problems and Policy**

*Murat Karabulut (Kahramanmaraş Sütçü İmam University), Mehmet Gürbüz*

Wetlands are ecosystems with high ecological and economic value. Among other wetland ecosystems, deltas are the ecosystems with the most dynamic and complex relations. This study comprises of wetlands of Göksu Delta which is located in the Mediterranean region of Turkey. Göksu Delta have one of the most important international wetlands that provide reproduction, nutrition and accommodation facilities for delicate, rare and in danger of extinction of many species. This area is also located on the one of the world's important bird migration route. In Turkey, approximately 450 bird species have been identified and 332 of them have been observed in the Göksu Delta. Globally, 12 endangered bird species out of 24 were also found in the Göksu Delta. Flora of the area consists of 384 taxa and among these, 5 of them on a global scale, 3 of them on the European scale and 43 which are rarely found species across the country are under threat. As a result of the hydrologic interventions and several human activities in Göksu Delta, the wetlands of Göksu Delta have been changed, many wetlands have extinct and Akgöl which was a temporary lake has been turned in to a permanent lake. This alteration has changed the cultural structure in the area totally and resulted in new settlement, production and consumption trends. The cultural life that emerged as a result of these alterations has also changed the way people utilize wetlands forcing people to adapt themselves to environmental conditions that have changed as a result of hydrologic intervention. Because of the cultural and biological values that the delta possesses, the area has been granted various protection statuses such as becoming RAMSAR site. Two different management plans also were prepared and work is currently underway as part of these plans between 1999 and 2009. However, the work currently underway is focused on the physical structure of the delta with the work related to the cultural qualities of the people living around the delta remaining limited. Thus, analyzing natural environment and human activities which are two interactive properties together would allow the protection activities to be carried out more effectively.

### **Addressing the information needs of farmers in North Rhine-Westphalia can help to promote sustainable land-use in overused landscapes.**

*Jenny Schmidt (Institut für Landschaftsökologie)*

A research project about the ecological, economical and political information requirements and perceptions of farmers in the Region of North Rhine-Westphalia in Germany is used to evaluate the success of incentives to promote biodiversity in a highly agriculturally industrialized environment. Topics addressed within the project will include: · - Do farmers have sufficient knowledge about the advantages of biodiversity for their own fields? · - What does biodiversity mean for farmers? · - Are state-promoted programs providing credible and understandable information about the benefits? · - Is the financial incentive the main reason for farmers to take part in the programs? · - How do scientists communicate their findings to the general public and potential users? · - Are there incentives for scientists to engage with the civil society? Lessons learnt from other countries, especially so-called third-world countries will be adopted and applied to a Western society. The methodology will be chosen with emphasis on a two way flow of information and knowledge between farmers and scientists.

## SE 02-01 - Border Water Scarcity

*Chair: Matthias Moeller, Hermann Klug*

### Trans-boundary flood monitoring in Namibia using automated sensor web infrastructure

*Jan-Peter Mund (University of Eberswalde), Joerg Szarzynski (United Nations University Bonn)*

The paper presents an international multidisciplinary initiative's Namibia Sensor Web Pilot Project that represents a testbed for evaluating and prototyping main technologies for distributed data processing: sensor web, Grid and clouds. Like many other regions on planet earth the Southern African Development Community (SADC) region is threatened by several severe disasters in terms of floods and droughts in close connection with water borne diseases. Trans-boundary river systems in Namibia's northern areas are characterized by strong seasonal flooding of ephemeral drainage networks in a semi-arid environment. Exceptional floods, such as those occurred in 2008-2010, caused emergency disaster conditions for the local population and infrastructure development. Increased climate variability is currently discussed as one of the major drivers for such events. In addition, vector- and water-borne diseases and epidemics of weather- and climate-sensitive infectious diseases, including malaria, meningitis, and cholera, cause massive disruption to societies and put a heavy burden on national health systems. The Sensor 'Web Pilot project aims at developing operational trans-boundary flood management decision support system for the Southern African region to provide useful flood and water-borne disease forecasting tools for local decision makers. The effort consists in identifying and prototyping technologies which enable the rapid acquisition and dissemination of both space-based and ground sensor data and geospatial products from risk assessment for the purpose of flood disaster management and water-related disease management. An integrated Disaster Management System (DMS) is proposed to allow governmental and non-governmental organizations to handle the changing conditions and resulting threads. The overall system needs to combine real-time and near-real time sensor information on several physical variables necessary for flood and disease early warning and disaster response with pre-computed multi-risk assessment information based on geospatial and geo-statistical base data. To encounter these requirements the proposed overall framework consists of two core components: a Flood Sensor Web and a Hazard Monitoring and Mitigation System. The Pilot will support the deployment of

services as well as the development of a virtual infrastructure to support such services. The Pilot Project is established under the auspices of the Namibian Ministry of Agriculture, Water and Forestry (MAWF) Department of Water Affairs, and the Committee on Earth Observing Satellites (CEOS) - Working Group on Information Systems and Services (WGISS), and is moderated by the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UNSPIDER).

### Integrated Water Resources Management and the Challenges of Action Plans in the Hadejia-Jama'are -Komadugu-Yobe Basin, Nigeria

*Haruna Kuje Ayuba (University of Maiduguri), Mala Mohammed Daura (University of Maiduguri)*

In recent times, the Federal Ministry of Agriculture and Water Resources (FMAWR), Nigeria and the European Union (EU) are partnering to support the piloting of Integrated Water Resources Management (IWRM) project in the Hadejia-Jama'are-Komadugu-Yobe (HJKY) Basin of Nigeria. The IWRM Project is part of the Water Supply and Sanitation Sector Reform Programme (WSSSRP). The IWRM Project aims to improve water governance in the basin. However, various institutions and organizations within the basin have developed many action plans, cutting across a wide range of environmental issues. In addition, not only are the institutions and organizations involved often uncoordinated, the action plans developed by them have not been integrated into a single and more comprehensive action plan. New developments within the basin also demonstrate the need for an updated action plan to take account of progress made and to ensure integrated water resource management (IWRM) and the conservation and sustainable use of natural resources within the economic and social development frameworks of the basin. This paper synthesized all the water action plans developed over the past 15 years in the HJKYB into a single, updated and more inclusive action plan for the basin to guide policy makers and the basin stakeholders. The plan consists of three major components, each of which is divided into sub-components: Development of the socio-economic and institutional resources in the basin, comprising the policy, planning and legislative framework, and capacity-building of the stakeholder organisations; Sustainable management of the basin's natural resources, comprising water and ecosystem resources; Increasing the knowledge base, comprising data, research and communication strategies. It builds on the present situation in each of these components to identify actions in

the short-term (~2 years), medium-term (2~5 years), with some actions for the long-term (~25 years). The emphasis is on specific and practical actions which can be undertaken by basin stakeholders. The plan proposes stakeholder responsibilities for implementing the various actions, and presents an outline budget. An updated and integrated action plan in the HJKYB will among other things provide solutions to the institutional problems which have hampered previous efforts at sustainable water resource management and integrated ecosystem management within the basin, establish a coherent basis for undertaking physical interventions and pilot projects in the basin and set a rational basis for data, research and communication strategies. The paper concludes by making some recommendations concerning dissemination of the plan.

### **Water-ecological aspects of transboundary cooperation in Continental Asia**

*Bella Krasnoyaroova (Siberian Branch of the Russian Academy of Sciences), Yuri Vinokurov*

Water resources are called the primary resources of the third millennium. Their availability and quality in many regions is a limiting factor for their development and a reason for interregional and international conflicts. In general Asia can be referred to the territories of water-ecological risk. Here, water resources are characterized by nonuniformity. The relationship between the North and the South is a problem of today taking into account the issue of water supply. The north possesses sufficient amount of water resources, while in Central and South Asia water resources are severely limited. It results in the outbreak of diseases and sometimes the risk of conflicts associated with water-related problems. In recent years, China being a peculiar kind of 'hydro-donor' of the region, finds itself in the center of water-ecological conflicts occurring within the Continental Asia. Here, such rivers as Brahmaputra (Matsang Tsangpo in Tibet), Hongha'RedRiver (Lishekhe-Yuantian in China) etc. originate. The most part of territories in Central Asia is provided by as many as half of water resources from abroad. Kazakhstan takes as much as about one-third of water from transboundary rivers rising from China. Thus the development of these countries directly depends on the economic and geopolitical behavior of China. Water-related interests of Russia and China intersect mainly in the basins of Irtysh, Ili and Amur rivers. Even with sufficient water supply of the Russian regions the issues of water apportioning and water quality are of great importance due to the increasing demand of population and expanding economy. In these

circumstances, the situation in the Irtysh basin becomes aggravated because of the presence of the 'third' countries when Russia is the 'second' user and gets water last after China and Kazakhstan without any participation in the agreement with these countries. Russia gets to choose between the passive participation in water management of the basin and the dynamic policy oriented to the conservation of water resources and the maintenance of the Irtysh status of significant artery. In Russia, water-related issues can be solved by two ways, namely, the construction of a dam near Omsk city and the construction of a reservoir for runoff retention. One more option is the construction of underwater artificial bars which allows the water level rise due to the reduction of flow rate. In our opinion, the second project is more preferable taking into consideration the water-related and ecological aspects. However, more conservative project on the construction of the low-head dam and a reservoir near Omsk city has been approved. The implementation of any of these projects deals with water management of Omsk city but not with sustainable water use in the basin. For this purpose more effective technological, technical and institutional efforts of three countries are called.

### **Drought management in transboundary river basins: An Iberian feasibility assessment on the Guadiana**

*Afonso Do Ó (Universidad de Sevilla)*

Over the past several decades, increasing economic integration and the impacts of climate hazards, which know no boundaries, have brought transboundary environmental issues to the forefront of international political debate. In semi-arid regions, water risks and conflicts are of major concern, and call for a shared multilateral approach, particularly during water-stressed periods such as droughts. Shared river basins of the Iberian Peninsula, and particularly the Guadiana, are of major interest for Mediterranean Europe, because of its significant dimension, aridity, water scarcity, and drought risk. A political agreement (the Albufeira Convention) regulates water issues between the two riparian countries (Portugal and Spain), but an exception regime is applied under drought conditions (when the conflict potential is higher), water planning remains strictly at the national level, and the hydro-hegemonic position of Spain dominates negotiations. This paper seeks to identify the potential and constraints for an effective transboundary drought management for the Guadiana river basin. To achieve such goal, a preliminary SWOT analysis was conducted on each country's drought management framework, based on 24 criteria grouped into four major categories: Institutional Cooperation,



Environmental Protection, Social and Economic Dimensions, and Planning System. Secondly, ten key decision-makers were interviewed in both countries, allowing to: i) validate the preliminary SWOT analysis; ii) identify competences to be shared for mutual benefice (win-win situations); iii) define the best level of competence for drought response measures; and iv) identify risks associated to transboundary competences, thus setting a business model framework to be used on a joint process of river basin planning. General results show that the Portuguese situation is quite fragile when compared to Spain's, because of its downstream position, weaker social, economic and negotiating capacity, and poorer governance conditions. On the other hand, Spain faces greater internal challenges, due to an excessive irrigation demand, and increasing political power fragmentation. Interviews point to a 'depoliticised' transboundary model of river basin management, mostly restricted to technical competences, and identify several risks related to the implementation of such competences at the transboundary level - namely loss of sovereignty, excessive costs, poor communication, and mismatching planning structures between riparian countries.



## SE 03-01 - Can we manage human-nature interactions?

*Chair: Beate Ratter, Kirsten v. Elverfeldt*

### On the potential in a relational arena perspective for understanding landscape dynamics

*Marie Stenseke (Human and Economic Geography)*

Culture's importance to maintaining natural diversity and vice versa is widely acknowledged. Furthermore, it is recognised that the management of our physical environment has to be considered within a multi-dimensional framework embracing societal values such as human well-being and cultural heritage. Theories, concepts and methods to explore and explain the integrated relationships between the human sphere and the non-human have evolved in various disciplines. A number of scientific approaches with holistic ambitions has been presented, and these have to some extent also been applied in various contexts. There are, however, shortcomings related to these approaches, evoking the question if an integration of nature and culture in environmental planning is possible? This paper elaborates on the potential in a geographical relational perspective in addressing this issue. It relates to empirical cases in Peak District, England, the Cevennes, France and Kinnekulle, Sweden. A prerequisite for landscape research is the acceptance of some fundamental differences between studies of plants and animals and studies of the human society and human actions. Recognizing these differences implies for example that it is highly problematic to apply analytical concepts developed in biology on the human sphere. One complication for the commonly used system perspective on people and nature as well as for mapping are the diverging scales for ecological relations and human societies respectively, where the first have remained fairly stable over time, while the latter has expanded and new land use demands such as tourism and recreation have evolved. In the paper, it is suggested that an arena perspective, related to time-geography and its core aspect 'thereness' helps to capture human intentionality and improve the understanding of the inherent character of landscape dynamics.

### State of Ukraine's socio-environmental system: Issues in striking the balance between development objectives of their components

*Sergiy Lisovsky (Ukrainian National Academy of Sciences)*

Ukraine's challenges to optimize the interaction between society and environment, to solve conflicts, aroused during formation of its integral socio-environmental systems in the process of socio-environmental interaction, represent crucial conditions to guarantee country's transition to sustainable development. At the dawn of the third millennium, irrational approaches to nature management in Ukraine resulted in national economy to become the most nature intensive in the world and all components of country's environment under powerful anthropogenic pressure. At the same time enormous scale of natural resource exploitation held back country's economic development and prosperity. Transformational processes which began and have been developing under the conditions of deep national and regional socio-environmental system crisis during 90's of the XX century and first decade of XXI century, aggravated the magnitude of old problems, and gave rise to new obstacles in the attempt to strike the balance between socio-economical development and environmental protection within the territory. We developed our own methodology for conducting multilayered (from global to local levels) comprehensive research on balanced development issues of environmental and social components within socio-environmental systems. To implement the methodology we developed and tested integrated benchmark indicator of the balanced development. We compared level of balance in development of some countries and territories in the world with Ukraine in within global commonwealth. The results we found allowed us to determine the Ukraine's position in balanced development among other countries, uncover and analyze resources and possible approaches to resolve the conflicts in Ukraine's socio-environmental systems and find ways for country's transition to sustainable development. We also conducted the research on regional differences in the levels of socio-environmental development balance. Based on the results we developed recommendations for country and its regions' smooth transition to the sustainable development. The main resources and potentials for Ukraine's balanced development implementation are human, farmland and natural resources, geographical position, socio-economic, scientific and know-how, historical and cultural resources. Implementation of transition to the sustainable development requires from Ukraine utilization of all its resources and application its full potential based on co-evolutional development, as well as resolution of all internal conflicts in the country's socio-environmental systems.

### Managing river and floodplain interconnection: Can we turn back time?

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The Upper Danube has been embanked and straightened, and hydropower plants have been built on it since the 19th century. River and floodplain became disconnected, the hydromorphological situation changed dramatically and typical floodplain habitats, such as softwood and hardwood riparian forests, have been suffering and diminished nearly. The presented project aims to restore the former river-floodplain interconnection by bringing back water and sediment dynamics via technical measurements to the riparian forest. Three measures were implemented, notwithstanding the still existing dams. At first a new river on the floodplain, permanently flowing, was created to bring more water to the soil and groundwater body. Then, two or three times a year, water will be diverted for ecological flooding, and at last the constantly high groundwater level will be drained from time to time. To improve the measures, an extensive monitoring program was installed and should support an adaptive management. All these measures are controllable, but only possible if they are sustained by human engagement. The question is how intensive the human action must be, and how long the situation will be stable. At present it is something like 'faking nature', but of course the hope is that the system will become more and more self-sustaining. Is it really possible to manage this human-nature interaction? Can we turn back time and correct our mistakes?

### Self-assessment tool on management effectiveness for UNESCO-biosphere reserves to manage human-nature interactions more successfully

*Clara Buer (University of Greifswald), Susanne Stoll-Kleemann (University of Greifswald)*

UNESCO-biosphere reserves are examples to manage human-nature interactions. Per definition, these model regions try to create and implement approaches for sustainable development while conserving natural and cultural diversity. In reality, its management bodies face various challenges by trying to achieve these aims. A self-assessment can help to reduce the gap between

concept and implementation. Therefore, this contribution addresses the following question: How can self-assessments on management effectiveness of UNESCO-biosphere reserve administrations help to improve the adaptive capacity? Instruments for a socioeconomic monitoring have been designed and tested in the context of a research project on societal processes in four German UNESCO-biosphere reserves (2009-2012). One of these instruments is a self-assessment tool on management effectiveness which is based on the WWF's Management Effectiveness Tracking Tool. In 2010 this tool has been tested with each of the four administrations. During a one-day workshop, 4 - 10 staff members joined an external moderated group discussion to assess their management effectiveness. The discussions were structured through a questionnaire divided into two parts: the valuation of 50 different external threats and the self-assessment which consists of 71 questions about e.g. management competencies, equipment, activities, and cooperation with stakeholders. The group discussions have been recorded and transcribed verbatim. Using the software tool ATLAS.ti, the data were interpreted according to a SWOT-analysis. The results show that most efforts of the administrations concentrate on conservation measures. Thus, to improve the implementation of the biosphere reserve concept, other aspects such as sustainable regional development, education, research, and monitoring need to be extended. In general, the self-assessment tool can foster adaptive management through: - Controversial discussions during the workshop which help to explicate different perceptions among staff members from different departments, e.g. about management priorities. This can firstly lead to strengthened mutual understanding and secondly, to a common identity of the management body. - The results can be communicated to the public and thereby increase transparency of management activities. - A comparison of the results with further monitoring results which directly detect environmental and societal changes allows explicating gaps between perception and reality. Direct actions can be derived from these findings to increase the adaptive capacity. If repeated biannually, this tool could be an essential part of an integrative monitoring programme for UNESCO-biosphere reserves. All in all, this self-assessment tool helps to identify concrete measures to improve adaptive management and to take on the challenge to manage the interaction of the society with its natural surroundings.



## SE 04-01 - Capturing imagined invisibility: How to analyze social representations of climate change?

*Chair: Lutz Meyer-Ohlendorf, Diana Reckien*

### Visions of climate change: reconstructing images of an invisible threat

*Eva Noethen (Goethe-Universität Frankfurt), Antje Schlottmann (Goethe-Universität Frankfurt)*

During the 1970ies a scholarly discourse emerged, and quickly gained popularity, that was concerned with the idea that a continuous growth of world population and its encroachment on natural ecosystems would result in global warming. Simultaneously, global warming as a threatening scenario became a major issue in mass media coverage. Today, according to omnipresent images such as thawing glaciers, shrinking polar ice masses, decreasing permafrost etc., it seems as if there is no doubt about global warming as a fact anymore. Recent approaches in cultural geography lead to a critical reflection of such discourses. In this context not only the social construction of global warming was emphasized, but also a simple understanding of the interplay of physical events ('nature') and their representation was questioned and re-theorized. However, emerging critical research focuses first and foremost on verbal discourse of climate change. This is remarkable given that contemporary communication processes are increasingly visual and assuming that visual communication is strongly related to the formation of collective knowledge assets. Moreover, visibility of any kind works in a direct and immediately affecting powerful way. Images work on the mind as well as on the body, evoking both emotions and motions. Though these latter effects remain often inconsiderate, it must be presumed that there is a strong interrelation of the body-related somatic work of images and social action. In our paper, we address questions of how and to which extent images of climate change in, predominantly western, mass media can be related to an everyday individual risk assessment and how visual representations are involved in confining scopes of action as a result. In this respect, we develop an action-oriented theoretical and methodological approach to the effects of visualities as well as to their modes of operation concerning required sustainable practices. In doing so, we compare examples from images of regions in the developed world to those in underdeveloped countries that both are obviously affected by climate change and that implicitly or explicitly appeal for taking action, although in different ways.

Today's life in the so called "developed world" is affected by a high level of technological development and an omnipresence of multimedia communication technologies. As a consequence, individuals are confronted with images of places or regions from all over the world. The globalization of information, however, of course also reaches the so called underdeveloped world. An unequal distribution of visual information derives from the power structures of stock photo agencies, rather than from territorial power structures. Beyond the geographical classification of a developed and an underdeveloped world, we thus call attention to the effects of the representation of development and underdevelopment in the discourse of climate change.

### The Invisible as Event: Social Memory and Climate Science

*Arne Harms (FU Berlin)*

While anthropogenic Climate Changes are largely predicted for the future, they already do unfold in the present and have so in the recent past. Some of its effects – large or small, unexceptional or dramatic – fit uneasily into broader patterns of environmental hazards and changes. They are, therefore, not only challenging livelihoods, but also culturally mediated perceptions, cosmologies and interactions. Climatic changes, therefore, unfold against the background of ever-evolving natures, as well as ever-evolving societies and are deeply enmeshed in these. In more than one sense the roles and uses of the past therefore hold important clues for the socially bent climate sciences. Drawing on the dynamic field of inquiry which evolves around the concepts of landscape, environmental hazard and social memory, I will highlight in this paper the usage of remembrance as an analytic tool to understand environmental changes and related social adaptations or dislocations. This, I believe, might be helpful in many ways. Among others, it will allow for a better identification of social vulnerabilities and resiliences; to address pervasive issues of power; or to analyze culturally mediated and contested interpretations of (environmental) changes. Fundamental to these (and other) analytical trajectories is, I believe, an attention to varying temporalities. Related to Climate Change, two basic modes of social remembering will be distinguished. That is, on one hand, a remembrance of large scale disasters, that is often institutionalised and on a grand scale. This will be contrasted, on the other hand, with the socially structured and culturally mediated remembering of processual, but dramatic changes that amount to forms of 'slow violence' (Nixon 2011). While the former often play a decisive role in global mediascapes, it are the latter that do and might further endanger lifeworlds in large parts of the Global South without much public notice. The

attention to varying temporalities, to the eventfulness of the uneventful and to politics of remembering might help to better understand how largely invisible changes are perceived and related to by vulnerable populations. I will illustrate these considerations through findings from my own fieldresearch in coastal/deltaic West Bengal (India).

### **Participatory Mapping of local knowledge about climate-change related natural disasters**

*Christian Reichel (Freie Universität Berlin)*

This article examines ways to complement the dominant normative and technological practise of catastrophe management by using local knowledge to improve the resilience against to climate-related risks. Based on comparative examples from Indonesia and Switzerland, it will be questioned how local perceptions and handling strategies of climate-related risks may be integrated within the politics of catastrophe managements in an effective way. Technical prevention strategies and local knowledge will be juxtaposed to examine their potential for contributing to improved resilience to climate-related catastrophes. In particular, it is shown in what ways an integration of local knowledge into catastrophe management contributes to effectively responding to the expected cultural, political, economic and environmental transformations which are caused by climate change. Participatory GIS mapping (PGIS) is the chosen method utilised in this research. It is a relatively new cartographical approach which includes local perceptions and handling strategies. It enables an improved communication of policy advice, thereby helping to implement an interdisciplinary cooperation within the academic world. Moreover, the approach fosters an active participation of local people in the process of catastrophe management.

### **Peasant perception and adaptation to climate change in the Sudano Sahelian zone of Cameroon**

*Marcel Nkoma (Ministry of Planning and regional development)*

Climate variability continues to weaken the economies of African countries and threatens the security of the poorest. They suffer the impacts of many extreme weather events such as -floods, droughts and reduced rainfall. Climate variability and climate change are phenomena of concern, mainly because as Cameroon (occupying the 157th position in the human development index), part of which consist of a sahelian zone. Agricultural productivity is strongly linked to rainfall.

Indeed, the unevent distribution of water resources, 72% are located in the southern part of the country while in the north and far north water resources are limited. This situation reinforces the negative impact of drought periods. As a proceed longer, a result the desertification in this part of Cameroon. This are caused a fall in agricultural production is observed, especially for some crops like sorghum and long cycle maize. Despite continuing threats due to climate change, the country has not yet gotting and operational contingency plan to deal with these situations. Faced with these situations, a perception rather based on the qualitative elements, brings farmers from sudano sahelian zone to do a reading of climate change, including: (a) the constant uncertainty about the continuity of the vegetable cycle, (b) the repeat of the seeding over a year, (c) the rains do not mean the beginning of the growing season, (d) uncertainly about the end of the rainy season, (e) the decrease in performance. As a matter of fact, the perception of climate change by farmers from the plains of the far north of Cameroon is based on rainfall variability. Faced with these risks due to climate variability, vulnerable populations have no choice-they must adapt. Adaptation is not yet an alien phenomenon in the area. People have historically developed adaptation strategies. In this study, we identified seven key strategies to climate variability: (1) the predisposition to suffer losses (they are psychologically prepared to face the worst), (2) the constitution of emergency stocks, (3) the development of traditional cultural practices, (4) the change in cropping patterns, (5) the use of new plots, (6) the date change for some operations (sowing date) and (7) the counter-season cultivation of lowlands and irrigated crops (case of Mouskouari). Thus, before analyzing the various response strategies of the northern populations associated to climate disturbances, we will go through a preview of the peasant reading of climatic changes based of a perception of qualitative elements. The methodology used in this paper results from the combination of different aspects of empirical evidence and literature review unable to gather accurate statistical data for the study, we had to resort at times to extrapolation techniques.

## SE 05-01 - Climate change – indications, dynamics and regional perspectives

*Chair: Heiko Paeth, Dieter Anhof*

### New assessments of areas and equilibrium line altitude of Chukotka glaciers and their development projection for the near future

*Maria Ananicheva (Institute of Geography RAS), Gregory Kapustin (Institute of Geography RAS)*

New assessments of glacier areas were received by ASTER and World View-2 images for Meynypilgynsky Range (South-East of Chukotka), which was divided into 6 glacier systems. The difficulties and peculiarities of practically manual deciphering (processing of the images) are discussed. These areas were compared with the data of the Glacier Inventory compiled for this regions in 1980-s (Sedov, 1991). The areal reduction of the range on average is ~ 25% as compared with Sedov data. It is relatively large shrinkage among the glacier systems of the NE Siberia and northern Far East, the new areal estimates for which will be presented as well. Our areal estimates and use of DEMs and some assumptions made possible to construct the spatial patterns of the contemporary equilibrium line altitude (ELA) for the studied region. The map of the ELA allows defining sites of enhanced glacio-nival hazard risk besides the new evidence about meso -climatic features of the mountain glaciated region of the Meynypilgynsky Range. The ECHAM5 as a climatic scenario was used for projection of the glacier systems development in near future (2049-60). The method was described in some publications (Ananicheva et al. 2008, Ananicheva et al., 2010, The Cryosphere). It consists basically of construction of vertical profiles of accumulation-ablation for each glacier system by weather stations data and ELA patterns plus construction of hypsographic schemes (distribution of ice via altitude in the system) based on topography data. The results of the projection for the region studied is 17% reduction, it is quite modest retreat despite the 'warm' scenario. The main controlling factor is lack of precipitation caused by warming taking place there in present.

### The seasonal transition of monsoon in Bangladesh and its association with atmospheric circulation

*Roxana Hoque (Tokyo Metropolitan University)*

This study presents comprehensive aspects of climatological characteristics of the monsoon seasonal transitions associated with the atmospheric circulation in Bangladesh, focusing on the pre-monsoon, monsoon and post monsoon seasons. In addition, the onset and withdrawal phases were examined using pentad and 20-day mean wind, moisture flux, precipitable water and rainfall distributions. These were obtained from Japanese 25-year re-analysis data from 1979 to 2003 and rainfall data from the Bangladesh Meteorological Department (BMD) from 1948 to 2008. Analysis of the pentad and 20-day mean the horizontal wind at 850 hPa, the total column water vapor flux, the precipitable water and rainfall distribution around Bangladesh showed that, the onset and withdrawal of the summer monsoon seasons in Bangladesh occurred between Panted 31 (May 31-June 4: P31) and P32 (June 5-9) and between P56 (October 3-7) and P57 (October 8-12), respectively. It is worth-noting that during pre-monsoon, southwesterlies wind, and water vapor flux zones are established around (24-29°N, 84-93°E), in P15-18 (March 12-31) over India and Bangladesh. At this time, the precipitable water distribution is found increasing. The rainfall distribution map also has shown obvious change in P15-18, at this time pre-monsoon rainfall observed northeast region at Sylhet station. These criteria indicate that precipitation gradually developing over land and the Bay of Bengal for the monsoon onset process. The dramatic changes have occurred during the monsoon onset period, between P31 and P32. At this time southerly wind, water vapor flux, and precipitable water are shown drastically stronger over the Bay of Bengal and Bangladesh. Drastic changes also have shown in rainfall distribution maps in P31-32, when abrupt increases of precipitation occur. Remarkable changes also have shown between P56 and P57, which is regarded as withdrawal of summer monsoon. At this time southwesterly flow vanished not only in and around Bangladesh, but also in almost the whole Indian Ocean and Indian subcontinent. Eventually the rainfall distribution maps have showed decrease in rainfall in P56-57. The annual cycle of 5-day mean rainfall has shown heavy rainfall occurs in the northeast region (Sylhet) during the pre-monsoon season and in the southeast region (Teknaf) during the monsoon season. The central west region (Ishurdi) receives relatively less rainfall in all seasons. Cluster analysis indicates that seasonal march of pentad mean precipitation at Sylhet is very unique pattern. Analysis of horizontal U and V-wind components, it has revealed that the V-wind component clearly defines the

monsoon onset and withdrawal and very clearly identifies the conditions of pre-monsoon, monsoon, post-monsoon and winter over Bangladesh.

### On the recent upturn in precipitation north and south of the Sahara and its potential causes

*Andreas H. Fink (Institute of Geophysics and Meteorology), Malvin Schneidewind (Universität zu Köln), Samo Diatta (Universität zu Köln), Julie Berckmans (Universität zu Köln)*

Based on a comprehensive rain gauge data set for tropical West Africa and subtropical Northwest Africa, standardized precipitation indices have been calculated. Stations are sampled into rainfall regions that show coherent low frequency rainfall fluctuations. For Northwest Africa, the three regions selected are the 'Atlantic Region (ATL)', mainly comprising the area to the northwest of the High and Middle Atlas Mountains, including the Rif Mountains, the 'Region South of the Atlas Mountains (SOA)', and the 'Mediterranean Region (MED)', encompassing parts of northwest Algeria. In tropical West Africa, the 'Guinea Coast (GC)', the 'West Sahel (WS)', and the 'Central Sahel (CS)' regions are considered. For Northwest Africa, the hydrological years Sep./Aug. 1900/01 through 2010/11 (base period 1961-1990) and for West Africa the rainy season from June-September 1921-2011 (base period 1950-1990) are considered. For the GC, the entire year as well as the two rainy and dry seasons will be analyzed separately. In the two Sahelian regions, the 11-year running means of the precipitation index indicate average rainfall conditions in the early and mid 2000s for CS and WS, respectively. The recovery from the drought in the 1970s and early 1980s started in the late 1980s, but was sustained not until the late 1990s, with the upturn occurring earlier in the CS when compared to the WS. As is well known, the GC exhibits stronger interannual than decadal rainfall fluctuations. However, a recent decadal wetting trend is also evident for the climatologically wetter southern part of West Africa. In this region, rainfall in the large dry season (December-February) and the stronger first rainy season (May-June) show the most pronounced decadal moistening trend in the recent decades. Overall, Northwest Africa also exhibits wetter conditions recently. In the ATL region, several wet years occurred in the last two decades, interspersed with single drought years, such that a sustained long-term upward trend is yet uncertain. A clear moistening trend is seen in MED that shows some coherence with the Sahel time series. In the SOA, recent years have been almost exclusively wetter than normal. Potential causes are discussed that are mainly concerned with changed patterns in Atlantic sea surface temperatures (e.g. the 'Atlantic

Meridional Mode' and 'Atlantic Multidecadal Oscillation'), variability in tropical extratropical interactions, and the occurrence of upper-level troughs over Northwest Africa in relation to the phase of the North Atlantic Oscillation (NAO).

### Climate driven changes for food- and waterborne diseases

*Christoph Höser (University of Bonn), Jan Semenza (ECDC), Thomas Kistemann (University of Bonn)*

The focus of the ongoing research topic described in this presentation covers food- and waterborne diseases like Norovirus infection, Salmonellosis, Cryptosporidiosis and Campylobacteriosis. The seasonal outcome of incidences covers a dense spatial and temporal variability. A close examination of weather conditions has been applied on each of the 30-day-periods preceding each of the reported incidences, based on a spatial resolution of a grid of 0.25 x 0.25 degrees in Germany. Due to the different incubation time and infection pathways the pathogens have been treated separately. Aspects of weather examined are precipitation, air pressure, maximum temperature, minimum temperature and mean temperature, all on a daily basis. The time span covers years 2001 to 2011. The resulting database has been visualised in interactive 3d animations. The visualizations show the pathogen-specific weather circumstances which do precede elevated incidences. Elevated incidences are preceded by a characteristic 30-day-weather-history, which is significantly different from lower incidences of the very pathogen. While each of the weather aspects do show its incidence- and pathogen-characteristic outcome in general, especially the precipitation-pattern shows up a day-to-day history of dry and rainy days within the 30-day-history examined. The results have been tested by Median-Test, Siegel-Tukey-Test and Kolmogorov-Smirnov-Test to determine the significant days within the characteristic weather history and again have been rechecked by the results of an extensive literature research. Thus a pathogen-specific weather-setting can be described which is pathogen friendly and may be followed by elevated incidences. But again pathogen-friendly weather conditions may support the incidence outcome but will not be able to force infection in an imperative way. Therefore the predictive quality has been checked by historic data, to achieve sensitivity and specificity and at least an impression of uncertainty. Regarding climate change the long-term scenario A2 has been taken into account to check the probability of the identified weather conditions for the next decades to come. Several climate change scenarios describe general settings for climate variables which may take place within the next decades to come. The resulting effects of changed variables have been



examined on a local scale and a dense time-resolution to cover the pathogen's opportunistic flexibility. Infections from food- and waterborne related pathogens do profit from pathogen-friendly weather conditions which are presented. The probability of these weather conditions within climate change scenarios may be an indicator for future outcome of incidences, thus adding a piece into the puzzle of a comprehensive picture of the future climatic conditions and its effects towards human health on a regional basis.



## SE 06-01 - Contextualising gender and climate change

*Chair: Kim Philip Schumacher, Astrid Ulloa*

### Climate justice and gender justice: Women in the climate trap

*Sybille Bauriedl (Universität Kassel)*

There exists no gender-neutral climate change, mitigation or adaptation. As climate change is an issue of ecological and social relations, the impacts and origins of climate change are always gender relevant. 'Climate change' is a powerful discourse with implications for gender hierarchies. The sustainability discourse of the 1990s constructed woman as environmental protectors and experts of local resource managers. With the climate discourse women lost this active role and got the role as victims of multiple vulnerabilities. Within climate studies of the last decade woman became objects of risks and vulnerability analysis, and at the same time they were excluded from local and international climate policy. Climate mitigation and adaptation are political projects and as so they reproduce, stabilize and intensify gender hierarchies - even though climate researchers recognize social justice as important element of adaptive capacity. Statistical data prove the argument of women as more vulnerable group, if women and man are observed as homogenous groups. Women are not more vulnerable as men because of natural hazards but because of socio-economical inequality. Some people are more vulnerable because they do not get access to land, education, income, political participation, knowledge. But they are not vulnerable because of their biological gender. Women are acting subjects of climate change - and gender hierarchies. White, middleclass men of the north should not be the unquestioned standard category of mitigation and adaptation, if climate researchers want to create efficient strategies for a sustainable and low carbon society and economy. I will summarise the main debates on gender relations within climate studies for the issues of gender specific vulnerability, perception of climate risks, involvement in climate change, adaptation, burden of mitigation, and participation in climate policy. The paper offers a theoretical contribution for a gender sensitive climate research with approaches of a feminist political ecology and intersectionality. These approaches helps to deconstruct the narrative of a poor rural woman in undeveloped countries as climate victim and its implications of a north/south and women/man-dualism.

### Adaptation to climate variability in small holder irrigation farming: A component of the gender contract

*Martina Angela Caretta (Stockholm University)*

'Gender contract' is defined as a set of power structures creating relations among men and women (Forsberg, 2010). These contracts constitute gender regimes where women face several constraints in terms of labor and decision making processes (Chant, 2007). The articulation of the gender contract into labor division shapes the attainment of knowledge for both men and women and determines their perceptions and responses to climate variability. The terminology of 'climate variability' takes into account both singular weather events and extremes, which farmers seem to remember better. Moreover, climate predictions for Eastern Africa, where the study was conducted, are not conclusive, while the existence of long term climate variability, possibly part of more complex process of climatic change, has been assessed (IPCC, 2007). This paper presents the findings of a multiple case studies investigation carried out in small holder irrigation farming communities in drylands in Eastern Africa. These locally developed irrigation systems are managed through a complex gender contract. Women, prohibited from irrigating, carry out soil and crop management, while men irrigate, clear out and fence plots of land, when needed (Watson et al., 1998). The division of labor reflects itself on the distinctive local division of knowledge. Women discern the characteristics of seeds and crops in relation to different climate conditions and are aware best practices to maintain and improve soil fertility. Men are involved with the construction and reparation of the furrows, which entail knowledge on erosion management and efficient irrigation distribution. Despite the fair amount of literature devoted to the analysis on the social organizations of irrigation systems in drylands in Eastern Africa (Davies, 2009; Östberg, 2004; Watson et al., 1998; Adams et al., 1997), the attention paid to gender relations has not gone beyond a mere descriptive approach. Especially it has not been studied how the local gender contract manifests itself, is articulated and negotiated. This is crucial in relation to adaptation to climate variability. Indeed, findings show a mismatch in the practice and knowledge divide: whereas men are officially recognized as climate predictors, women farm and depend on climate conditions. Nevertheless, women pragmatically assert their knowledge by making autonomous soil and crop management decisions and negotiating communities' decisions through self-organized groups. Participant observation, in-depth interviews and focus groups with both men and women resulted in narratives of gender specific memories and perceptions of climate variability. This shows that adaptation to climate variability in relation to

soil and crop management is a critical aspect of the gender contract and is constantly re-negotiated to bear for instance, periods of hardships or to turn an extreme weather event, as unexpected rains, into an opportunity to produce cash crops.

### **Gender Justice in Climate Change Politics and Research: Perspectives from Latin America**

*Dörte Segebart (Freie Universität Berlin)*

The paper applies the concept of environmental justice for analysing aspects of gender justice in climate change politics and gender-specific impacts of climate change in Latin America. As environmental justice analyses aspects of distributive and of procedural (participative) justice, the paper focuses on aspects of gender-specific natural resource use, on the distribution of environmental costs and risks referring to the impact of climate change and is therefore analysing gender specific vulnerabilities. Gender-specific possibilities adopting adaptation as well as mitigation strategies will be assessed. Recent policy processes, regulations, political participation and ongoing struggles in Latin America referring to gender and climate change issues will be critically reflected and evaluated. The paper expounds the problems of uncertainty, of gender-blindness in climate change research and political processes, as well as of exclusion mechanisms in global climate change discourses and practices affecting most vulnerable groups. Based on the Latin American experiences, the paper concludes with general recommendations towards more gender justice in climate change politics and research.

### **Implications of global climate politics on Indigenous women in Colombia**

*Astrid Ulloa (Universidad Nacional de Colombia)*

This paper presents the effects of the discursive formation and ecogovernmentality related to climate change in the local context. One of the strongest criticisms of global politics related to climate change is the lack of inclusion of other knowledges, notions of nature and gender perspective. Measures to control climate change have focused on commitments and agreements related to the reduction of greenhouse gases, and less into consideration of different cultural conceptions and local environmental realities. Similarly, there are few references of the relationship of both indigenous men and women with nature and the effects of climate change in their cultural

practices. This paper specifically focuses on the territories of indigenous peoples and the social implications of these processes in indigenous women lives. At the same time, it looks for local proposals and alternatives to face climate change. The proposals of indigenous women have shown the existence of border thinking, other positions towards climate change, which express a different logic related to territory and nature, which have generated specific use and appropriation of natural resources. Finally, it will present the indigenous women demands related to the recognition of their rights of self-determination, access and control over their territories and resources, and the right to participate on equal political conditions at the time of making decisions about actions required to mitigate the effects of climate change.



## SE 07-01 - Crossing boundaries in human-environment-system research: Exploring transdisciplinary approaches 1

*Chair: Ulli Vilsmaier, Daniel Lang*

### **The 'Lifeworld' and Transdisciplinary Development Research between different Knowledge Paradigms**

*Anna-Katharina Hornidge (University of Bonn)*

Within ongoing debates on transdisciplinarity and transdisciplinary approaches in the addressing of 'real-life' problems, the inclusion of local lifeworlds in the research process to facilitate the local fit of the research outcomes is repeatedly stressed. While sharing this conviction, the here proposed paper aims to discuss the role of all lifeworlds involved in a transdisciplinary research experience, including besides 'the local lifeworlds' additionally 'the lifeworlds' of the often not-local researchers and representatives of funding institutions. It is therefore the aim of this paper to shed conceptual and empirical light on the notion of the 'lifeworld' in transdisciplinary development research by (a) discussing the concept of the lifeworld, as originally developed and defined within the phenomenology of knowledge and especially by Alfred Schütz (1932), as well as later further deepened by Schütz and Thomas Luckmann (1979), with reference to ongoing discussions on transdisciplinarity; and (b) assessing the experiences of a German-funded, three year transdisciplinary, development oriented innovation research in Uzbekistan[1] with regard to the interaction and close cooperation of three different types of lifeworlds: foreign researchers, Uzbek researchers and local Khorezm water users and managers. The paper thus hopes to contribute to an increasingly growing body of scholarly work on transdisciplinary research, empirically by offering further insights into the role of lifeworld interpretations of reality of foreign and local researchers as well as local stakeholders in processes of transdisciplinary interaction, and conceptually by bringing some of the original thoughts on the notion of the 'lifeworld' by Schütz and Luckmann back into ongoing discussions on transdisciplinarity. [1]Precisely the 'Follow-the-Innovation' experience conducted in the realm of the interdisciplinary research project 'Economic and Ecological Restructuring of Land- and Water Use in the Region Khorezm (Uzbekistan)', funded by the Federal Ministry of Education and Research of Germany and implemented by the Center for Development Research, University of Bonn.

### **What role for scientists in transdisciplinary approaches?**

*Michael Stauffacher (ETH Zurich Institute for Environmental Decisions (IED))*

Scientists involved in transdisciplinary (td) research can jeopardize their societal role: abandoning the classical role of 'speaking truth to power', scientists may end up as 'political activist'. Such peril is not unique to td research, but common in many applied, commissioned research or sustainability transition setting. To critically review td approaches, I present some conclusions from the perspective of the sociology of science. In essence, these views point to the development of role conflicts for scientists involved in transdisciplinary projects. In addition to soundness of science, scientists are as well responsible for the usefulness of their results. Some scholars argue that transdisciplinarity cannot be understood as science but rather as policy advice or even more bluntly even as policy itself. It is as well argued that quality of its output cannot be guaranteed as peer review only functions in a precise disciplinary context. In contrast, I stress that (i) transdisciplinarity is a scientific activity not 'just' policy advice or politics, (ii) a balance between soundness of science and societal usefulness of its results is possible (and without promoting neo-liberalism), and that (iii) scientific quality of research within a transdisciplinary setting can still be evaluated based on disciplinary standards (but not alone). To justify these claims I will refer to several necessary characteristics of a td approach: (i) the need for the translation of a real-world problem into one or more epistemic objects and as such being able to integrate and contribute to disciplinary knowledge bases, (ii) the careful reflection on the broader societal decision process(es) the td project is embedded in and the different roles scientists can and must not take over, (iii) the importance in this respect of a functional perspective of transdisciplinarity (i.e. why do we need whom, when and for what purpose contributing to the project?), (iv) the distinction between different discourses/processes on going in a td project (epistemic, value, interest) and the respective responsibilities. With respect to the role td can play in the science system, I argue that in fact td is a promising approach for disciplinary researchers to formulate innovative research questions and as such can have a much broader impact. In fact, the relation between disciplinary research and td research will be in my view decisive for the success of td in our present science system. I will conclude by pointing out, how crucial it is to combine this rather instrumental view of the role of science in transdisciplinary projects with a more reflective and critical stance towards present societal developments.



### Mixing and modifying methods for the generation & integration of knowledge

*Renate Renner (University of Graz), Ulrich Strasser (University of Graz)*

TOURIEN Liezen is a transdisciplinary (td) research project that aims at combining tourism and sustainable energy production. Liezen is an alpine region in Styria, Austria and its citizens strongly identify with and gain an important income by tourism. In terms of the regional development different stakeholders from Liezen pursue diverse and on the first sight conflicting future aims. Some are interested in the enlargement of sustainable energy production by, for instance, using wind power and by building hydropower stations and photovoltaic parks. Others think this would destroy the unspoiled countryside, which is very important for tourism. Td research anticipates to have the capacity to solve complex life world problems and to achieve consensual solutions by those involved (cf. Pohl and Hirsch Hadorn, 2007). In order to allow those involved to define their 'life world' (ibid) problem, we did not apply for a clearly defined research project but integrated a pre-phase (1 year) that includes the development of a stakeholder network, generation of system knowledge and structuration of the research problem. Besides, we will meta-analyse the need for different methods, regardless of whether these are approved td methods, disciplinary methods or suchlike, that will become modified within our research for the requirements of transdisciplinary research. Ergo, we focus on the first phase of this td research project and observe the impact of applying and mixing certain methods for the generation of system knowledge and for the integration of scientific and societal knowledge. Experiences within this first phase of research will be documented and critically analysed for consequential learning. Beyond, we will compare our results with data from selected td research projects for the purpose of developing a deeper understanding of methodological requirements for knowledge generation and integration in td research. Pohl C. and Hirsch Hadorn G. (2007) Principles for Designing Transdisciplinary Research - proposed by the Swiss Academies of Arts and Sciences. München: oekom.

### Transdisciplinary co-production of strategies for sustainable water use

*Flurina Schneider (Institute of Geography of Berne), Stephan Rist (Centre for Development and Environment (CDE))*

Both climate change and socio-economic development will significantly modify the supply and consumption of water in future. Consequently, regional development has to face aggravation of existing or emergence of new conflicts of interest. In this context, transdisciplinary co-production of knowledge is considered as an important means for coping with these challenges. Accordingly, the MontanAqua project aims at developing strategies for more sustainable water management in the study area Crans-Montana-Sierre (Switzerland) in a transdisciplinary way. It strives for co-producing system, target and transformation knowledge among researchers, policy makers, public administration and civil society organizations. What kind of research design is needed in order to achieve this goal and how can academic and non-academic knowledge be related in this endeavor? In the MontanAqua project, the process of collaboration between researchers and scientist started when the research proposal was elaborated in order to achieve sound life-world orientation. Later, it was centered on a process of participatory scenario development where the stakeholders' visions of regional development (target knowledge) are linked to the scientists' models on water resources, distribution and use (system knowledge). This step lays ground for jointly assessing the consequences of the stakeholders' visions of development in view of scientific data regarding governance, availability and use of water in the region as well as developing necessary transformation knowledge. The aim of the talk is to evaluate potentials and constraints of the applied transdisciplinary approach regarding the joint production of strategies for sustainable water management.

## SE 07-02 - Crossing boundaries in human-environment-system research: Exploring transdisciplinary approaches 2

*Chair: Ulli Vilsmaier, Daniel Lang*

### Participatory strategy development to increase renewable electricity production – a transdisciplinary process

*Meike Düspohl (J. W. Goethe University), Petra Döll (J. W. Goethe University)*

The stability of our climate system is in danger (IPCC 2007). To stabilize the system, CO<sub>2</sub>-emissions from fossil fuel use quickly have to be reduced. Also in view of the recent incidence in Fukushima, a transformation of the energy sector to a sustainable supply system based on renewable energy is essential. Transformation of the energy system of a region requires a region-specific strategy that is supported by a broad range of stakeholders. The county Groß-Gerau in the German state of Hessen aims at covering by 2020 30% of its energy consumption (without traffic) out of renewable energy. For reaching this goal in Groß-Gerau a transformation-process in the county and its communities has to be set up. To tackle the transformation process with the right strategy different forms of knowledge (academia and non academia) has to be generated and integrated into this process of strategy identification. The different types of knowledge for the transdisciplinary approach are system knowledge, transformation knowledge und target knowledge. Therefore different stakeholders have to participate in the strategy formation. However, there is no well-established standard design for a successful participatory, transdisciplinary process. We will present the concept and tools that support the process for the elicitation and integration of stakeholder perspectives in the problem field of sustainable renewable energy use. In this paper, we aim at presenting the concept and tool that enable participatory process for the elicitation and integration of stakeholder perspectives in the problem field of sustainable renewable energy use. Preliminary results will also be included. Actor-based modeling (ABM) and Bayesian Networks (BNs) are adopted in this study. ABM is performed by the software DANA (Dynamic Actor Network Analysis) and BNs by the software Netica. For initiating the process, a total of 15 most relevant institutional actors, inter alia, energy sector, financial sector, public decision makers, and NGOs are identified. The representatives have been interviewed individually and invited to participate in the first workshop. A total of four

workshops is planned throughout the study period. The problem perceptions and the goals that guide the actions of the representatives are depicted in causal networks. Subsequently, these networks are discussed and exchanged in workshops. Apart from eliciting problem perceptions, alternative actor-based scenarios of the development and implementation of renewable energies will also be developed. In this study, the impact of the applied participatory method on social learning of the involved actors will be evaluated.

### Participatory regional scenarios: Serving scientific and applied purposes

*Jennifer Hauck (Helmholtz Centre for Environmental Research - UFZ), Jörg Priess (Helmholtz Centre for Environmental Research - UFZ)*

The use of the limited resource land for one purpose often excludes other uses. Trade-offs may be complicated under conditions of Global Change and increase the complexity and uncertainty under which land use decisions have to be made. In the context of the research topic 'Land Use Options - Strategies and Adaptation to Global Change' of the Helmholtz Terrestrial Environment Programme we address this complexity and uncertainty by developing land use-scenarios with two different stakeholder groups. One group consist of scientists including social, economic and natural science disciplines. The other group comprises representatives of different groups of practitioners from regional NGOs, planning and state agencies. Participatory scenario development combined with rigorous quality control measures is considered a process suitable to develop scenarios serving not only scientific purposes, but also practitioners. Repeated reviews and other feedback mechanisms ensured relevance for scientists and practitioners, legitimacy and scientific credibility of the scenarios.

### A transdisciplinary approach to the evaluation of coping and adaptation in the context of changing water-related hazards

*Maria Schwab (UNU-EHS)*

Water-related hazards threaten a high number of people in the world; these risks take on even greater importance in the light of rapid social and climate-induced changes often observed in the most vulnerable regions. The actual implications of the prevailing risks for both the people and the environment depend crucially on the capacity to act sustainably. It is therefore important to gain a better understanding of coping and adaptation in the light of a changing social and

ecological system, their limits and opportunities and, in particular, each strategy's value for different stakeholders. This demands for integrative transdisciplinary approaches in order to not only grasp the tangible effects on society and the environment but to see their dynamic interplay and the actual value of these effects for the stakeholders. Coupled social-ecological system theory and especially the related vulnerability research provide a basis for such an analysis and evaluation of coping and adaptation strategies. It can convey a better understanding of system dynamics, tipping points and transformations doing justice to the complexity of an action's implication for nature and society. Nevertheless, a mere system-based approach neglects the perceptual dimension of the research problem. A more actor-centred view can, in this regard, convey a good intuition of how people perceive their environment, how they act and how these actions as well as changes are valued. This transdisciplinary concept demands for a mixed-method approach when taking this lens to look at the real world. It is necessary to not only follow a single methodological paradigm but to apply qualitative, participatory and quantitative research in a complementary way. Participatory group discussions and role playing games, for example, can facilitate an understanding of priorities and perceptions whereas secondary data and a semi-structured household surveys can provide the foundation for quantification and validation. In consequence, this approach can show the differences in the actions of groups confronted with different hazard and vulnerability patterns, especially in regard of their adaptive capacity. For some stakeholders, appropriate informal individual and formal governmental strategies might keep on being just an option whereas others have the capacity or access to actually benefit from their implementation. These benefits as well as the costs can affect both nature and society. It can be shown what the actual social and ecological outcomes are and reveal why it is not only them but also individual priorities which make a strategy a 'good' or rather a 'bad' one. Having found how people act and value actions allows depicting the sustainability of coping and adaptation and may also provide a basis for predicting future sustainability when applying the concept in the context of hypothetical actions in different scenarios.

### **Transdisciplinary Evaluation of Alternative Adaptation Strategies – Value-Tree Method as a Tool to Integrate Multiple Values of Science, Practice and the General Public into Decision-Making**

*Anke Schmidt (Leuphana University Lüneburg), Meinfried Striegnitz (Leuphana University Lüneburg), Mirjam Willert (Leuphana University Lüneburg)*

Coastal protection strategies increasingly have to take into account the effects of climate change. At present, engineering and natural science models that assess the impact of global climatic transformations on regional coastal zones remain rather detached from societal bodies of knowledge. Various adaptation options may conflict with value-based interests and priorities of different actors. This paper argues, that innovative coastal protection requires not only inter- but transdisciplinary research that takes into consideration the whole array of actors involved in regional coastal protection. The findings presented in this paper result from the 5-year research project A-KÜST "Changes in the Coastal Climate: Evaluation of Alternative Strategies in Coastal Protection" that was launched in 2009 in the context of the Climate Impact Research Programme (KLIFF) of the German federal state of Lower Saxony. The transdisciplinary project is structured into natural, engineering and social science subprojects. In addition, the project comprises an advisory board with all relevant actors participating in coastal protection in the project region (Ems-Dollard estuary, Southern North Sea). The findings are based on an evaluation study -conducted within the social science subproject- which focuses on disclosing and structuring latent value-based interests and objectives of different actors and integrating those into a multi-criteria evaluation of alternative adaptation options in coastal protection. Therefore the value-tree method was applied during moderated group discussions with representatives from institutions that are concerned with and affected by coastal protection, to identify different value judgments. In a second step the evaluation criteria against which different alternative adaptation options are to be evaluated were developed. The main objective of the value-tree method was to create a comparable and sound framework of evaluation patterns of all relevant actors related to regional coastal protection. This analysis reveals a heterogeneous picture of areas of consensus and of striking differences that may have many implications for the collective strategy development process. The extracted evaluation criteria broadened the catalogue of criteria against which alternative options for adaptation are evaluated. The value-tree analysis turned out to be a promising methodological approach that can be embedded in transdisciplinary research contexts, by meeting the requirements of integrating the whole array of societal and scientific actors, their



knowledge and interests in a transparent procedure. Reflecting the diverging or resembling interests, objectives and perceptions fosters the communication and common understanding among science and practice and finally fosters the societal anchoring of adaptation strategies within the governance network of regional actors.

## SE 08-02 - Geographic Information Systems, society and education

*Chair: Francis Harvey, Thomas Jekel*

### Transformations in spatial meaning production of public space: A perspective on GeoWeb users as agents of change

*Florian Fischer (Alexander von Humboldt Institute), Robert Vogler (Austrian Academy of Sciences/Institute for GIScience)*

The GeoWeb (i.e. the convergence of geospatial technology, mobile web and social media) recently enabled an environment for participation in the production and distribution of geographic information. A vivid mash-up culture let emerge a variety of geomedia, promoting space to a new paradigm for online search, communication and interaction. Geomedia provide a way to recollect physical location in today's networked and multiplexed spatialities. While everyday life is shaped by physical nomadism, flexibilisation, fragmentation and global flows of goods and services, geomedia facilitate new relationships between people and places far beyond a filtering by physical proximity only. New forms of spatial augmentation inherently transform the publicness of space, as the debate about Google StreetView shows. Current research depicts that social location services serve a consumer society for mastering urban heterogeneity and are used to facilitate new forms of empowerment in the appropriation of public space. Contributing users become new gatekeepers who mediate between local businesses and customers. Thereby new modes of spatial meaning production emerge, including partial publics with the capability to contribute. Hence users of these services can be considered as agents of change in networked urbanity. However there are substantial indices for the exclusion of potential users. The platforms are shaped through functionalities by their providers and the intentions of contributing users who need to hold certain means of production in order to become new gatekeepers. Hence the emerging reassemblies of meanings on physical space are not comprehensive or neutral, but biased by intentions of portal operators and practices of contributing users. Furthermore users produce information that assist for social and spatial sorting and is valorized by platform providers in commercial relations with third parties. At the moment we just started to understand how digital citizens perform public space in the context of its transformation by the GeoWeb. Consequently, it is uncertain how users will deal with the extended publicness and what tactics will emerge to appropriate it. It is unclear what ethics will arise for practices of companies in the GeoWeb, and

how they will be able (or have) to adhere to them in future. Nevertheless, in a democratic society it is crucial that citizens are aware of these new modes of spatial meaning production regarding both empowerment and exclusion. This awareness can be mediated best through education. In consequence and based on the premise that its aim is to foster 'actualized citizens', future (spatial) citizenship education has to enlighten about these new phenomena arising out of the (Geo)Web. Based on examples and results of empirical research, this presentation will reveal the transformative capacity of the GeoWeb for the becoming of public space and sketch the consequences for (spatial) citizenship education.

### GIS education on the test: Findings from a systematic review in GIS education research

*Uwe Schulze (University of Koblenz-Landau), Detlef Kanwischer (University of Koblenz-Landau), Christoph Reudenbach (Philipps-University Marburg)*

Due to the increasing relevance of digital geodata and various GIS applications as smart tools in everyday life, the experienced handling of geoinformation and communication technology (geo-ICT) has not only a high meaning in professional fields, but also for the individual's communication and participation in social contexts. Since generally the role of GIS as a supportive tool for students competence development in the classroom has been recognized in recent years, a more specific question arises for the different levels of education: which competences must be considered essential for a successful application of GIS and geoinformation? While the identification of professional competences depends on the needs of specific domains, the redefinition of generic skills occurs mainly due to societal pressure. Under the phrases of 'information based society' and 'lifelong learning' a harmonization of key competences takes place on an international-scale. Particularly the outcomes of the ICT driven Assessment and Teaching of 21st Century Skills project evolves an interesting framework for the discussion on competence orientated GIS education, because it can serve as a basis for a conclusive connection between the demands of an ICT related education of the 21st century society to the development of GIS curricula. Our research addresses the interplay of three competence dimensions that gained importance to GIS education and training: problem-solving, spatial thinking and procedural KSC in GIS&T. Based on our qualitative content analysis of international documents on GIS curricula, we hypothesize that problem-solving capabilities have a fundamental impact on the development of spatial thinking skills and technical as well as methodological

KSC in GIS. However, it is unclear how these core competences are distinct from each other and how they interact, especially under conditions of domain-specific technology - like GIS. Therefore, and to arrive at empirically validated evidence for the development of GIS curricula standards, effective assessment tools and test designs are needed. But, which are they? Against this background, our contribution focuses on the question which methodological approaches are currently used to investigate and assess student learning with GIS? We therefore conducted a systematic review of primary studies in GIS education from 2006 to 2011, using pre-planned methodologies and statistical analysis. Our population relates to peer-reviewed articles in relevant journals and publications, e.g. *Journal of Geography in Higher Education*, *Journal of Geography* as well as the proceedings of the annual forum *Learning with Geoinformation*. Introducing our results, we focus on the foundation of a consistent research framework for GIS education, discussing the scope of the used research questions, the survey instruments as well as the value of the obtained findings of these studies.

### **Expanding AND shrinking worlds of geo-communication: Spaces of complex technology and the geographies of common lifeworlds**

*Tilo Felgenhauer (Friedrich-Schiller-Universität Jena)*

Late modern societies tend to develop many different specialised and mutually opaque contexts of knowledge and action. For example, technology-driven expert systems stand in a deep contrast to the lifeworlds of lay users. Thus, everyday routine action (such as mobilities of people, things and symbols/communication) requires the constant translation of technological 'geo-codes' into everyday geographies of the individual's home, of place, region and national territories. From the understanding of postal codes to the use of satellite navigation - both expert and lay competences are necessary to carry out successful interactional routines. Especially, current innovation in interface design shows remarkable changes in the way geo-information is managed and in the way its diffusion is supported. Given this background, the question arises, how these manifold routines of interaction and translation (especially, its ambiguities) can be interpreted in a cultural geography perspective. Focussing the lay user's position, two concurrent trends will be identified and discussed: Firstly, the offering of unprecedented possibilities to gather geo-information and, secondly, at the same time, the release from the necessity of comprehending and reflecting on geo-information in order to make use of (geo-)technology. On the one hand, formerly opaque and highly complex technological systems seem

to become transparent for a more and more sensible audience of lay users. On the other hand, examples from interface design reveal a general tendency to 'lifeworld-simulation' by replicating the individual's spatial perception (such as in augmented reality applications for smart phones which reduce geo-information to the user's actual surrounding).

### **Professional GIS Training programme at Universities in Cambodia**

*Jan-Peter Mund (University of Eberswalde)*

This paper presents the development, implementation and lessons learnt about a new professional GIS education programme in Cambodia and document a critical geography approach to solving a geographic, environmental and GIS education problem. Land management and land administration are defined as a system of planning, management and administration methods and GIS based techniques that aim to integrate ecological with social, economic and legal principles in the management of land for urban and rural development purposes. The main objective is to meet changing and developing human needs, while simultaneously ensuring long-term productive potential of natural resources together with maintenance of inherent environmental and cultural functions. In the wake of social and political turmoil in Cambodia's recent history in the late twentieth century, there is rising demand for transparent land management and land administration that paves the way for economic development in the country. This results in demand for educated young professionals in Cambodia in the related areas of Geomatic and GIS training courses for land management, land administration, surveying and remote sensing. Therefore, the Cambodian Ministry of Land Management, Urban Planning and Construction in collaboration with the Ministry of Agriculture, Forestry and Fisheries initiate a long term capacity building process for GIS based land management in Cambodia. Subsequently the Royal University of Agriculture in Phnom Penh was given the task in 2002 to set up an undergraduate programme and a GIS short training course leading to a Diploma Degree for continuous education of ministry staff. In Cambodia, no such education was ever offered until the establishment of the new Faculty of Land Management and Land Administration within the Royal University of Agriculture. Consequently there was a deficiency in human resources to develop the new curriculum and to establish the faculty at the national level. While geographic education in schools will provide this pool of human resource in the long term, the immediate needs can only be met through professional development and GIS teaching for existing workers and officers in these areas. It is also through professional development that education for



sustainable development (ESD) will have the farthest reach in society, in this case. In addition to providing the empirical evidence for the lack of professional GIS education, this paper describes how the researchers are agents of change in creatively solving the problem through adopting a professional development approach. It also assesses the present status of professional GIS technology development as the mode of ESD in Cambodia and provides a framework for using GIS based professional development as a continuing educational mechanism for other developing countries.

## SE 09-01 - Geomorphic systems under pressure – anthropogenic forces in a changing environment

*Chair: Thomas Glade, Gary Brierley*

### Why do we persist in ignoring the fate of Earth's surface?

*Olav Slaymaker (University of British Columbia)*

Much has been written and huge resources have been channeled into research into atmospheric and oceanic system changes. This is appropriate given the urgency of understanding the behaviour of our planetary system which is enclosed by the atmosphere and whose surface is 71% ocean. But humankind is located on the terrestrial surface and civilization depends heavily on the top few metres of regolith and on the ecosystem it nurtures. By comparison, few resources have been made available for research into the degradation of the terrestrial surface environment. But both biogeochemical and social systems are built on soils. 15% of global soils have been removed and an unknown, but significant, percentage has been degraded. Remediating degraded soils may take hundreds of years, but reconstructing soils requires thousands of years. Global soil degradation and accelerated erosion are critical components of global change. The most important drivers of land degradation and land transformation can be summarized as running water and human activity. Case studies from Ethiopia and Nunavut, Canada confirm the conclusion from the Millennium Ecosystem Assessment that consistent monitoring systems for terrestrial energy and water flows are weak, especially in the less developed world. The general question that arises, and which is addressed in this paper, is "what critical measures or indices adequately reveal global conditions and trends in terrestrial geomorphic systems under pressure?".

### Soil erosion and sediment transportation in the Mora Dhansiri River catchments in Assam, India

*Rana Sarmah (Pandu College)*

This study aims at establishing an equation between soil erosion and sediment transportation in the Mora Dhansiri River catchment in Assam, India. Magnitude and rate of soil erosion, mostly triggered by anthropogenic forces, from land use / land cover areas is estimated using a proposed relationship of discharge, sediment concentration, time, and land tillage frequency. This relationship is also applied to estimate magnitude and rate of sediment transportation through the

river excluding the land tillage component. Discharges are measured at water-sediment flow outlets of various land use / land cover areas in the field, and three discharge measurement sites of the river. Sediment concentration data are generated by analysis of sediment samples in the laboratory collected from various water-sediment flow outlets of land use / land cover areas and at three discharge measurement sites of the river. Magnitude of soil erosion, mostly triggered by anthropogenic forces, from built-up land, agricultural land, forest land, and waste land are estimated to be 3767, 39824, 534, and 1952, tonnes respectively in 2009; 4674, 56704, 624, and 1664, tonnes respectively in 2010; and 5646, 45369, 1258, and 3422 tonnes respectively in 2011. Rate of soil erosion from built-up land, agricultural land, forest land, and waste land are estimated to be 2.00, 3.09, 1.10, and 1.85, tonnes/hectare respectively in 2009; 2.39, 4.61, 1.30, and 1.87, tonnes/hectare respectively in 2010; and 2.83, 4.23, 2.60, and 3.73 tonnes/hectare respectively in 2011. Average magnitude of soil erosion from built-up land, agricultural land, forest land, and waste land during 2009-2011 are estimated to be 4696, 47299, 805, and 2346 tonnes respectively. Average rate of soil erosion from built-up land, agricultural land, forest land, and waste land during 2009-2011 are estimated to be 2.41, 3.98, 1.67, and 2.48 tonnes/hectare respectively. Rate of soil erosion from the catchment of the Mora Dhansiri River is estimated at 3.67 tonnes/hectare/year.

### Morphological Influences on Fine Bedload Distribution of Initial Streams in Extremely High Rainfall Region: A Case Study of Um-U-Lah Watershed, Cherrapunji, India

*Hiambok Jones Syiemlieh (North Eastern Hill University)*

Initial streams in high rainfall regions carry a lot of load because of large volume of runoff and variable slope. Such streams, though initial in nature yield discharge up to 4.103 m<sup>3</sup>s<sup>-1</sup> from an area of 103.4 ha and measuring a length of about 2 km. This discharge is very high at global scale due to heavy precipitation (averaging around 11,000 mm y<sup>-1</sup>). Because of the influence of Monsoon, the winters are dry and the flow is scanty in the streams. In order to study the nature of fine bed load, the main stream was divided into different sections. Spot visits during winter were made to the site and samples of fine bedload were collected from dry stream beds. These samples were oven dried, sieved, segregated and weighed to understand their textural characteristics associated to different slope and drainage length conditions. This paper tries to understand how in such extreme conditions along with anthropogenic interferences, fine bed load is distributed within short distances over varying





slope conditions and how varied is the transported material which ranges from pebbles to clay particles are influenced by morphological conditions of the stream. It was found that clay particles are negligible while pebbles dominate the upper parts of the catchment. At about 2 km from the source coarse sand is found to be more abundant.

### **Confection of Thematic Chart and Geomorphological Mapping of Barra De Mamanguape 1:25.000, Topographic Chart, Eastern Border of The State of Paraíba, Brazil**

*Wesley Ramos Nóbrega (UFPB), Maria Emanuella Firmino Barbosa (UFPB/IFPB), Diego Nunes Valadares (UFPB/IFPB), Alexandre Santos Souza (UFPB)*

This work aims realize a geomorphological study in region comprehended by the topographic chart Barra de Mamanguape, between geographic coordinates 35° 07' 30" / 35° 00' 00" of longitude west, and 6° 52' 30" / 6° 45' 00" of latitude south. The study area covering by this coordinates is located in north coastal of Paraíba state, Brazil, comprehended a portion of the Paraíba area where such studies have been poorly developed. Thus, analysis of the relief is of fundamental importance for understanding the environmental context, since their comprehension will enable the planning of the use and occupation of space through the interpretation of cartographic products generated. For the developed of this research has been initially used the topographic chart Barra de Mamanguape in scale of 1:25.000 with equidistance of level curve from 10 m, from which it possible for the production of thematic maps, hypsometric, Declivity and roughness of the relief, which was made possible through the development of the geomorphological map with the same scale as soon as this scale allows to analyze the geomorphological peculiarities present in the study area. Besides the production of the maps mentioned above, was made a map of use and occupation of the land using satellite image HRC / CBERS 2B. The software utilized in production of all cartographical material is the Georeferenced Information processing system (SPRING 5.1.8). Thus, the whole process undertaken during the research supports the importance of digital products in the study of geomorphological features of the study area, providing information relevant to the reading and understanding the geomorphological peculiarities of the chart studied, so that from this understanding of the relief, the relevant knowledge about this area, serves as an indispensable support for the application of any environmental planning in this area of study.

## SE 10-01 - Global challenges & local responses: The mitigation of climate change by travel behaviour change

1

*Chair: Joachim Scheiner, Martin Lanzendorf*

### Targeting Sustainably Aspiring Motorised and Active Travellers or Environmentally Apathetic Motorised Travellers? Reducing unsustainable travel behaviour through segmentation.

*Candice Howarth (Global Sustainability Institute)*

Greenhouse gas emissions from the transport sector continue to grow demonstrating that political, technological and economic measures are not delivering the required reductions. Strategies aimed at reducing CO2 emissions centred on behavioural changes are increasing in popularity to fill the gap left by technological and political measures. In spite of this, statistics show that travel behaviour remains unsustainable and due to its perceived indispensable nature, shifts to more sustainable practices remain a challenge. This paper establishes the extent to which population segmentation and the use of climate change information can lead to sustainable travel choices. Postal questionnaires and focus group results identified three clusters according to attitudinal traits and travel behaviour. Three behavioural clusters were identified: Sustainably Aspiring Motorised Travellers (43.9%) are environmentally-focused, feel morally responsible and obligated to change their travel behaviour and understand the benefits this would have, yet travel principally by car. Sustainably Aspiring Active Travellers (29.8%) characterised by sustainable attitudes and marked active travelling (i.e. by non-motorised modes). Conversely Environmentally Apathetic Motorised Travellers (26.3%) express little concern about the implications of their own personal behaviour and see no point in changing it, further highlighted by their heavy motorised travel patterns. These results highlight the existence of an attitude-behaviour gap. Perceived barriers to behaviour change identified within each group depended implicitly on perceived personal gains and losses as well as a lack of awareness on the availability of options to facilitate changes. Habit, misperceptions of modal emissions and environmental impacts of travel, cost, convenience and lack of incentives to change were all significant determinants of sustainable attitudes. Findings from focus groups highlighted the need for a positive approach to instigate travel behaviour change led by incentives rather than penalties: demonstrating the ease of change, highlighting the benefits and

ultimately promoting transparency of peer, social and government action. Climate change information was found to successfully reduce perceived barriers to change and increase willingness to engage in sustainable travel when tailored to specific clusters identified and highlighted the personal benefits of travelling sustainably. Respondents also highlighted a need for clear and transparent information on peer, political and industrial engagement in order to alleviate fears of free-riders and encourage widespread changes. By segmenting travellers based on their attitudes and perceived barriers to behaviour change, this paper demonstrates how targeted climate change information can influence sustainable travel choices and can support transport infrastructure in facilitating a shift to more sustainable practices.

### Can cycling mitigate climate change? – Understanding and explaining the behavioral change of cyclists in German cities.

*Martin Lanzendorf (Goethe University Frankfurt), Annika Busch-Geertsema (Goethe University Frankfurt)*

In many cities worldwide cycling related policies are an important tool to achieve a more sustainable transport system and, among other goals, to reduce greenhouse gas emissions. However, in the literature surprisingly little is known on the travel behavior change of individuals from other modes to the bicycle. Some research refers to the relatively high speed of bicycles in urban areas compared to many other modes, to its little operating costs and the convenience of parking the bicycle close to any destination in the street or close by. Other researchers refer to the experience of physical exercise, independency or, additionally symbolic-emotional aspects related to cycling. However, these benefits of cycling are not perceived by all travelers similarly, since other travelers claim unsafe aspects and vulnerability of cyclists by being exposed to car traffic or other discomfort aspects of cycling like for example the exposure to bad weather. For the purpose of this paper we ask what the reasons for this increase of bicycling on an individual's level are and if, ultimately, cycling can mitigate climate change. As travel behavior research and theories like the mobility biographies research suggest, travel behavior is frequently a routine and does not change easily. Thus, we expect that the travel behavior change towards more cycling will not be observed for the whole population of an urban area uniformly. Instead we expect that the routines for certain travel purposes are weaker or that people affected by key events in their life course will be more open to travel behavior changes than others. For the empirical analysis of these hypotheses we employed the German national travel survey 'Mobility in

Germany' from the years 2002 and 2008. Our bi- and multivariate analysis of mode choice draws mainly on the regionally extended data sets of Frankfurt Rhine-Main, Berlin, Hamburg and Munich and the travel behavior changes observed between these two years in each of the cities. The empirical results suggest that individuals in a life phase after major key events (e.g. children in the household, moving) are more likely to increase their cycling shares than others. Moreover, general socio-economic factors like age, gender, and income affect the likelihood of increased cycling as well although the interaction of these variables with other key events in the life course is possible. Even, the travel purposes show significant differences between each other. Ultimately, the effect of bicycle infrastructure and marketing policies are hard to assess from the available data set since they might be perceived as a key event for travel behavior change.

#### **The role of global challenges for the usage of electric cars: An empirical study about commercial users of electric cars**

*Jessica Stock (Technische Universität Berlin), Christine Ahrend (Technische Universität Berlin)*

Electric mobility is regarded as an important element in the transition to sustainable, post-fossil mobility. The scarcity of energy sources is attended by a rising societal awareness for climate change and environmental problems. Therefore alternatives to the internal combustion engine and new mobility concepts are gaining in importance. In this context the Federal Government of Germany has set the goal that by 2020 one million electric vehicles should drive on German roads. A successful diffusion of electric cars presents major challenges not just to politics and economies, but also to the users. They are encouraged to integrate the electric car in their daily lives. The focus of this paper is the user analysis as a part of the subproject 'user behaviour analysis and spatial planning regional infrastructure'. The results refer to the target group of commercial users. Regarding the electric car this group already shows a strong acceptance. But such acceptance is not to be equated with the willingness to integrate the electric car in daily routines in the long run. Acceptance represents an important basic condition for a successful integration into daily mobility, but doesn't automatically lead to a reconsideration of private and commercial mobility routines. The user analysis aimed at the identification of current requirements for electric vehicles. Electric car users are often associated with a strong environmental awareness. But are they also willing to accept changes in their mobility routines and to implement them permanently? What do

we even know about the use of electric cars? An answer shall be given to the question of whether the promotion of electric cars is a suitable measure to reduce greenhouse gas emissions. For this, one has to ask for the potentials of electric cars to reorganize mobility routines. In this context we have identified two user perspectives: the substitution and the innovation perspective. Both perspectives include their own specific ways of thinking and lead to differing perceptions and evaluations of electric cars. The substitution is the dominant perspective on electric cars and their use. In our paper we want to show how the great white hope electric car is actually used. Subjective user experiences must be taken seriously. The users make diverse demands to their means of transportation and their routines illustrate large inertia effects in everyday life. A new transportation technology must be seen as beneficial compared to the existing one. But is the zero emission trait of the electric car sufficient to accomplish this?

#### **An estimation of the interaction of gasoline prices and entropy on transit ridership: Evidence from vector auto-regression and multi-stage least squares analysis**

*Bradley Lane (The University of Texas at El Paso)*

Gasoline prices are one type of cost that can influence travel behavior. Amid notable fluctuation, real US gasoline prices rose approximately 300 percent between 1999 and 2008. Despite their presence in the public consciousness, relatively little work has examined the role of gasoline prices in influencing travel behavior. Both research and public policy have focused on measures such as purchase taxes and roadway tolls to influence travel. Public transportation constitutes one particularly unexplored component of travel behavior influenced by gasoline prices. Increasing the cost of travel through fuel price could lead to a reduction in automobile usage. However, other transportation modes such as public transit must absorb some of this displaced travel. The relationship between a reduction in auto usage and modal shift is particularly relevant in the US, where public transit is relatively limited and excessive levels of automobile driving have negative externalities contributing to the unsustainability of transport. Previous research has established the presence of a significant, inelastic effect of gasoline prices increasing transit ridership. This relationship appears to contain temporal components and works in tandem with other socio-economic characteristics and transit deployment. These relationships have been established through case studies with complex modeling structures and inter-urban analyses with more simple statistical models. There appears to be



geographic and temporal variability in the magnitude of the relationship, as well as interrelationships among the independent variables including gasoline prices, but thorough examination of these facets is lacking. This paper advances this knowledge by using more recent data and employing a more complex modeling structure to further explain the influence of gasoline prices on public transit. Vector auto-regression and multi-stage least squares models are applied to gasoline price data as well as data on other economic and demographic factors for a set of 42 cities in the United States. Discontinuity effects are also tested to identify potential changes in the relationship over the time period. The vector auto-regression and multi-stage models allow for the testing of simultaneous effects among socio-economic characteristics that influence travel behavior as well as to estimate the lagged nature of those effects. Data are measured in monthly intervals between January 2002 and December 2011 and comparisons are made among different types of bus and rail systems. The results indicate a consistent effect of gasoline prices as a component of a set of economic characteristics which, working together over time, suggest the potential for large changes in urban travel behavior. The results are discussed for their implications toward transit and price mechanisms in transport sustainability.

## SE 10-02 - Global challenges & local responses: The mitigation of climate change by travel behaviour change 2

*Chair: Joachim Scheiner, Martin Lanzendorf*

### Commuting travel behaviour and polluting emissions in suburban north-west Milan: Which role for travel demand management?

*Giulio Mattioli (Università degli Studi di Milano-Bicocca), Mario Boffi (Università degli Studi di Milano-Bicocca), Matteo Colleoni (Università degli Studi di Milano-Bicocca)*

Policy approaches to sustainable transport can be seen as located on a theoretical continuum: at one extreme, "technological fix" solutions (alternative fuels, etc.) aimed at reducing transport emissions without challenging trends towards ever-increasing travel demand, motorization and suburbanization. At the other end of the continuum, many scholars and policy-makers see reductions in travel demand and changes in travel behaviour (such as modal shift away from the car) as the only way to achieve a reduction in greenhouse-gases emissions. In this second field, a further dividing line can be traced between approaches that target individual behaviour directly (such as travel demand management) and planning interventions aimed at changing the spatial structure in which transport choices are made (Transit Oriented Development, urban densification, etc.). The paper addresses this policy dilemma, by presenting the results of an exploratory survey on the commuting behaviour of the employees of public and private firms in suburban north-west Milan. The survey has been carried out by the Department of Sociology and Social Research of the University of Milan-Bicocca in May 2010, in the context of a travel demand management initiative that has involved both local governments and private firms. The collected data allow an estimation of the PM and CO<sub>2</sub> emitted during the daily commute, making it possible to assess the environmental impact of work-related travel. The findings show the existence of two main types of employees: a relatively old, mostly female public-sector workforce, who lives in the local area and has low environmental impact; a group of private employees who is younger, more educated and lives further away from the workplace, and is thus responsible for a much larger amount of emissions. The data also allows for the appraisal of the environmental impact of three extreme policy scenarios: a "technological fix" scenario, where all the

vehicles are replaced with less polluting ones; the implementation of a successful travel demand management strategy, which considerably reduces the modal share of the car; an urban densification strategy, that reduces the commuting distances. This mental experiment leads to the following conclusions: first, the social and spatial trends of the last decades are clearly the main driver behind the dramatic rise in transport-related polluting emissions; second - and consequently - the potential impact of travel demand management policies and technological fixes appears limited, especially in comparison with densification strategies.

### Suburban daily mobility – between freedom and sustainability

*Cornelia Rahn (German Aerospace Center (DLR))*

In Berlin, an increase of multi-modal mobility is observed based on urban lifestyles combined with the availability of alternatives to the private car such as public transport, bicycle rental systems or car sharing. To examine the influence of travel behaviour on the mitigation of climate change in developed countries, it is important to consider not only urban but also suburban areas since the suburban population in western countries has been growing over the last decades. Due to limited facilities of surrounding communities, daily car trips of suburbanites account for a substantial share of all-German traffic. Only if motives for suburban travel behaviour are known, changes in the perception of transport modes can be induced aiming at a more multi-modal mobility. Hence potential savings regarding energy consumption can be identified. Against this background the question arises if daily mobility of persons living in the suburban fringe of Berlin is influenced by urban 'sustainable' trends or if suburban residents remain with their 'traditional' mobility. Different assumptions exist: On the one hand they do stick to their cars which results from their chosen 'suburban way of life' with the car as the ultimate symbol of freedom. This car-affinity is strengthened by the suburban built environment and infrastructure. Contrary to that new research shows that the dichotomy of place related urban and suburban lifestyles renders obsolete based on observed urban attitudes of suburban residents and vice versa. This presentation aims to address the question if suburban residents in the Berlin area tend to show rather urban than suburban mobility patterns. Special attention is given to underlying motivation which shows the awareness of risks of climate change by GHGE and the possibility to contribute to the mitigation by individual mobility behaviour. The knowledge of the specific reasons influencing suburban mobility will help to identify potentials to reduce the overall energy consumption. Analysis is based

on a quantitative household survey (n = 1,135) that was carried out in 2007 by the Geographical Institute of Humboldt-University of Berlin. On base of this data, mobility patterns of the suburban residents can be shown. The survey was complemented by a sample of qualitative interviews (n = 20) in 2008. Through the analysis of interviews underlying motives and reasons for the discovered travel behaviour become clear. The majority of the surveyed residents had lived in Berlin before they moved to the suburbs in the mid-1990s. Therefore they were able to compare their former urban with their current suburban travel behaviour. This comparison provides an indication of the influence of urban respectively suburban lifestyles and built environment on mobility.

### **Changing travel behavior requires understanding travel behavior - The impact of preferences towards land use for travel behavior**

*Julia Jarass (German Aerospace Center (DLR))*

In order to reduce greenhouse gas (GHG) emissions by changing travel behavior it is necessary to better understand the key drivers of travel behavior: various studies have been conducted analyzing the impact of socio-demographics, land use and lifestyles on travel behavior. However, taking these factors into account still does not explain travel behavior to its full extent. In this context the question arises as to what extent preferences towards land use influence travel behavior. Are there differences in the travel behavior of residents with preferences towards urban or suburban land use and do people use specific transport modes according to their land use preferences? Finding answers to these questions will enable transport and urban planners to better understand the key drivers behind travel behavior. Ultimately, this knowledge will help to change travel behavior and improve the acceptance for sustainable transport modes. Using data from the "StadtLeben" project it is possible to provide an insight into the issues raised above. The survey conducted in 2002-2004 examined different land use structures in the region of Cologne assessing travel behavior, living environment, every day activities, lifestyles and socio-demographics. Since reducing car dependence, and therefore emissions, is especially problematic in the disperse land use structure of suburban areas, in the session of IGC 2012, I intend to focus on a suburban area: analyzing the data illustrates that travel behavior here differs distinctively between residents with urban preferences and those with suburban preferences. Moreover, more than 50 % of the residents have urban preferences, but they live in a suburban area. What does this mean for their travel behavior? This mismatch bears at the same time potential and challenges for more sustainable travel behavior: On the one hand, residents with urban

preferences tend to have a rather urban travel behavior, namely they walk, bicycle and go by bus more often than residents having suburban preferences. On the other hand, they still do not walk, bicycle and use public transport quite as often as residents living in urban areas. Hence, in my presentation I intend to provide a closer look at the impact of preferences towards urban and suburban land use on travel behavior. My presentation will address the type of preferences that lead to a rather "urban" and more sustainable use of transport modes and the socio-demographics by which the residents having urban or suburban preferences can be described. This knowledge can provide an important basis for promoting sustainable travel behavior, since stimulating an already existing preference is a promising approach to changing travel behavior.

### **20 Years of Semester Tickets in Germany – A Success Story with a Significant Contribution to Greenhouse Gas Reductions: An Evaluation of the NRW-Semester Ticket**

*Miriam Müller (Wuppertal Institute for Climate, Environment and Energy)*

20 years ago, the first semester ticket (ST) was introduced at a German university. Invented and demanded by student initiatives, STs are special tariffs for students to use public transportation in the area of their university. Price, geographical reach and terms of a ST are subject to negotiations between student representatives of a university and their respective local and/or regional public transportation companies. If a ST model is introduced to a university, it has to be purchased by all students at a contractually agreed solidarity contribution, leading to very low prices compared to regular tickets. The introduction of STs in Germany has positively influenced the student's travel behaviour towards more sustainable modes of transport. For example, after introducing a ST in Duisburg, the student's use of public transportation increased by 27%, while the use of motorised private transport diminished by 28% (from 1991 to 1996). Similar effects could not be identified for universities not having a ST. Students having expenditures for a car diminished from 53% (1991) to 34% (2009). Since the 1990s, the geographical reach of STs has undergone a remarkable development: While the first STs were valid only for public transportation within a city, some STs of today give access to the public transportation system in the entire federal state. Since 2008, the ST for North Rhine-Westphalia (NRW) extends the geographical reach of the still valid regional STs to state level. NRW has 18 million inhabitants, extensive agglomeration areas and an efficient public transport system. In 2010, 48 universities have introduced the ST NRW for more than 370.000 students, which equals 18% of



all students in Germany. Within a diploma thesis supervised at the Wuppertal Institute, the ST NRW was evaluated in an online survey at the University of Bielefeld in 2010, regarding acceptance, utilization and impacts. 4.500 students (25%) took part by self-selection. The survey revealed that the ST NRW is broadly accepted by the students, although approval differs depending on the students' regional provenance, age and car ownership. 80% graded the ST NRW as 'good' and 'very good'; 76% wish to retain it. Car ownership could be reduced by 10%, the acquisition of a car could be prevented by 26%. Of the trips travelled with the ST NRW, 28% would not have been travelled without the possession of the ST NRW; 18% of the trips would have been travelled by car. Roughly estimated, this shift from car to public transportation equals CO<sub>2</sub>-reductions of about 3.000 t/a at the University of Bielefeld. The ST NRW can be considered a good approach to help develop a sustainable mobility culture at a young age. However, the unidirectional extension on the Federal State of NRW is capable of improvement. The options to further disseminate the tariff model within Europe and beyond should be examined.

## SE 11-01 - Globalisation of trade and production and (ecological) sustainability

*Chair: Amelie Bernzen, Peter Dannenberg*

### Globalization and its impact on sustainable development opportunities

*Eugenia/Levgeniia Maruniak (Ukrainian National Academy of Sciences), Sergiy Lisovsky (Ukrainian National Academy of Sciences)*

At the turn of XX-XXI centuries, the international community realized the growing interdependence of countries and regions, as well as global problems, unfolding against this background. The contradiction between the high intensity of end-use of natural resources, formed in most developed countries of the world, and the high level of environmental degradation in developing countries (in which extraction and primary processing of the resources occur) permanently increases. Inadequate assessment of different types of resources takes place, new conflicts appear, the activity of TNCs growth. For Ukraine, the main problem, that arises due to the influence of globalization processes, is its 'object's reality' in the modern system of international relations, which identifies a whole number of problems of internal development in social, economic and environmental spheres. Some risks arise: polarization of regional development; increasing poverty and income differences; utilization of human, industrial and natural resources in the interests of other players; homogenization of the ethnic and cultural space; further environmental degradation; biodiversity loss; illegal migration; transnational crime; spread of diseases. To prevent such risks, to overcome their consequences, complex methods, which include research, management and monitoring for all levels, should be developed and implemented. Due to the significant potential of geographical science in this area the authors have made certain steps which could be presented in the report. Therefore, particular attention should be paid to the study of such major aspects of the impact of globalization on the possibility of attaining sustainable development, as follows: 1. Globalization is a factor to be taken into account when developing plans for transition towards sustainable societal development at all levels. It influences the features of interaction between society and nature, the scope and territorial features of anthropogenic impact. 2. Globalization affects the nature of usage by the community of the natural resources capacity of the globe (territorial features, the scope and directions) as well as the possibilities of population of certain regions to gain access to certain types of

resources. 4. Under globalization, for certain countries and governments of certain countries it is becoming more difficult to implement their policies to ensure sustainable development within their own territory. So, the state must pay special attention to conservation and development of the socio-economic potential of its own territory as well as to preserve cultural diversity. 5. The phenomenon of globalization requires to join efforts of all mankind and to raise society's awareness in each country and region in order to ensure coordination of efforts to realize the transition toward sustainable development within the whole planet.

### Corporate Social Responsibility in Developing Countries - The impact of CSR on sustainable regional development

*Peter Jakob Fürmaier (Universität Erlangen-Nürnberg)*

The planned contribution has the intention to show how companies get socially and ecologically involved with developing countries in accordance with the concept of Corporate Social Responsibility and with this action going beyond minimum statutory requirements. The first step is to ask for the intention that lets the companies become engaged in an ethical aware manner. A general distinction is made between institutional, economical and moral approaches. The main focus of the contribution first of all lies on a description of connections between corporate social commitment of companies active in developing countries and a sustainable regional development in the respective area. In addition correlations between corporate social commitment and a sustainable regional development are derived by development sensitive growth parameters including income, human capital and social capital. The measurement is based on the classical 'Input-Output-Outcome-Impact' ('IOOI') approach. The 'Input' is represented by the companies' investment of money and resources, the 'Output' by the CSR measures taken instantaneously. The effects achieved for the target groups (employees, residents, etc.) are the 'Outcome', the additionally effected impacts on civic concerns are referred to as 'Impact'. The case study for the acquisition of an empirical basis was conducted on the cut-flower industry situated north of Quito, canton Pedro Moncayo in the Pichincha province of Ecuador. Thirty-one percent of the 33,000 inhabitants of canton Pedro Moncayo are employed in the cut-flower industry which amounts to 80 farms and a land coverage of 968 hectares. The farms of the case study that are certified according to the CSR tool 'Environmental and Social Certificate' of FLP, Max Havelaar (Fairtrade), Global G.A.P., Veriflora, MPS, Rainforest Alliance and Florecuador show an additional commitment regarding social and ecological



concerns defined by an own Code of Conduct compared to a control group of flower farms without any certification. The planned contribution will describe the 'FLP-Flower Label Program' certificate in detail. Currently 23 flower farms are certified according to the FLP. Preliminary results of the study demonstrate a positive effect of the certifications on regional development indicators such as human capital, social capital and income. The main motivating factor for obtaining a certification seems to be the fear of losing the respective 'license to operate'. Neither economical advantages of the FLP certification nor institutional pressure by the government are shown to be the reason for such a commitment. As additional reason a philanthropic, altruistic thinking is suspected to make the companies act as Good Corporate Citizens in the region.

#### **Agri-food globalisation and governance for environmental sustainability: Challenges and opportunities of a global commodity chains approach**

*Edward Challies (Leuphana University Lüneburg), Jens Newig (Leuphana University Lüneburg), Andrea Lenschow (University of Osnabrück)*

This paper discusses the conceptual implications of a relational view of globalisation for environmental sustainability, and suggests that the increasing predominance of cross-scalar, relational networks in the organisation of global production and trade demands new approaches to environmental governance in theory and in practice. With reference to contemporary globalisation in the agri-food sector, we consider the challenges posed by increasing global interconnectivity and interdependence - between distanced regions, populations, and social-ecological systems - for the conceptualisation and operationalisation of governance for sustainability. We reflect on the case of intersecting commodity chains for animal feed and factory-farmed meat, and consider the ways in which a global commodity chain approach may offer insights into the current and future governance of environmental impacts across geographically remote, but increasingly mutually dependent, socio-ecological systems and communities of producers and consumers. Drawing on insights from recent literature on global commodity chains and production networks, coupled social-ecological systems, and global environmental governance, we identify a need for special attention to scale, and a critical re-examination of concepts such as resilience, vulnerability and sustainability as they are commonly applied to social-ecological and agri-food systems.

#### **L'essor maritime et portuaire balte face à la nécessité d'un développement durable des transports**

*Arnaud Serry (Université d'Orléans)*

La Baltique présente des particularités uniques. C'est une mer jeune, qui, avant de devenir une mer intérieure fut tour à tour détroit, vaste baie, et enfin lac. Peu de mers au monde sont aussi vulnérables que la mer Baltique dont l'environnement maritime et les régions littorales sont au cœur de problématiques fort différentes. La pression résultant des activités des populations qui vivent et travaillent dans le bassin de la Baltique commence à se faire gravement sentir et les façades sont exposées aux pollutions d'origines diverses.

L'essor important et récent du transport, surtout maritime, dans la région renforce les interrogations quant à l'avenir de cette mer fermée. Le développement d'un système de transport durable et de qualité s'impose comme une obligation pour les Etats Baltes mais l'articulation du binôme transport/développement se trouve complexifiée par les externalités négatives, notamment environnementales, des activités de transport. Le transport, en tant qu'activité économique, participe incontestablement au développement des Etats Baltes. Au cours des deux dernières décennies, l'espace balte a, en effet, vu s'y multiplier les flux, principalement ceux de marchandises. Or, c'est surtout en matière de fret que les enjeux de durabilité sont les plus élevés. Les avantages économiques et sociaux de cet accroissement des trafics sont difficiles à concilier avec les coûts environnementaux élevés. Ainsi, le transfert progressif d'une partie des volumes vers des modes plus polluants comme le transport routier, l'omniprésence de marchandises à risques dans le fret sont autant d'éléments à prendre en compte dans l'appréhension de la durabilité du développement dans les Etats Baltes.

Cette communication met en évidence les spécificités de cet espace balte et les difficultés d'y concilier développement du transport, secteur omniprésent dans les économies, construction régionale et impératifs de développement durable. Il s'agit de plus de révéler le rapport entre développement et durabilité des transports dans les Etats Baltes, en rappelant l'organisation et les mutations du système de transport et les stratégies et les jeux d'acteurs mis en place afin de réaliser l'objectif de durabilité..

## SE 12-01 - Green economies: A business, society and policy approach 1

*Chair: Brita Hermelin, Grete Rusten*

### Public Transportation Geographies in New York State: Using Data to increase utility of Transit

*Richard Quodomine (New York State Dept. of Transportation)*

In the USA, development over the past 50 years has encouraged urban sprawl, or more accurately, increasingly urbanized suburbs as economic hub activity was moved out of prior-existing core business districts. At first, there was the use of lower, wider buildings and more extensive use of land, rather than intensive use of land. Then, the spaces between villages and cities became planned suburban areas. Most famous is Levittown, Long Island, New York, but there were many others who emulated a similar style of planned community. However, over the last 10 years, this growth has subsided. Middle class growth from manufacturing has declined and these communities and housing stock have aged significantly. This creates a conundrum: the more a population ages, the less income it produces, the more tax dollars it utilizes and the more public transportation of some sort is needed. When most people think 'public transportation', they presume it to mean buses. In the United States, however, tax dollars support 62 different types of publicly-supported transportation, from large buses and rail, to veterans' transportation, to Medicaid and Medicare service, even on cars. With shrinking public tax bases to support these options, new ideas are necessary to deliver public transportation. In the USA, this has come under Coordinated Transportation, with an emphasis on Mobility Management, otherwise known as, 'How do you get multiple government agencies unused to talking to each other to share costs and burdens wisely and still maintain a system that caters to the needs of customers'? Compounding this issue has been a law that protects equal access to public services for people of any race, socio-economic circumstance, or nation origin. This includes providing as much as access as is reasonable to those with Limited English Proficiency (LEP). In the last 50 years, immigration into the US has been by people who do not speak English well, and can come from anywhere in the world, making the US the destination for over 150 different languages. Identifying where concentrations of LEP populations are is a new point of emphasis in public transportation. All of this data can be best accessed and publicly understood by Geography. Specifically, using Census data to show

aging populations, lower socio-economic status populations, and limited English proficiency populations that identify likely 'need users' of public transit. In concert, utilize data where new densities are located that may get choice commuters, i.e. those who utilize public transportation and choose to do so. In New York State, I and my colleagues have identified these populations through an Environmental Justice project that focuses on identifying those populations. This paper will show some of the results of this ongoing project and how it can be important to better utilize precious tax dollars in an era of difficult budgets.

### Are companies concerned about sustainable transport ? Results of a qualitative research in a french mid-sized city.

*Patricia Lejoux (Transport Economics Laboratory)*

In a globalized world, transport plays an important part in companies functioning through the delivery of goods and services, employee travel and employee commuting. But transport has also significant impacts on the environment, accounting for 50 % of global oil consumption and 23 % for carbon dioxide emissions. This can become a problem for companies which are faced with demands for increasing ecological sustainability. The aim of this paper is to know if companies are concerned or not in sustainable transport and if that is the case, to answer two questions. The first one is : why companies develop strategies to promote sustainable transport - Is it for economic reasons - For example, the implementation of sustainable transport measures can be a way for the company to cut costs, particularly if fuel prices rise. Is it for environmental reasons - The company can be interested in implementing sustainable transports solutions because the company head is very sensitive to environmental issues or because the company cares about its corporate image and wants to communicate about its corporate environmental responsibility. Is it for social reasons - The company can be aware of the difficulties of its employees to come to work by car (traffic jam, fuel prices increases?) and wants to implement sustainable transport measures to solve the problem. The second question is : what kind of sustainable transport measures are implemented by companies - For example, they can decide to buy green vehicles which are more fuel-efficient. They also can reduce business travel by improving meeting management, by using new technologies (e.g. videoconferences), by encouraging car pooling? Then, companies can also decide to implement a mobility plan for their employees or to increase telework? In order to answer those questions, we will submit results of a qualitative research based on in-depth interviews of companies heads. These companies are specialized in

industry, transport and logistics and are located in the periphery of a french mid-sized city (160 000 inhabitants).

### Knowledge dynamics in a green economy

*Margareta Dahlström (Karlstad University)*

This paper aims to develop the understanding of knowledge dynamics processes developed in the European research project 'Regional trajectories to the knowledge economy' (EURODITE) applied on knowledge dynamics processes in a green economy. Demands for conversions into ecological sustainable production of goods and services calls for the generation and processing of new knowledge. To address the challenges of an ecological sustainable production, the furthering of knowledge within single scientific disciplines is not sufficient for driving innovations to tackle these challenges. On the contrary, different types of knowledge such as analytic, synthetic and symbolic, as well as knowledge from diverse disciplines have to come together to develop new knowledge needed for solving problems to advance a green economy. Hence, the generation and development of new knowledge takes place in complex relationships between different types of actors located in different places. Actors involved in knowledge generation and development range from micro businesses to transnational firms, higher education and research institutions and public actors and agencies of different kinds. Increasingly, also users and consumers are identified as playing important roles with regards to knowledge dynamics. Knowledge interactions across sectors, scales and actors can be called knowledge dynamics. An important aspect of knowledge dynamics is that changes in knowledge are driving innovation. In addition, policy actors can play a role in taking action to promote and support knowledge dynamic processes and remove obstacles obstructing such processes. The paper explores knowledge dynamics in a green economy with an empirical focus on Lake Vänern in western Sweden. Lake Vänern is the largest lake within the EU and with its surrounding area provides a multifaceted region where many of the green economy challenges and opportunities are present. The lake has a unique fauna and flora and is the fresh water source for the 300 000 inhabitants in the region. It is also Sweden's largest hydroelectric power dam and is used for transportation, commercial fishing and recreational purposes for the local population as well as for the tourism industry. With regards to local planning, the lake provides an attractive setting for waterside developments. Lake Vänern administratively affects thirteen local and two regional authorities, in addition to regulations at national and EU levels that are

affecting the lake and its surroundings. Through the many competing demands on the resource of Lake Vänern, the region provides a valuable case to study knowledge dynamics in a green economy.

### Eco-networks for eco-innovations and a green economy

*Brita Hermelin (Stockholm University)*

This paper aims to analyse the development of eco-innovations through composite knowledge in eco-networks. Eco-innovations may be defined in terms of innovation processes toward sustainable development and a green economy. Innovations, knowledge and learning are closely related concepts and in this paper the aim is to understand how these develop in a number of cases of eco-networks for eco-innovations. There are many types of innovations involving organisational, product, market, process and input innovation. Innovations have also been categorized in terms of radical or incremental. The discussion in this paper proposes a broad and encompassing understanding of innovations. The paper aims a particular interest towards eco-innovations through cross-sector knowledge interactions and which are closely related to composite knowledge, i.e. the processes of developing new knowledge through combinations of knowledge from different knowledge fields. The empirical data in the paper is derived from the mapping of a selection of projects for eco-innovations. These are projects developed in Sweden and which involve actors from different organizations and industries and from the public and the private sectors. The paper describes and discusses how the selection of eco-networks develops across sectors and also across space in multi-local structures and processes. The aim is to advance the understanding how eco-networks generate learning, knowledge and innovation processes and also how discourses and institutional settings means hindrances for knowledge dynamic processes in network relations.

## SE 12-02 - Green economies: A business, society and policy approach 2

*Chair: Brita Hermelin, Grete Rusten*

### Changing energy geography of North Eurasia: Regional impact of global policy, technology, and market shifts

*Vladimir Litvak (VTB Capital)*

Traditional energy geography of Russia and other CIS countries is changing, both structurally and spatially. Spatial changes involve both location and configuration of energy production, processing, and transportation facilities, and the patterns of energy trade. A variety of drivers are in play: from global, regional and national climate change mitigation policies to market shifts, from technology-driven transformation to regional integration, from energy security considerations and efficiency gains to policy impacts of natural disasters and industrial accidents. The above cause changes on the national and subnational public policy levels and in the behavior/response of government agencies, energy companies, financial institutions, expert community, and civil society. Although "greening" of the region's energy sector has been slower than in the other regions, virtually all countries adopted national goals and policies related to green growth, achieving greater energy and resource efficiency, and development of renewable energy and started moving to implement the above. The paper will highlight the impact of selected global change factors, mediated by regional and national policies and practices, on energy geography of North Eurasia (Russia and other CIS countries), with focus on development of sustainable ("green" energy) and spatial changes in conventional energy. It will, inter alia, address the following cases: (i) impact of regulatory and market changes on geography and structure of the Russian power and heat sector; (ii) changes in geography of the Russian energy exports due to the EU energy policies, development of Asian energy markets, and technological changes in gas industry; (iii) policy and market-driven development of renewable energy in the CIS countries: case studies of Armenia and Ukraine; (iv) urban energy; (v) associated gas utilization in Russia, Azerbaijan, and Kazakhstan; (vi) regional and local sustainable energy finance influenced by targeted interventions by the international financial institutions (vii) subnational energy policies and practices in Russia

### Maritime cleantech entrepreneurship in Frederikshavn, Denmark: Exploring the role of intermediaries on information and competence provision

*Roberto Rivas Hermann (Aalborg University), Jeanne-Christine Lunde-Christensen (Maritime Center for Operations), Henrik Riisgaard (Aalborg University), Arne Remmen (Aalborg University)*

The demand on maritime cleantech may increase as result new regulations on maritime source air pollutants by International Maritime Organization and the European Union. As result, the demands will also increase for ship retrofit and cleantech installations. Such opportunities may be triggered by frontrunner shipyards and its interlinked maritime-servicing clusters and networks. Yet, in order to exploit these opportunities, conventional business literature usually refers to information availability and competence building. Yet, in the blossoming literature of eco-entrepreneurship both topics are barely discussed. This paper aims to fill this knowledge gap by studying the case of Frederikshavn district in Northern Denmark. This district can be considered as a paradigmatic case, from which generalizations can be made to other harbors in Western Europe. The article departs from the following research question: What is the current role of brokers and intermediaries in facilitating information concerning green shipping practices? The paper's main argument is that information availability, facilitated by public and private networks is a requirement for potential maritime cleantech eco-entrepreneurship. In this article, eco-entrepreneurship is understood as offering new services and products (either by an existing firm or by a start-up). Such services and products may address an environmental externality. The following are the case study's main results:- Two broker/intermediaries contribute to information flow between information rich domains (maritime associations, conferences, etc) to end users: Frederikshavn's district government (Kommune) and Frederikshavn Business Council (Ehrvervshus Nord). - "Information" in the Frederikshavn's context implies: new shipping environmental regulations, air and water pollution control technology specifications. Besides, information encompasses maritime staff competences on how to service new air emission control technology (e.g. scrubbers, SCR, etc...), as well as alternative energy sources engines (e.g. LNG, hydrogen fuel cells). The case may provide insights on how eco-entrepreneurial opportunities are recognized with intermediaries' support. According to Baron (2010, 124) a key question in entrepreneurial recognition is 'Why are some people and not others able to discover specific opportunities'? This author considers that an answer to this question resides in access to and best use of information.

Furthermore, access to information can result from active search, alertness to opportunities, and entrepreneur's previous experience. The Frederikshavn case study may add a fourth element: access to information can result from the facilitation provided by intermediaries.

**Sustainability and competition: The role of management consultancies in the embracement of eco-innovations in production systems.**

*Grete Rusten (University of Bergen), Silja Kristiansen Bruland*

Eco-innovations can be understood as a technological move for development of eco-efficient product and processes leading to efficiency and value creation. This may involve a whole range of actors, in-house or external experts, firms and policy makers that are engaged in developing tools, giving advice, organising procedures and evaluating and regulating sustainable developments. This research focus on what role external consultancy services play in providing knowledge in these projects. The theoretical approach in our study combines literatures within technology development, management, innovation and industrial design. The basis for this research is to investigate the supply and demand side of eco-innovation projects through empirical evidence that combines updated company information from a systematic analysis of the consultancy service company database with a sample of 50 service management companies and 50 industrial design service companies operating in Norway. Firstly we analyse occurrence and details around eco-innovation advice and projects. Secondly, we combine this with an electronic survey among businesses demanding these services. Major sectors including marine resource industries, maritime industries and petroleum industries are of particular focus.

## SE 13-01 - Integrative approaches to water resource management in times of global change 1

*Chair: Flurina Schneider, Olivier Graefe*

### Enhancing Stakeholder Involvement in Water Management Schemes of the Heihe River Basin (China) - A Theoretical Outline Based on the Greifswald Approach

*Lilin Yu (Universität Greifswald), Jan Felix Köbbing (Universität Greifswald), Niels Thevs (Universität Greifswald), Konrad Ott (Universität Greifswald), Stefan Zerbe (University of Bozen-Bolzano)*

Managing freshwater has gained a broad attention in our public debates. The uneven natural distribution of water resource and diversified socio-economic conditions make it highly challenging to formulate a standard package of solutions. How could we establish an integrative approach, which is sustainable and embedded in local socio-economic reality? Upon the Heihe River Basin case, we propose a holistic approach that regards the whole river basin as a unit in social-scientific analysis. The Eco-system services approach, multi-criteria valuation and adaptive management are three important components in our framework. Within the Greifswald Approach, we understand water as a non-living fund with a zero rate of substitutability. To solve hydro-logical problems, it is vital to grasp an in-depth understanding of hydro-logical problems from within user's perspectives. Those perspectives include, above all, "water cultures" like history, perception, economics, schemes, and institutions as well as water ethics in the contemporary times. A "Universe of Discourse on Water-Related Practical Problems" (UoDW) could then be established, consisting of discourses from stakeholders. Presuppositions of parties concerned in UoDW should be reflected, ambiguity be dissolved and arguments be reconstructed. In our study site, there are four types of stakeholders: the locals (S1), farmers (S2), entrepreneurs (S3), and government agencies responsible for managing conserves, e.g. Mt. Qilian, various wetland parks and the tugai forest (S4). Reluctance of stakeholders to participate in water management schemes is largely a result of (1) unawareness of the issue actually at stake and its weight; and (2) failure to reach compromises in face of conflicting interests. For the first point, we suggest start with Ecosystem Services evaluation. In our view, each stakeholder pays for various ecosystem services (ES) from the River to sustain their existence and enhance the quality of life. Different ESs are categorized as: provisioning (E1), regulating (E2), supporting (E3) and cultural

(E4) services (The Millennium Ecosystem Assessment 2005). A matrix can be then established as  $[SE]_{i,j}$  where  $i,j=1,...,4$ . The values of Ecosystem Services should then be conveyed to each stakeholder and their opinions be gathered. Nonetheless, there is potential risks in applying the ES approach; therefore, local resource managers should take deeper considerations as to the validity of stakeholders' argumentation. "Validity" here is rooted in the Habermasian Discourse principle (D). A map of multi-criteria is inferred from arguments deemed as valid. Subsequently, an appropriate management proposal can be drafted, which is expected to encounter least objections (the second point), and hence enhance stakeholder involvement. This draft, again, should be able to withstand public scrutiny.

### Water research in South Africa: Knowledge and adaptive capacity

*Raymond Siebrits (University of Cape Town)*

The coupled human-environmental system of water resources in South Africa is seen by many as approaching or already in a crisis but solutions can and must be found. This paper therefore proposes to identify and understand the past and present paradigms of water related research in South Africa. It then proposes to critique this water related research endeavour through theoretical and contextual debates of sustainability, appropriateness and relevance in research. It is stressed that this paper focuses on a macro understanding of the past, present and future of water research activities and questions and does not attempt to answer whether the research is aiding sustainability, is relevant or appropriate. A contextual narrative will be created using meta-data from all peer-reviewed scientific publications related to water in South Africa since 1971. This will be strengthened by interview data and narratives with key persons who are and were engaged in water related research. Discussions around the role of knowledge and science in society will also be presented to this narrative. The final analysis will represent the categories and themes in matrix form that many thousands of publications apply to and possibly identify areas of research focus or neglect in the past. Paradigms and changes thereof in the past research will be identified and discussed. This narrative will then be used to invoke thought and debate amongst a diverse array of water research stakeholders in South Africa. These stakeholders will be invited to participate in a horizon scanning endeavour using comprehensive online surveys at its core. This undertaking will generate categories and rankings of priority water research questions in South Africa that are being asked or should be addressed. A few hundred robust, achievable and structured research questions will be presented to the water

research community. Coupling the contextual narrative and horizon scanning results will then allow the current state and direction of water research to be critiqued. This will be performed in the theoretical context of the requirement of adaptive capacity for greater resilience to enable a more sustainable path to be attained. This paradigm will be critiqued amongst the complexity, debate and challenges that exist in sustainability science as well as assigning appropriate notions towards research. This critique does not aim to definitively answer whether research is sustainable, whether it contributed/contributes towards sustainability or whether it is relevant, but rather wishes to identify and critique current and past paradigms identified in the data analysis within these theories.

### **Modeling of the human-environment interaction: Conflict and cooperation over water resources in the Nile River Basin**

*Peter Michael Link (Universität Hamburg), Jürgen Scheffran (Universität Hamburg), Franziska Piontek (Potsdam Institut für Klimafolgenforschung)*

Recent studies suggest that climate change can aggravate environmental degradation and resource scarcity, which may contribute to violent conflict in a number of ways, including resource captures, mass migrations, and conflicts over the distribution of risks and costs between countries. However, it is also possible that addressing the problems and risks might lead to more cooperation instead. In the context of the overarching subject of the session, we focus particularly on water as an essential natural resource. A conceptual framework of conflict and cooperation is applied that assesses the link between environmental factors, human security and societal instability. A macro-level analysis of regional impacts of climate change is combined with a micro-level analysis of potential environmental conflicts, regionally focusing on the Nile River Basin, which can be considered a potential climate hot spot. The aim is to provide a deeper understanding of the climate-society links and the potential for destabilizing cascading effects and tipping points. The analysis of impacts and responses provides a basis for developing and testing strategies and policies for adaptation, stabilization, cooperation and conflict resolution in the Nile River Basin in light of a possibly significantly altered water availability due to changing environmental conditions. It is expected that the Mediterranean region will be severely affected by global warming. Rising temperatures and changing precipitation patterns exacerbate existing problems of desertification, water scarcity, and food production. Based on data of key countries in the Nile River Basin regarding various economic, environmental, developmental, and political dimensions, an analysis of the potential regional security implications and

conflicts is conducted that may arise if the influence of climate change alters the current status quo. In the past, Egypt has established itself as a water hegemon that controls a majority of the water resources of the region. This status has been recently challenged by developments and alliances of the upstream countries, increasing the tension between Egypt and some of its neighbors. Unfavorable shifts in precipitation patterns can augment the pressure on the downstream countries, causing them to consider shifting towards strategies that are based on threats rather than on cooperation. A computational modeling framework is introduced to outline the complex interactions between the most important variables of the climate system and fundamental socio-economic quantities in the upstream and downstream countries of this region. It is used to assess the dynamic interactions between countries which invest into different action paths to improve water availability. Recent developments and different scenarios are discussed, alternative strategies and cooperative approaches are considered that enhance conflict prevention and governance structures to address security risks.

### **Best practices for community-based environmental assessment – Promoting learning and sustainability in Kenya and Tanzania**

*John Sinclair (University of Manitoba)*

This paper establishes best practices for community-based environmental assessment (CBEA) in Kenya and Tanzania and examines what participants in community-centered approaches to environmental assessment have learned. Three CBEA cases involving water supply projects were studied using interview methods and action research. Findings show that best practices for encouraging meaningful community involvement include providing access and adequate notice to participants, fairer cost sharing, broader representation of women and youth, participant understanding of the CBEA facilitator and culturally appropriate sharing of findings. Learning outcomes attributable to the CBEA process included technical skills for erosion control, new information about EA regulations and shared values of environmental sustainability and community unity. An application of selected best practice approaches in a test case in order to encourage greater participation and learning had mixed success. For example, attempts at providing early notice still resulted in it being far too late for most participants and only about one-third of the participants were women. However, a pictograph functioned as an effective tool for reporting CBEA results to the community and demonstrating learning outcomes.





## SE 13-01 - Integrated water resource management and land use change in South America

*Chair: Rene Höfer, Carsten Lorz*

### How to balance urban and agricultural water related needs under changing conditions in the Maipo catchment, Chile?

*Laura Simon (Karlsruhe Institute of Technology), Helmut Lehn (Karlsruhe Institute of Technology), Melanie Oertel (Karlsruhe Institute of Technology)*

The Central Valley in the metropolitan region of Santiago de Chile (MRS), located in the Maipo Catchment, is the most densely populated area in Chile, with all the main economic, social and technical functions of the country and therefore especially vulnerable to the impacts of climate change. Already today 100% or even more of the available water resources are allocated as private water rights leading to competition for water among agricultural, domestic and industrial purposes. The available renewable water resources of the Central valley are composed of 1) precipitation and 2) inflow of surface water from the Andes via the rivers Maipo and Mapocho. Precipitation shows considerable variations within a year and even stronger between different years. This precipitation pattern leads frequently to droughts, increasing the risk of a growing competition between agriculture and urban water demand. Due to low average annual precipitation and its concentration in winter months most water-related needs in the rest of the year are highly depending on melt water from glaciers and snowfields of the High Andes (McPhee et al. 2011). The regional impacts of global climate change will noticeable influence the future water availability in the MRS, leading to an increase of temperatures and a decrease of precipitation up to 10-30 % but with higher variability and intensity. Downscaling of climate models predicts reduced run-off of the Maipo River in summer months up to -40 %. Facing the shrinking water resources the elaboration of suitable measures for climate change adaption is a pressing need. The CAS-Project combines downscaling of global climate change models for the supply side with two socio-economic regional scenarios in order to address possible developments on the demand side in the region. Two plausible future storylines Business as Usual and Collective Responsibility have been developed, based on assumptions of the key socio-economic relationships and driving forces of change. On the basis of the outcomes of both scenarios in a participation process adaptation measures have been developed with relevant institutional stakeholders of the region. These measures include both the supply and demand side. While supply

side adaptation options involve, inter alia, increases in storage capacity, rain water harvesting or making other water resources available, demand side options focus on increasing efficiency and sufficiency of water use. There are large potentials given for reduction of water demand and increased water use efficiency within the city and the surrounding agricultural belt. Besides technical aspects, institutional/policy-based matters are considered.

### Analysing the Relevance of Urban Structure Types for an Integrated Water Management Using Remote Sensing

*Linda Firmbach (Helmholtz Centre for Environmental Research - UFZ), Rene Höfer (Helmholtz Centre for Environmental Research - UFZ), Michael Thiel, Carsten Lorz (TU Dresden), Holger Weiß*

The rapid urban growth in the recent decades mainly concerns areas of developing and emerging countries. Urbanization, i.e. mostly surface sealing, higher water consumption, and waste water production, is likely to have substantial effects on water resources, e.g. reduced groundwater recharge, shift in infiltration-runoff ratio, waste water collection (treatment and drainage), and water quality issues. The analysis and prediction of effects of urbanization is a major challenge for applied research. The study is part of the IWAS ÁGUA DF project - a German-Brazilian cooperation which is funded by the German Ministry of Science and Education (BMBF) and Brazilian Partners (CAESB, UnB). In the scope of the general project aim of developing an Integrated Water Resources Management (IWRM) for greater Brasilia region, analysing and predicting the effects of urbanization are major challenges of the project. Remote sensing techniques can be used for urban monitoring and save time and costs. The Distrito Federal do Brasil (DF), planned for approximately 600,000 inhabitants, is situated in the tropical savannahs with pronounced dry and rainy seasons. Since its foundation in 1960 the population has been increasing to more than 2.5 million in 2010 (IBGE, 2011). The main objective of this research focuses on the importance of the urban structure types (UST) for an IWRM derived from remote sensing data. UST are units of physiognomically homogeneous urban areas. They are used as spatial indicators that help to divide and differentiate the urban fabric into open and green spaces, infrastructure, and building complexes so that their typical characteristics such as physical, functional, and energetic factors can be identified. Study area of this research are two sub districts of the Distrito Federal do Brasil, characterized by high urban dynamics over the last decades. The methodological approach is interdisciplinary using remote sensing and census data. First socio-demographic

and socio-economic information from recent census are analysed according to their relevance of an IWRM. Second UST will be derived from very high resolution satellite images (Quickbird 0.6 m pan, 2.4 m in the multi-spectral) using an object based image analysis approach (OBIA). OBIA is based on image segmentation approaches which generate areas by referring to one or more homogeneity criteria. The segments have additional spectral information (mean values, median, min, max, ratios) and spatial information (distances, neighbourhoods, topologies, etc.). Furthermore, supplemental information e.g. from GIS data can be included in the classification process (Blaschke, 2010). Finally, the derived UST are compared with the results from the census analysis to demonstrate their relevance for an IWRM.

#### **The impact of agricultural conservation management practices on simulated water balance and sediment loss in a Central Brazil catchment**

*Michael Strauch (TU Dresden), Jorge E.F.W. Lima (Embrapa Cerrados), Albano Araújo (The Nature Conservancy), Franz Makeschin (TU Dresden)*

Fast growing population along with urban sprawl and intensification in agriculture has drastically increased the pressure on water resources of the Federal District (DF), Brazil. Serious conflicts arise in rural areas of the DF, where water is used for both public supply and agricultural production. The problem is aggravated by the lack of efficiency in controlling irrigation and avoiding soil erosion. In order to study the impact of conservation management practices on catchment hydrology as well as sediment generation and sediment yield, we utilized the Soil and Water Assessment Tool (SWAT) for the intensively cropped catchment of the Pipiripau River. The SWAT model was successfully calibrated and validated against measured streamflow and turbidity-derived sediment loads. Model calibration was conducted with particular consideration of precipitation uncertainty. Finally, the model is supposed to be used for scenario simulations with changed management practices that are currently being discussed as useful measures to reduce surface runoff and hence soil erosion. These measures include (i) the implementation of terraces on agricultural land, (ii) sediment basins along roads, and (iii) the conversion of soybean and corn monocultures into diversified crop rotation systems. The study is part of the IWAS-Água-DF project that aims at contributing to an Integrated Water Resources Management for Brasília, DF. Using SWAT as a simulation tool for the Pipiripau River Basin is also a useful complement to the Water Producer Program ('Produtor de Água') established by the National Water Agency (ANA),

because it allows the evaluation of management practices that are supported by the program in form of 'Payments for Environmental Services'. Our research depicts critical issues of watershed modeling, such as model calibration, uncertainty analysis, and the representation of conservation practices within SWAT. Despite numerous uncertainties, we expect that this study will provide useful recommendations for water resource managers especially in the Pipiripau River basin, but also in similar catchments.

#### **Towards cost-effective watershed management in the Brazilian Atlantic Forest: Valuing forest ecosystem services related to water quality in the Guapi-Macacu watershed**

*Vanesa Rodriguez (Institute for Technology and Resources Management in the Tropics and Subtropics), Udo Nehren (Cologne University of Applied Sciences), Jan Boerner (CIFOR), Juergen Heinrich (Universität of Leipzig), Rachel Bardy Prado (Embrapa Solos), Hartmut Gaese (Institute for Technology and Resources Management in the Tropics and Subtropics)*

The Brazilian Atlantic forest is considered a global biodiversity hotspot, harbouring a large number of endemic species, and providing essential watershed services to millions of urban water users. However, agricultural expansion and urban development have reduced the forest area to less than 8% of its original size. Multiple pressures on the Atlantic forest ecosystem continue. Payments for environmental services (PES) schemes are increasingly proposed by local initiatives and supported by international cooperation to manage the trade-offs among agricultural uses and watershed services in a cost-effective manner. Studying the provision costs of as well as the demand for watershed services can help decision makers to evaluate the scope and economic feasibility of PES and alternative management options, such as regulatory measures and land purchases. The Guapi-Macacu watershed in the state of Rio de Janeiro supplies water to 2.5 million inhabitants within five municipalities. Water resources are of utmost importance for agriculture and industries, such as water bottle companies, breweries and the biggest Brazilian petrochemical complex COMPERJ. Our study concentrates on valuing watershed services in terms of controlling nutrient and sediment loads under different land-use systems. Nutrient loads include Nitrogen and Phosphorus found in surface water, whereas sediment loads are measured in terms of turbidity and total solids. Replacement and avoided cost methods are applied focusing on the local water treatment facility to estimate demand for service maintenance and improvement. To provide empirical evidence of the link between land use/land



cover and water quality indicators, we rely on water quality modelling and monitoring specifically adapted to this area. This takes place within the framework of the multi-disciplinary German-Brazilian cooperation project DINARIO/MP2. Spatial conservation opportunity cost modelling is used to study the costs of watershed services maintenance and improvement and derive implication for cost-effective management on the basis of scenario analyses. Early results suggest that aggregate water quality demand justifies investments in watershed conservation initiatives, but PES may not generally be the most cost-effective intervention option vis-à-vis strategic land purchases and regulatory measures.

## SE 13-02 - Integrative approaches to water resource management in times of global change 2

*Chair: Flurina Schneider, Olivier Graefe*

### One Scale, Multiple Loci: The Shaping of Water Resources Policy in West Africa

*Jean-Philippe Venot (International Water Management Institute)*

From the 1990s onwards, the river basin has invariably been singled out as the cornerstone of Integrated Water Resources Management (IWRM) and the sole and 'natural' scale for the planning and the management of water resources. This paper opposes this monolithic and rhetoric vision of the river basin to the multiple loci where water resources policies are shaped by investigating the case of Burkina Faso in West Africa. IWRM policies in Burkina Faso meet global calls of international organizations and the institutional arrangements that are devised appear to echo those observed in the West 'notably in France, not the least because of donors' support. However, the agency of local and national actors clearly expresses itself during implementation processes. Watershed committees appear to be embedded in the socio-political reality of Burkina Faso where a strong bureaucracy disputes decision making to newly formed decentralized government structures. This is for example illustrated by the inherent tension characterizing local watershed committees that are alternatively seen as consultation platforms to vet decisions taken at other scales and true management bodies with the power to implement an action plan. The trajectory of IWRM policies in Burkina Faso and more generally in West Africa frame the river basin as a social and political space. Institutional arrangements for basin management need to internalize discontinuous political processes and the flux of power and influence that span multiple scales. This re-scaling process, embodied by development brokers, is more likely to allow for the engagement of local actors towards sustainable water resources management.

### The contested waterscape of Khartoum: Between neoliberal reforms and Islamic discourse

*Detlef Müller-Mahn (University of Bayreuth), Anne-Sophie Beckedorf (University of Bayreuth)*

The paper presents findings of an integrative study on the water supply system in the Sudanese capital and its recent transformations in the context of

neoliberal reforms, rapid urbanization and local discourses. Using a politico-ecological approach, the case study interprets the current condition of water management as both an indicator for and a result of ongoing socio-political changes. It shows that due to water's specific socio-physical characteristics, water management is more difficult to commodify than other public services, such as electricity. The paper explores the epistemological potential of political ecology for the study of water management in this particular case. Special attention is given to the institutional setting within governmental organizations and the way how they manage, modify and renegotiate water related services in day to day practices. On the basis of observations and interviews at the empirical micro-level within governmental institutions, the paper will discuss the question how and why governmental organizations responsible for water supply implement, modify, negotiate, and contest specific reforms in specific historical contexts; how and why governmental organizations responsible for water supply navigate between different ways of water management; and how and why the government employees involved in these operations form alliances, take decisions, and create different logics, practices and narratives. With respect to Khartoum's waterscape, the paper refers to organization sociology to show how the analysis of internal processes within the main governmental water supply body helps to explain aspects of governance at various scales. In the case of Khartoum, these aspects are closely connected to the transformation of water sector institutions. While these transformations are induced by global models of neoliberal water management, they are modified, partly rejected, partly accepted and adjusted to local contexts, which in turn results in parallel and partly even contradictory ways of water management. In sum, the paper argues for a combination of approaches from both political ecology and organization sociology in order to grasp the complexity of water management and to develop a more integrative perspective on current changes.

### Bridging the gap between hydrosystems and hydropolitics: A comparative study of two key concepts in water management

*David Blanchon (Université Paris Ouest Nanterre)*

Two major concepts have emerged in water sciences in the 1980s. On the « environmental » side, the concept of hydrosystem has profoundly renewed our view of the continental hydrology. On the « socio-political » side, understanding hydropolitics has become the focal point of scientific controversies. These concepts have not only shaped academic debates, but they have also influenced water policies and the implementation of the Integrated Water



Resources Management (IWRM) paradigm. Although they are widely discussed in several academic disciplines, 'hydrosystem' and 'hydropolitics' are seldom studied together. In this presentation, I would like to examine how it is possible to bridge the gap between the two approaches. After a short description of the genealogy of the two concepts, I will focus on the theoretical difficulties which prevent us from using rapid shortcuts. For instance, the use of a systemic approach in hydrology is one major obstacle to its inclusion in research partially based on Actor-Network Theory often used in hydropolitical approaches by authors such as E. Swyngedouw, J. Budds or J. Linton. In the second part, I will see how the use of hydrosystem and hydropolitics conceptual frameworks could change our way of analysing particular issues, such as the implementation of IWRM in South Africa.

## SE 14-01 - Localising climate change in a development context: Adaptation to what?

*Chair: Detlef Müller-Mahn, Chinwe Ifejika Speranza*

### Climate Change, perceptions and vulnerabilities: a case study in Brazilian biomes

*Teresa da-Silva-Rosa (Universidade Vila Velha), Renato Maluf (UFRRJ- Universidade Federal Rural do Rio de Janeiro), Andrea Vanini (Campus FIOCRUZ da Mata Atlântica), Michelle Bonatti (UFSC), Kamila Mynssen (Campus FIOCRUZ da Mata Atlântica), Catia Zuffo (Universidade Federal de Rondônia), José Carlos Lopes (Universidade Federal do Mato Grosso do Sul), Francisca Gonçalves (Universidade Federal de Rondônia), Larissa Homem (Universidade Federal de Santa Catarina), Luiz D'Agostini (UFSC)*

Taking into consideration the impacts caused by climate change (CC) and by extreme weather events, the question of assessing vulnerability becomes crucial in the context of scientific research and development of adaptation strategies and public policies. Based on the assumption that the vulnerability condition is socially constructed, and that it may, as such, change according to transformations in human action, it appears necessary to take the matter to the core of studies on the social aspect of CC, risk level and the prevention of disasters. The social nature of vulnerability is determined by elements such as poverty, inequality, exclusion and access (or not) to sanitation, to water, to food, and to education among other factors. Those factors should be the main focus both in field work and in projects that map vulnerabilities and enable the development of skills in order to identify the most vulnerable members of society and their perception with regard to the climate question. In 2010, a study was undertaken, in the ambit of the project 'Climate Change, Social Inequalities and Vulnerable Populations' (by the Brazilian Network for Social Mobilization/COEP and the Reference Centre of Food and Nutrition Safety/CERESAN/UFRRJ, Brazil), on the perception of CC and on vulnerability assessment. Information was gathered through interviews which consisted of structured questionnaires administered in communities in three Brazilian biomes: the Atlantic Forest, the Amazon and the Cerrado region. 115 low-income families in rural and urban communities who were frequent victims of floods or draughts were interviewed. Issues that emerged in association with each biome and the different populations interviewed, rural riverine communities (Porto Velho, RO) and quilombolas (Campo Grande, MS), as well as communities in the urban

periphery of Florianópolis (SC) and Rio de Janeiro (RJ), were discussed taking into consideration the local aspects of the results. To conclude, at least two points in common must be highlighted. (1) The residents of the communities studied do not have plans or actions to adapt to the natural variability of the climate, and by extension, to CC. This makes the communities more vulnerable and unprepared to act with protective or reactive preventive measures. (2) Thus, it is important to consider the process of developing skills training aiming at the elaboration of a future action plan to include measures that tackle the identification of climate change as an environmental problem with direct causal effects on the development of communities. Likewise, it is important to develop actions that address the practice of organised irresponsibility, here understood as a network of mechanisms which keep environmental problems in a state of normality, or regarded as being of governmental responsibility alone.

### Adaptation in the face of socioeconomic transformation: Differing impacts and drivers of formal and informal adaptation strategies to urban flooding in the Mekong Delta

*Dunja Krause (United Nations University)*

The rapidly developing Mekong Delta is often described as one of the world's most vulnerable regions when it comes to climate change. Facing the multiple water-related hazards climate change might have in store for the region the need for adaptation becomes evident. Yet, many non-climatic drivers, such as the socioeconomic transformation or large-scale development projects influence local realities and interact with natural changes creating a high-risk environment. Considering the speed and scale of ongoing development processes including their local impacts, adaptation should be evaluated from a development perspective and aiming at more than climate change scenarios. Analyzing the public discourse on climate change, it is argued that in order to adapt successfully a stronger focus is needed on the notion of 'adaptivity' and flexibility in (spatial) planning thus also questioning of current approaches and evaluating strategies against the background of potential secondary impacts and cross-scale effects. Using the example of relocation versus in-situ adaptation in urban Can Tho City, Vietnam, this paper traces the information base and guiding principles that shape adaptation endeavors of formal institutions versus flood-affected households. It is argued that the gap between technocratic planning approaches and local perceptions, traditions and beliefs leads to different, partially conflicting assessments of the situation. A prevailing idea of technocratic progress and pursuit of a modern lifestyle following Western or East Asian

examples thus somewhat clashes with the local reality and perceived capacities of many: Whereas formal strategies often focus on engineering solutions and large-scale infrastructure, individual households are affected more by secondary effects and development projects than primary impacts caused by environmental or climate change. This divide may lead to divergent evaluations of options which exacerbate integrated approaches to adaptation. Open and semi-structured interviews as well as group discussions build the basis for analyzing drivers of people's agency and pointing out key evaluation criteria. Understanding the information base and drivers of people's decisions is thought crucial for the inclusive evaluation of adaptation options. It is needed to juxtapose differing principles, to understand value judgments and facilitate dialogue between local stakeholders. Overall, the identification of evaluation criteria and gaps is intended to point out leverages to overcome current limits in adaptive capacity.

### **Seeing like the Karrayu: Adapting and Securing Livelihoods under Climate Change and State Policy Encroachment in Central Ethiopia**

*Girum Getachew Alemu (University of Bayreuth)*

Local livelihoods in dry land areas in Ethiopia in general have been challenged by extreme weather events such as drought and flood. However, those who primarily inhabit such environments have been practicing their everyday livelihoods not only as the sole actors in such a context but also interacting with other actors that may or may not share similar goals and objectives with their livelihoods. The presence of multiple actors in a local scenario has presented multiple options that entail various decisions as well as strategies to deal with the respective decisions. In many cases agro-pastoral households employ different strategies of dealing with livelihood insecurity ranging from adaptation, appropriation and buffering. However, all these strategies do not come out of a blue-rather they are embedded in the social fabric of that particular community as manifested in livelihood decision making process and the associated power struggle within and across households that share the same resource base. Another peculiar character of households in dry land parts of Ethiopia is the flexible nature of their strategies that are tailored to specific problems in order to secure livelihoods. Despite the flexibility of strategies, Karrayu agro-pastoral households also clearly delineate their own boundaries and define the roles and responsibilities of members and non-members. On the other side of the story, the state is yearning to deliver development to the local community by implementing sedentarization programs. The justification for state intervention is

mostly the failure of the local strategies to respond to the frequent drought in that particular area. Here, drought is used as an escape goat to materialize the state policy in the local domain and the solution is mainly based on 'thin simplifications' of the local context and standardized planning and implementation. Under such scenario, I argue in this paper that a localized approach to both climate change and development is important in order to understand the spaces of strategic maneuver for livelihood adaptation and security by various actors and hence to point out the specific strategies that are tailored to particular objectives so as to tackle the important and recurring question "adaptation to what?". In this paper, based on a total of twelve month field research among the Karrayu agro-pastoral communities of upper Awash valley in Ethiopia, I discuss the dilemmas that households are presented with while both dealing with climate related extreme weather events such as drought and state policy encroachments through sedentarization schemes.

### **Adapting to climate change? The Kenyan agricultural extension services**

*Boniface Kiteme (Centre for Training and Integrated Research in Arid and Semi-Arid Development (CETRAD)), Chinwe Ifejika Speranza (University of Bern)*

Climate change is adding to the various factors constraining public extension services from continuing to play a key role in improving agricultural production in Kenya. This paper examines how the public extension services is adapting to climate change and what structural or institutional reforms are necessary to enable it to effectively promote farmer adaptation practices. Data was collected through a review of public extension services and empirical studies in three contrasting agricultural production areas of Kenya - agro-pastoral Embu and Makueni districts and fishing in Bodo district. Results show that among others, extension officers know little about the effects of climate change on fish farming compared to crop and livestock production. The study discusses policy and structural linkages between climate research and extension services, extension services content and message on climate change adaptation. While extension officers have knowledge of climate variability and climate change, inadequate government funding, dominant extension models and the socio-economic conditions of their mainly poor clientele limit their actions and effectiveness. Various options are discussed on how to improve the content and messages on climate change including the exchange of knowledge with farmers and researchers in ways that foster adaptation to climate change in the smallholder agricultural sector of Kenya.





## SE 15-01 - Man and environmental change: Progress in geoarchaeological applications

*Chair: Helmut Brückner, Kosmas Pavlopoulos*

### The aftermath of flood: Geomorphological evolution of the Danube Delta after reconnecting Black Sea / Mediterranean and its implications on eneolithic settlements location

*Jean-Michel Carozza (University of Strasbourg), Laurent Carozza (GEODE - UMR 5602 CNRS), Christian Micu (Institutul Cercetari Eco-Muzeale), Albane Burens-Carozza (GEODE - UMR 5602 CNRS)*

Lower Black Sea coastal plain are a key-zone in the understanding of neolithic sprawling during the 7th millennium bc and metallurgy spreading during the 5th millennium bc. The core of this process is the Romanian Dobroudja and particularly the lower Danube delta. Until recent progress, the Danube delta was supposed void of any human occupation as late as late Iron Age. The discovery of a first Eneolithic occupation in the heart of the delta provides a better constraint on paleogeographic evolution and the formation process of older phase of the Danube delta related with the final sea level rise in the Black Sea. If the question of the Black Sea / Mediterranean reconnection is still debated, a consensus seems to emerge to consider it as early (~ 8,4 ky BP) and limited amplitude (~ 40-30 m) phenomenon. After the reconnection occurred, the delta show two major step of evolution : 1) The 'blocked phase' during witch the delta remains confined behind the Letea-Caraorman spit and is dominated by fluvial processes. This stage is poorly documented and constrained. 2) The open sea phase, wave dominated delta type is much better well know as well on chronological and palaeogeographical point of view. Data collected on and around the eneolithic site of Taraschina allows us to document the last evolution phase of the blocked delta and its transition to open delta stage. After the Black Sea reconnected to global ocean, the Danube delta grows within fresh water lagoon developed in context of sea-level rise. Evidence from former drilling and new palaeoecological data support this scenario. Between the reconnection phase around 8.4 ky BP to 6.0 ky BP, aggradation has domined the delta evolution, controlled by rapid sea level rise. Danube delta evolution could be regarded as a « bay head transgressive delta ». From 6.0 ky BP, decrease in sea-level rise rate initiated a stage of rapid progradation of the delta and the beginning of St George lobe formation. This phase is well documented by a series of coring around the eneolithic site of Taraschina and have huge influence

on human settlement occupation. During 6.5 ky to 6.0 ky BP rapid aggradation occurred in the lagoon and stops abruptly. This period corresponds to the occupation of Taraschina settlement now wildly silted. We proposed that the site was built at the edge of a loessic terrace recognized in core and correlated with other Pleistocene deposits within the delta. This terrace probably constitute the southern extend of the Bugeac plateau. During 6.5 to 5.9 ky BP interval high variability in fluvial regime is observed. Two phases of high fluvial regime (Flood Dominated Regime like) are recorded between 6.4 to 4.3 ky BP and 4.1 to 5.9, separated by hydrological quiescence (Low Water Regime like). Synchronicity between hydrological regime and settlement occupation is point out, implying rapid adaptation of eneolithic societies to environmental variability.

### Geochemical investigation of palaeo-pollutions in sedimentary archives of the ancient harbour of Rome (Tiber delta, Italy)

*Hugo Delille (UMR 5600), Jean-Philippe Goiran, Janne Blichert-Toft, Francis Albarède, Jean-Paul Bravard, Simon Keay*

Important pollutions were generated during the Antiquity. Our study focuses on the analysis of palaeo-pollutions in Portus, the Tiber delta, downstream of ancient Rome. The hypothesis is that harbour basins had the ability to integrate pollutions by heavy metals originating from local economic activities (proximal pollutions: foundries, fulling, tanning), as well as from activities related to the upstream development of Rome (allochthonous pollution). Discharges of waste water from Rome concentrated into the Tiber were forwarded to Portus through a network of canals connecting the river to the sea. In this manner, harbour basins accumulated both allochthonous and autochthonous heavy metals. Three sediment cores have been selected from the Portus area. The characterization of contaminants is carried out by high-resolution polymetallic concentration analysis of Pb, Cu, Sn, Zn, As, Cd, Ni, Ag, P, S, etc. followed by statistical treatment of these data (PCA, HAC). We are focusing in particular on Pb, which were widely used by the Romans during the Antiquity, especially in buildings, hydraulic structures, food, etc. The simple measurement of Pb concentrations, however, is insufficient for deltaic environments, where mineralogical variations of sediments take place extremely rapidly. These variations influence the concentrations of Pb in the sediments as a function of the intensity of detritism. We therefore also measure the Pb isotopes, which are unaffected by textural variability. An additional strength of Pb isotopes is their ability to discriminate between proximal lead (variations from one core to another attesting to their nature and origin) and distal lead (no isotopic variation between

cores). We have also implemented multi-elementary tracers (Ca, Mg, K, Al, Ti, Na, Sr, Mn, etc.) for a better discrimination between local and/or regional origin of pollution and sedimentary deposits. The behavior of combined elements and the preservation of their relationship over the entire height of the core can be interpreted as the result of environmental changes through time. This behaviour results in chemically defined lithofacies.

### **Pollen and sediment evidence for the influence of late Holocene climate change on chestnut cultivation at the Seonam-dong archaeological site, Gwangju, Korea**

*Jungjae Park (Seoul National University)*

We present pollen and sediment evidence for the influence of late Holocene climate change on chestnut cultivation from the Seonam-dong archaeological site in Gwangju in southwest Korea. The relationship between the environment and agricultural activities has not been properly investigated in Korea using a paleoenvironmental approach due to the lack of undisturbed samples with high sedimentation rates. This study clearly shows climate-induced changes in chestnut production, which was contemporaneously recognized by the Chinese as an important and unique local food source. It is also shown that the people's adaptation to climate change resulted in both the degradation and the recovery of the local forest ecosystem in the study area. The evidence from the Seonam-dong site supports the following three conclusions. 1) Chestnut cultivation was enhanced to compensate for the decreased crop yields due to the climatic deterioration between 1100 BC - 500 BC and between AD 200 - AD 800. 2) Chestnut cultivation declined between 500 BC - AD 200 and between AD 800 - AD 1600 as crop production increased sufficiently to sustain the population due to the climatic amelioration and/or agricultural improvements. 3) The increased chestnut cultivation led to forest disturbance and increased flooding, whereas the forest staged a recovery during the periods of decreased cultivation.

### **Environmental change and its impact on human culture in the Central Peloponnese – a comparison of two ~8 ka lake records from Stymphalia and Asea, Greece**

*Ingmar Unkel (Kiel University), Helmut Brückner (University of Cologne), Walter Dörfler (Kiel University), Timothy Filley (Purdue University), Jeanette Forsén (University of Gothenburg), Christian Heymann (Kiel University), Haydn J. Murray (Indiana University), Oliver Nelle (Kiel University), Arndt Schimmelmann (Indiana University), Christine Schriener (Indiana University), Eleni Zagana (University of Patras)*

Sediment cores from inland lakes typically express a more constant sedimentation, thus providing a more continuous archive than alluvial or near-shore sediment archives. The central Peloponnese has been lacking detailed reconstructions of the palaeoenvironment, although a direct comparison of sedimentary and other geoarchives of climate and environmental changes against the rich archaeological and historical records of ancient Greek societies may shed new light on human-environment interactions. In 2010 we recovered four sediment cores from a former lake bed in the valley of Asea near Tripolis. In particular, one of the cores, the 8 m long core Asea-1, covering the last 17 ka, has the potential to provide detailed information about the palaeoenvironment. In the same year, we also retrieved a 15.5 m long core (STY-1) at the center of Lake Stymphalia, the only remaining natural lake on the central Peloponnese, which seems to have recorded the entire Holocene and Late Pleistocene back to 40,000 years BP, based on our <sup>14</sup>C chronology. Two supplementary cores (STY-2 and STY-3) of 10 and 6 m length were taken in Lake Stymphalia in 2011. The first step of our research focuses on sedimentological and geochemical proxies of the last ~8 ka. High-resolution AMS-<sup>14</sup>C dating and Bayesian age-depth-modeling was used to establish time series of climatic and environmental variables. We attempt to correlate our records from the Peloponnese with (1) other Mediterranean and global patterns of Holocene climate change, and (2) with archaeological and historical information for this region. While there is a profound archaeological record of cultural changes in mainland Greece that have their climax at around 4200 cal BP (2200 BC), there is still a lack in linking this record with natural archives recording climatic and environmental changes. Many studies dealing with this issue agree that these changes might have influenced cultural development. Going into more detail, we shall focus on the balance between sustainability and exploitation, trying to answer questions like: How did the different ancient cultures manage their water resources? How sustainable was their agricultural land use? So far, our



geochemical analyses of sediments from Lake Stymphalia have shown that the water supply in the region fluctuated over time in response to changing climate. The Rb/Sr ratio as a proxy for changes between dry/warm and wet/cold conditions indicates pronounced humid phases around 6800, 4000'3700, 3500'3000 and 500'200 cal BP, partially corresponding to known phases of rapid climate change. Together with the geochemical analyses from Asea, which were still in progress when submitting this abstract, we are going to present the first steps towards a detailed and comprehensive environmental reconstruction of the central Peloponnese.

## SE 16-01 - Palaeoenvironmental reconstruction along the corridors of modern human dispersal from Africa to Europe

*Chair: Frank Schäbitz, Henry F. Lamb*

### A 200,000-year record of climatic change from Lake Tana, source of the Blue Nile

*Henry F. Lamb (Aberystwyth University), C. Richard Bates (University of St Andrews), Sarah Davies (Aberystwyth University), Dei Huws (Bangor University), Michael Marshall (Aberystwyth University), Tony Prave (University of St Andrews), Helen Roberts (Aberystwyth University), Harry Toland (Aberystwyth University)*

Seismic and core data from the deep sedimentary infill of Lake Tana, the source of the Blue Nile, provide the first continuous ca. 200 ka palaeoenvironmental record from continental NE Africa. Chronological constraints on the 92 m core are from polymineral fine grain IRSL dating combined with radiocarbon analyses of the younger sediments. Within the limits of resolution, the seismic data show: (1) horizons between 200 ka - 93 ka to be relatively conformable (no major erosion events); (2) two phases of shallow-water prograding wedge construction between 93 ka - 61 ka, separated by erosion at 87 ka and terminating with a prominent unconformity at 61 ka; (3) a seismically transparent unit between 61 ka and 52 ka interpreted as recording high sedimentation rates and terminated by an inferred desiccation event; (4) a decrease in sedimentation rate between 52 ka and 17 ka, punctuated by a cut-and-fill sequence and a short period of increased sedimentation between 40 ka - 34 ka; and (5) a previously reported desiccation event at 17 ka with subsequent cut-and-fill facies, contemporaneous with the Younger Dryas, followed by drape fill to present day. Geochemical data from high-resolution XRF scanning support the seismic interpretation. Interpreted wet and dry intervals in Lake Tana correlate well with Gulf of Guinea sea-surface salinity, and correspond to run-off and dry episodes reported for the Nile Delta. Correlation with NW Indian Ocean sea-surface temperature is less consistent, but offers a plausible explanation for the change from high to low sedimentation rates at 52 ka. The record also aligns well with the marine isotope stage chronostratigraphy, but does not readily manifest individual Greenland stadial - interstadial cycles, or most Heinrich events. The correlations with global proxies suggest that NE African climate change over the last 200 ka is primarily

linked to millennial-scale high-latitude northern hemisphere changes. The most prominent environmental change appears to be at ca. 61 ka, marking the end of wedge progradation followed by a major dry phase that lasted throughout MIS4. Environmental pressure over this sustained dry period may have influenced the size and distribution of early modern human populations.

### Humid corridors across the Sahara and the origins of the Aterian

*Nick Barton (Institute of Archaeology), Mike Rogerson (University of Hull), Tim Brücher (Max Planck Institut f. Meteorologie)*

MSA (Middle Stone Age) Aterian assemblages are found over a vast geographical area of North Africa extending from the Maghreb to the Western Desert of Egypt. Re-dating of sites in Morocco suggests that some of the earliest evidence for this technocomplex occurs in the Maghreb in late MIS 6 and MIS 5 thus implying a more complicated pattern of early modern human dispersal within Africa than is traditionally accepted. The new dates also suggest that re-thinking is necessary of population and cultural histories in North Africa immediately before the proposed last out-of-Africa exodus at 70-60 kyr. Moreover, a new generation of climate and hydrological models means that the past surface conditions in North Africa can be elucidated in unprecedented detail. In this paper we review the different potential dispersal routes across the 'green Sahara' and consider alternative theories about corridors and hydrological processes that may have given rise to the early appearance of the Aterian in the west. Barton, R.N.E.1, Coulthard, T.2, Rogerson, M.2, Ramirez, J.2 and Brücher, T.3 1 Institute of Archaeology, University of Oxford 2 Department of Geography, University of Hull 3 Max-Planck-Institut für Meteorologie, Hamburg

### Cave and rockshelter deposits of the Western Mediterranean – Records of Last Glacial cultural and environmental change

*Martin Kehl (University of Cologne), Jörg Linstädter (Institute of Prehistoric Archaeology), Klaus Reicherter (Institute of Neotectonics & Natural Hazards), Gerd-Christian Weniger (Neanderthal Museum)*

Marine and limnic records suggest that Heinrich stadials were the driest and coldest climate phases during the Last Glacial in the Iberian Peninsula (IP) and, probably, Northern Morocco. Heinrich stadials also left imprints on sediment sequences of caves and rockshelters which include most of the palaeolithic sites and, therefore, are of utmost importance for analyzing the response of

palaeolithic hunter-gatherer communities to climate change. We analyzed archaeological and geochronological data of Iberian caves and rockshelters and discussed a possible correlation of Heinrich stadials 3 and 2 with the end of the Early Upper Palaeolithic and Gravettian technocomplexes, respectively (Schmitt et al., accepted). In Morocco, similar correlations between cultural and climate phases are indicated, but evidence is limited, particularly for Middle Palaeolithic to Iberomaurusian time (Linstädter et al., submitted). Here, we examine the sedimentary records of Iberian and Moroccan sites in order to evaluate their stratigraphic consistency and possible imprints of climate change focusing on the period from Mousterian/Middle Palaeolithic to Solutrian and Iberomaurusian times, respectively. The sites are mostly located in carbonate rocks within the Alpine fold belts and few are found in Tertiary Basins and the Iberian Massif. The sedimentological information reported varies to a large extent related to the time of excavation, the complexity of the analytical approach and the reliability of geochronological frameworks. Overall, few detailed sedimentological studies are available. Also, some long stratigraphies of well known sites, such as El Pendo or Cueva Beneito, have recently been challenged. The review reflects the still limited knowledge on sediment properties of Iberian and Moroccan cave sites. The idiosyncratic nature of these deposits requires detailed sedimentological descriptions for understanding site formation processes, enable sound stratigraphic correlation and deduce palaeoclimatic information. These will strengthen the significance of cave and rockshelter fills as archives of climate and cultural change in the Western Mediterranean. Schmidt, I., M. Bradtmöller, M. Kehl, A. Pastoors, Y. Tafelmaier, B. Weninger, G.-Chr. Weniger (accepted): Rapid climate change and variability of settlement patterns in Iberia during the Late Pleistocene. - Quaternary International Linstädter, J., Eiwanger, J., Mikdad, A., G.-Chr. Weniger (submitted): Human occupation of Northwest Africa: A review of Middle Palaeolithic to Epipalaeolithic sites in Morocco. - Quaternary International

### **Sodmein Cave, Eastern Desert, Egypt – A key site for investigating Northeastern Africa as a possible modern human dispersal route out of Africa**

*Olaf Bubenzer (Heidelberg University), Philip Van Peer (Katholieke Universiteit Leuven), Mathias Ritter (University of Cologne), Karin Kindermann (University of Cologne), Alexandra Hilgers (University of Cologne)*

Understanding the movement of modern humans through and out of Africa from the centre of origin into Northeastern Africa and to Europe is a major research

issue in palaeo-sciences. It is thought that the habitat expansion, accompanied the interglacial period of OIS 5e, relaxed ecological constraints to such a degree that the movement of modern humans through the Eastern Desert of Egypt towards the Levant became feasible. Interdisciplinary geoarchaeological research as part of the German Collaborative Research Centre 806 'Our Way to Europe: Culture-Environment Interaction and Human Mobility in the Late Quaternary' ([www.sfb806.de](http://www.sfb806.de)) in the area of Sodmein Cave, situated in an isolated Tertiary limestone complex (Jebel Duwi) of the Egyptian Red Sea Mountains, around 30 km west of the seaport Quseir, provides the opportunity for the integration of the archaeological data and the geo-archives within a stratified context. Besides the extraordinary archaeological sequence of the cave, the research shows that the topography (e.g. wadis, basins) and the palaeo-environment (e.g. climate, vegetation) could have played an important role in the dispersal of modern humans out of Africa.

## SE 17-01 - Plants, play and place: Green Environments as a contribution to children's healthy development

*Chair: Silvia D. Schäffer, Christina R. Ergler*

### Observing children's play in Naturescape: Key findings relating to social and environmental interaction

*May Carter (PlaceScape)*

Research undertaken in 2010 by Centre for the Built Environment and Health (CBEH) at The University of Western Australia (UWA) for Kings Park Botanic Garden and Parks Authority (BGPA) explored child and parent perceptions and preferences relating to outdoor play environments. This research demonstrated strong support for play areas within the urban landscape that can reconnect children with nature and nature-based play and opportunities. Following this preliminary research, BGPA commissioned an observation study of the newly constructed nature-based play area (Rio Tinto Naturescape Kings Park). Over two days during spring 2011, the behaviour of 372 children (accompanied by adults in either family or school groups) was observed within six Naturescape activity areas. Quantitative and qualitative data was collected by a team of trained observers using a data collection instrument developed specifically for this project. Particular attention was paid to: observation of the type and frequency of children's interaction with different activity elements within Naturescape; positive/negative environmental interaction by children; positive/negative social interaction between children; sizes of groups playing together; and adult involvement in play. In addition, children, parents and teachers were surveyed to gauge children's perspectives of specific activity areas; adult overall perspectives of Naturescape; and identification of potential safety issues by parents and teachers. Data collected was used to develop strategies to maximize play and educational opportunities within Naturescape. Several areas of beneficial experience for children visiting Naturescape were identified and include: enabling contact and experience with nature and fostering future environmental care; providing opportunity for creative, imaginative, non-adult directed play and for interactive play, team building and cooperation; developing problem solving skills; promoting physically active play; and complimenting child development and learning outcomes. These findings resonate within current literature suggesting that nature-based activities for children can have beneficial effects on children's personality development, cognitive functioning, attitude and school behaviour. Playing in natural

environments can assist with building children's motor skills and play in natural settings is associated with increased intensity of physical activity. Our research findings provide some unique observational data not previously captured in published studies. This presentation will provide an overview of the research methods used and discuss key findings, particularly those relating to social and environmental interactions. Authors Dr Karen Martin, Assoc. Professor Lisa Wood, Jacqueline Samson, Centre for Built and Environment and Health, The University of Western Australia Dr May Carter, Executive Director, PlaceScape

### Urban children's perception and experiences of nature in their neighbourhoods: A case study from 'clean and green' New Zealand.

*Robin Kearns (The University of Auckland)*

While New Zealand projects a 'green and clean' image internationally and its citizens regard themselves as outdoor people, there is limited knowledge of its children's environmental awareness. Recent urban intensification and declining parental license to explore local environments independently has potentially reduced children's knowledge of the natural environment. We consider how children (8-10 years) resident in inner city apartments and suburban housing in Auckland (population 1.4 million) conceptualize nature in research that used child-led neighbourhood walks. While urban compaction is deemed more sustainable, we found that apartment-dwellers were divorced from knowledge of, and activity in, natural settings. We reflect on the impacts of this 'retreat from nature' and argue that, in order to exact positive change, policies should not only focus on the maintenance of healthy environments but also enable children to rediscover 'the local' through promoting the therapeutic effects of engagement with the 'natural' world for benefiting a healthy development in times of obesity and associated health risks.

### School gardening, a safe alternative for outdoor play and access to the natural environment? A critical review.

*Liz Trenchard (Coventry University), Moya Kneafsey (Coventry University), Michelle Newman (Coventry University), Gemma Sutton, Elizabeth Cheese (Coventry University)*

There is a common sense view that contact with the natural environment improves children's general health and emotional well-being and may also improve academic attainment. Despite this common sense view, children in the developed world today have restricted opportunities for outdoor play and



interaction with the natural environment. Children now lead more sedentary lives compared to previous generations, and this lack of physical activity is thought to be one of the reasons for the increase in childhood obesity and other diseases. The barriers to outdoor play may be physical, a lack of green space in urban environments, or busy traffic which makes play unsafe. But equally a child's ability to roam freely may be restricted by their parent's concerns about their children's safety, fears of predatory strangers who may lurk in playgrounds or unsupervised green spaces such as woods and the urban fringe or exposure to the 'harmful' rays of the sun. In the UK there has been a recent rapid growth in the number of schools undertaking gardening and food growing activities. Initially, the focus of these initiatives was mainly on healthy eating. Nevertheless, if children have restricted access to green space, could school gardening programmes provide alternative opportunities for outdoor learning and safe supervised outdoor play? The main aim of this paper will be to produce a critical review of the literature available, to determine if there is evidence that school gardening programmes have a positive impact on children's health and well being and understanding of the natural world. The review also aims to determine if there are barriers to implementation, or opportunities for increasing participation and does the evidence confirm the commonsense view that contact with the outdoors 'natural' environment improves emotional well-being, general health and academic attainment for many children. Whilst locating our review within the context of international interest in improving children's access to green spaces through schools, our paper will take the United Kingdom as a case study and focus on the recent policy and initiatives which aim to encourage school growing. The paper will also highlight the challenges involved in 'measuring' the impacts of school growing programmes. These include uncertainty as to how to assess impacts quantitatively, difficulties in comparing qualitative data in a meaningful manner, and challenges in comparing analyses from the many different disciplines which have contributed to knowledge in this area so far. Initial research suggests that children are very rarely included as stakeholders when the success of such programmes is evaluated, the paper will also investigate ways in which this can be addressed.



## SE 18-01 - Protected areas and tourism planning – preparing for global challenges 1

*Chair: Susanne Becken, Hubert Job*

### Use of spatially explicit annealing techniques for ecotourism planning- a case study from Manas Tiger Reserve and World Heritage Site, India.

*Sonali Ghosh (Aberystwyth University), Richard Lucas (Aberystwyth University)*

In this paper we discuss the application of Marxan a decision support tool for conservation zoning in Manas Tiger Reserve, India. Manas is a UNESCO designated world heritage site and is well known for its outstanding natural beauty and rich biodiversity. The site has however, witnessed major upheavals including significant destruction of ecosystem properties in the mid 1990s that was mainly attributed to armed conflict and civic unrest that led to general disruption of law and order. The protected area (PA) has since been revived and is currently on a path to recovery with some proactive conservation measures such as reintroduction of locally extinct wildlife species; rebuilding of infrastructure and public support by promoting community-based ecotourism and livelihood activities. At present there are more than thirteen local ecotourism centres that assist the PA authorities in protecting the buffer. These ecotourism centres are usually run and managed by trained local youth and surrendered poachers who are also expert wildlife trackers. The key tourist attractions include wildlife viewing of rare and endangered species such as the Golden langur, Bengal florican along with Rhino, Tiger and Elephants. We used Marxan with Zones (V1.0.1) to analyse whether the eco-tourism centres had adequately represented the area and biodiversity values of the PA. Marxan uses spatially explicit annealing techniques to allocate planning units to multiple configurations such as tourism and core zones. The purpose is to assign each planning unit in the PA to a particular zone in order to meet a number of ecological, social and economic objectives at a minimum total cost. The resultant maps depict the gaps and potential of augmenting the tourism network and suggests suitable areas for wildlife management planning including the designation of multiple use areas in the buffer region. Preliminary results indicate the need for including local communities along the western periphery of the National Park into the tourism and multiple use areas. The techniques developed here demonstrate the need to include computer automated spatial zoning techniques into existing PA

management plans and ecotourism planning in India. Key words: Marxan, community based Eco-Tourism, Manas,

### Vulnerability of Nature Based Tourism to Climate Change: Grassroots Perspectives from the Nepal Himalaya Protected Area, the Annapurna Conservation Area

*Anu Kumari Lama (Lincoln University)*

Nature based tourism is a major incentive for nature conservation and the contributor to the local economy of Nepal Himalayas' most popular protected area - the Annapurna Conservation Area (ACA). In recent years, the global environmental changes pose significant challenges for the nature based tourism system (NBTS) with the potential to negatively impact its key resources (natural, human and tourism) and the livelihood of the people residing in the mountain regions of the ACA. This paper provides the first 'on-the-ground' perspectives on the vulnerability of the NBTS of the lower Mustang region of the ACA, which is experiencing a phenomenal phase of social change driven by multiple stressors of the global environmental change. The dynamics of changes brought about by these stressors and especially climate change are important vulnerability contexts for the tourism stakeholders of this region. Using a case study approach and a mix of qualitative methods, the paper portrays the stakeholders' perceptions on their understanding of climate change, its impacts on the NBTS and their capacity to respond to such impacts. The paper also presents an approach to assess the vulnerability by applying the vulnerability assessment framework model tailored to the characteristics of the NBTS and by framing the responses of the stakeholders into an impact pathways framework developed specifically for the region. The study found that the NBTS is exposed to both climate variability and change. From the impact pathways framework, climate variability is perceived to have affected all three key resource bases of the NBTS, indicating that more systemic change in the climate could pose significant threat to the sustainable development of tourism in the region. However, it was also evident that the context for stakeholders' vulnerability to climate change and their adaptive capacities are multidimensional as they are shaped by wider perceptions and knowledge of climate change. In turn, these perceptions are likely to influence the NBTS itself and its vulnerability to climate change. The paper finally provides briefing on the implication of the findings for sustainable NBT management in the lower Mustang region of the ACA.



### Natural landscapes appreciation: Outcomes for protected areas and tourism (comparison between Russia and Japan)

*Elena Petrova (Lomonosov Moscow State University), Yuri Mironov (Russian Academy of Sciences)*

Up-to-date urbanization, increasing in industrial, transport, and other man-made load as well as other challenges threaten natural landscapes at different levels; from local to global one. When revealing areas for special care and protection one should take into account not only objective appraisal of their natural peculiarities, significance, and usefulness but also their aesthetic originality, because it is very important to preserve beautiful landscapes for the next generations. At the same time, the beauty and attraction of a landscape play the most important role in choosing natural objects for tourism and recreational purposes too. The scenic beauty and high aesthetic value of a landscape is for example one of the key prerequisites for giving a National Park status. People belonging to different cultures differ by their landscape preferences due to a number of ethno-cultural, historical, social, and environmental factors. Thus, the 'outside view' of another culture representatives allows us to see unusual in usual, to assess originality and beauty of familiar landscapes, and to find out new aesthetic features. The purpose of this study is to find out new criteria for revealing of valuable natural objects for protected areas and tourism, using a cross-cultural analysis of landscape preferences in Russia and Japan, in two countries with deep-rooted traditions of landscape appreciation. The photo database of landscapes both similar and unique for Russia and Japan was created. The respondents in both countries are suggested to classify and group photo images of different landscapes according to their personal perception as well as to estimate the attractiveness and exoticism of given landscapes images. Using elementary and multi-dimensional statistics methods we revealed some common features of emotional and visual perception of landscapes, and the main points of differences between the Russian and Japanese cultures, as well as between groups of Russian respondents from different regions (Moscow, Siberia and Kamchatka). While grouping landscapes the most important feature appeared to be the presence/absence of water and type of water basin. Topography is also important for the Russians, while both visual and seasonal characteristics are significant for the Japanese. Russian and Japanese respondents generally agree in assessing the attractiveness of different landscape types, but evaluate their exoticism differently. It was revealed that for Russian respondents the most exotic landscapes are the most attractive, although we can't see such a tendency for Japanese respondents. Despite all

the differences, the most attractive for both Japanese and Russian respondents are mountains, mountain lakes and waterfalls. These landscapes are the most suitable for development of ecotourism. Ecotourism is the form of land use that can reconcile such conflicting goals as of nature conservation, tourism and regional development.

### National parks and tourism labor markets in Arctic Sweden

*Dieter Müller (Umeå University)*

Sometimes seen as location for residual capitalist activities only, peripheral areas in industrialized countries have particularly suffered from globalization and subsequent economic decline for a considerable time. In this context national parks have been considered a tool for regional development. Thus instead of focusing environmental protection only national parks are increasingly seen as potential tourism destinations. Growing employment in adjacent communities induced by tourism to national parks is the major expected economic impact. Recently this assumption has been challenged frequently. A growing number of national parks and other protected areas implies that national park status does not guarantee tourist arrivals. Moreover several studies indicate local resistance against further nature protection and thus further restrictions. This is particularly true for peripheral locations where alternate land uses include mining and forestry promising employment, in-migration and high income-levels. Consequently it can be argued that national parks in cases where they fail to deliver the expected economic impacts are contested and challenged. Hence, a successful tourism development becomes increasingly crucial for justifying nature protection not least in the eyes of the local community. Against this background the purpose of this paper is to analyze the geography of labor market change in the World Heritage Area Lapland, Sweden, containing several major national parks. This is facilitated by a dataset on labor market change in the area. Mainly descriptive statistical methods are used to analyze the patterns of change. The core objective is to assess the consequences of a turn towards tourism for employment and economic well-being in the destination communities. The paper departs from theories on restructuring and peripheral tourism development. Accordingly nature-based tourism at least theoretically offers alternatives for people who lost their employment owing to de-industrialization in the primary industries. The jobs that are an outcome of this process are however hardly suitable for substituting incomes from industrial jobs. Thus the tourism labor market seems to be isolated from other sectors of the labor market and hence attracts incoming labor mainly. Therefore the recent



interest in natural resources like biomass, oil and gas and mining products, redirects focus back to the primary industries. Thus tourism appears not to be an end in itself, but rather a way of hibernating economic decline in other sectors. To accomplish wider reaching economic impacts linkages to other economic sectors have to be established. Otherwise there certainly is a risk that national parks and other protected areas are threatened by competing land-use interests promising desired impacts that tourism fails to provide.

## SE 18-02 - Protected areas and tourism planning – preparing for global challenges 2

*Chair: Susanne Becken, Hubert Job*

### Tourism, sustainability and governance in National Parks – the case of the Peak District National Park, UK

*Nora Mehnen (University of Groningen), Ingo Mose (University Oldenburg), Dirk Strijker (University of Groningen)*

In the UK National Parks are major tourist and recreation destinations, but with increasing numbers of visitors, problems according to 'mass tourism' emerge. Recently initiatives of the national government (e.g. the Sustainable Development Fund of 2002) are promoting sustainable development in National Parks. Pilot initiatives will be given support to sustain biodiversity, adapt to climate change, consider demographic change etc. and thereby make National Parks 'models for sustainable development'. The purpose of this paper is to describe and evaluate the governance structures and the decisive role of networks, tourism partnerships and schemes in the light of the above challenges in a systematic way by the example of the Peak District National Park (Peak Park). The Peak Park is an outstanding example for National Park development in England, because it is the oldest park, and because it is one of the most popular National Parks in the country. Tourism is one of the main industries in the Park with more than 8 million visitors every year. Whilst the Peak Park has only 38,000 residents, it is surrounded by the cities of Sheffield, Manchester, Leeds and Nottingham and thereby easily accessible to more than 20 million people. Although tourism does make a significant contribution to the quality of life of local communities in the Park, the industry tends to offer part-time, low paid and seasonal work, and local people have little say in how tourism develops in their area. 85% of visits to the Peak Park are made by car. Traffic congestion has all kinds of negative external effects, for the residents and for the tourists. Other problems include footpath erosion, damage to wildlife habitats and farmland. Although most of the land is in private ownership, the National Park Authority is responsible for drawing up policies for planning and managing the National Park. It has developed different policies on recreation and sustainable tourism. These strategies and schemes are implemented in partnerships with the tourism industry, local authorities and other agencies to provide a 'high quality visitor experience'. The National Park Authority aims to resolve potential conflicts through good management, discussion and dialogue, with priority on

conservation. So, the Peak Park illustrates the development of a diverse system of governance structures which has major relevance for the design of future pathways in sustainability. Especially the role of networks in the National Park comprising public, private and civic actors is significant. We conclude that National Parks such as the Peak Park, presently facing major future challenges, provide a specific testbed to observe governance structures and their relevance for tourism planning. As experiences in the Peak Park advice, negotiation, dialogue and discussion for reaching agreements and consensus are crucial for the design of future pathways in sustainability.

### Economic value of National Parks as rationale for conservation? – The case of Bavarian Forest National Park, Germany

*Marius Mayer (Julius-Maximilians-Universität Würzburg)*

German National Parks (GNPs) are under pressure from differing and conflicting policy goals and land use trends. As per the National Biodiversity Protection Strategy, until 2020, 2% of Germany has to be under strict protection. This requires the banning of traditional land uses in the existing parks to the greatest possible extend. Similarly, two radical government decisions, such as stopping the use of nuclear power in 2011, and promotion of renewable energy (to fulfill the Kyoto Protocol commitment) are leading to higher wood prices. As most GNPs consist of forests, there is a considerable demand to continue traditional land use practices. In addition to this, the ongoing financial crisis and the resulting budget cuts means that the willingness of decision makers to allocate money for conservation, specifically in compensating the opportunity costs of traditional land use in national parks, may be limited. These backgrounds set the need for conducting economic valuation of National Parks so as to provide objective information, enabling policy makers to deal with these land use conflicts. Till date a complete cost-benefit-analysis of a German National Park does not exist. This study tries to close this research gap through a case study from the oldest and most well-known protected area of Germany. The research aims at clarifying some specific fundamental questions such as: (1) Is the designation of National Parks economically justified? (2) Can revenue from park tourism compensate for the termination of forestry in protected areas? (3) Which stakeholders profit from national parks and who bears their costs and at which geographical scales? The analysis was carried out using the value-added analysis, travel-cost model and contingent valuation, economic impacts of park tourism, its recreational value and visitors' willingness to pay were measured. The productive use value of the park in terms of timber sales and the direct

costs of park were obtained from the Park Administration and the Ministry of Finance. The opportunity costs of forestry use and wood processing industries and indirect costs of the park were modeled, the former, using the actual market-price based data of the park, commercial and state forestry units as well as sawmills, and the latter, with the help of GIS applications and the results of an opportunity cost analysis. Results suggest that National Parks cannot be seen as economically unfavorable land use options in any case. At a national level, half of the scenarios show a positive cost-benefit-ratio (CBR) for the Bavarian Forest National Park whereas half show a negative CBR. This variation stems from differing assumptions and methodological rigidity. At the regional scale, the National Park can be definitely regarded as a tool for economic development because it generates net monetary gains for the surrounding counties.

#### **Tourist town on the edge: Marginality and resilience at Franz Josef Glacier, Westland National Park, New Zealand**

*Stephen Espiner (Lincoln University), Susanne Becken (Lincoln University and Griffith University)*

Protected Areas (PAs) serve multiple functions and provide a useful focus for regional development. Significant relationships exist between protected areas, neighbouring communities, tourism interests and land management agencies, creating complex alliances which sustain the whole. The social-ecological system that includes the network of relationships around PAs is also subject to multiple internal and external factors, some of which threaten the integrity of PAs and the futures of communities that rely on them. For some PAs, geographic isolation and particular environmental conditions contribute to their marginality as destinations - potentially compromising community lifestyle, business profitability and visitor safety. In destinations such as these, emergent global climate trends and predicted energy crises may be the difference between survival and collapse. Situated adjacent Westland National Park, on a narrow strip of land between the Tasman Sea and New Zealand's Southern Alps, the tourist town of Franz Josef is 'on the edge' in many respects. A tectonic plate boundary runs down the main street and major rivers carve out the boundaries of the town. There is a single road running north to south, and no rail or sea access. The town is almost completely dependent on tourism and especially reliant on nearby Franz Josef Glacier as a tourist attraction. Issues associated with geographic isolation are compounded by major threat of flooding and earthquake, sensitivity to fluctuating fuel prices, and climate change scenarios which imply that the region's glaciers that have lured visitors for well over a

century may be melting into the background. In partial response to the latter, tourism stakeholders have attempted to diversify the town's attractions, ironically developing a new focus on the world's rarest kiwi - itself perhaps irredeemably threatened. Drawing on a series of interviews with tourism stakeholders, this paper explores dimensions of Franz Josef's marginality as a tourism destination, and seeks evidence of the community's resilience to current and future conditions. Early analysis suggests a high level of inherent adaptive capacity, with a well-organised community focussed around a 'pioneer spirit', disaster management strategies and other initiatives to counteract vulnerability. The paper also considers the relationship between the concepts of marginality and resilience, and discusses the extent to which this destination is equipped to tolerate future social, economic or environmental perturbations such as predicted changes in climate and increases in fuel costs; and what adaptations might be possible to sustain Franz Josef in coming decades. The paper concludes by contemplating the future of remote protected area tourism destinations in the context of rapidly changing social, economic and environmental conditions.

#### **Assessing the Tourism Potential of the Lake Bosomtwe Basin of Ghana**

*Emmanuel Mensah (University of Cape Coast), James Kweku Eshun (University of Cape Coast)*

In rural areas with declining agrarian economies, tourism provides diverse opportunities for rural dwellers to empower themselves and improve their well-being through the acquisition of jobs, income and information gained through the inflow of tourist and the development of rural resources to support tourism. In such rural areas, it is important that the potential for tourism be assessed by examining the interactions between recreational resources preferences of visitors and the supply of rural resources which can be used to support tourism development. It is also important to seek the views of rural dwellers in order to gain a holistic view of the potential within a destination. This paper examines the tourism potential within rural lake side communities administered by the Bosomtwe-Atwima-Kwanwoma District Assembly of Ghana. An inventory of tourism and recreational resources was conducted using Geographic Information systems (GIS) and Remote sensing (RS). This was followed by a survey of visitors to the lake side and focused group discussions with residents of six communities around the lake. The study found out that, the population of visitors to the lake side was composed of a large segment of young domestic



visitors. A smaller percentage of middle aged local and foreign visitors both male and female were also present at the destination. Terrain based activities such as viewing the scenery and relaxing on the water front, took precedence over other activities such as swimming and the enjoyment of cultural displays. Factor analysis of visitor preferences indicated a four factor solution in visitor recreational resources preferences. Groups of resources which correlated with the identified factors at eigen values of 0.45 and above were: facilities and services, natural resources, cultural resources and accessibility. Existing and potential recreational resources were found to be accessible, nature based and consisting of a series of swimming, boat landing and open recreational areas. Viewshed analysis of communities showed that Abono, the main tourist town had a better viewshed than all other lake side communities in the district. Residents of sampled communities, perceived a linkage between tourism development and the well-being of their communities. Community support for tourism did not differ with distance from the main tourist town. Based on the profile of visitors to the lake side and the distribution and accessibility of rural nature based resources as well as community support for tourism, it was concluded that, the potential for community based nature tourism exists within lake side communities of the Bosumtwi-Atwima-Kwanwoma District.

## SE 19-01 - Senses of identity and belonging in coastal regions in transition

*Chair: Beate Ratter, Tialda Haartsen*

### Watchman or Retreat? Local Meanings of the Dutch Wadden Sea Dike

*Tialda Haartsen (University of Groningen), Henry Bos (Groningen University)*

Future growth and development of rural regions is increasingly dependent upon the 'amenity' of their local physical, social and economic environments. In most coastal regions, this amenity follows a gradient from high to low according to distance from the coast. In the north of the Netherlands, this is the other way around. The Dutch Wadden Sea coast is not generally perceived as attractive landscape. It is commonly known that this has to do with the construction of a high dike at Dutch Delta height, which created a barrier between the sea and the land. Access to the dike and to the coastal zone is very limited, and the dike-landscape hardly has any variation. Before the dikes were built, the relationship of the north-Netherlands people with the sea was much more natural and self-evident. In the (near) future, it will become necessary to adapt the Delta dike to global sea level rise. It may be possible to improve the accessibility and attractiveness of the north-Netherlands coastal landscape in the same movement. In order to be able to connect to potential local wishes considering landscape improvement, knowledge of the local meanings of the Dutch Wadden Sea dike is necessary. Which role does this dike play in the everyday life of inhabitants of local coastal villages? What defines the perceived qualities of the dike, and what could be added to improve these? This paper intends to answer these questions by using survey data (N=200) from four coastal villages in the province of Groningen, The Netherlands.

### Wadden Sea Survey – The Dutch View. A comparison of peoples perception in the Northern parts of Germany and the Netherlands.

*Katharina Philipp (Helmholtz-Zentrum Geesthacht)*

What role play social and physical coastal landscapes in the ways the inhabitants identify with their region? In how far does peoples view on their surrounding influence the perception of renewable energy installations? Are they conscious of climate change and its impacts? And what does this mean to their personal life? In order to get insight into these topics, there is a necessity to

analyse the perception of the coastal population and ask people: -> Where do they come from and what do they associate with the region they live in? -> What are their perceptions of the sea and the coastal landscape? -> How do local residents see nature? -> What are their opinions on offshore wind farming and the believed impacts of offshore wind farming? Former surveys among the inhabitants of German North Sea coast revealed in a great enthusiasm for and attachment to Northern Germany coastal areas. Interviewees perceived their region as unique. They were proud of their home county and wanted to preserve it. Connotations of the sea ('seascape') such as wilderness and freedom and values assigned to offshore wind farming turned out to compete in terms of acceptance or rejection of offshore wind farming. There was considerable emotional attachment to these values. The German North Sea coast is part of the Wadden Sea, which embraces also Dutch and Danish sections. This offers the opportunity to investigate the question 'What is more formative: space and nature or nationality and the respective history of a people'? In comparing surveys around the southern North Sea we want to find out whether people feel in a similar way or whether there are differences. And, if the latter was the case, what are the differences and how could they be interpreted? In 2011, a survey on landscape perception and sense of place in coastal communities was conducted in the Dutch Wadden Sea area. Results from this survey will be presented and potential differences in perception between Germany and The Netherlands will be outlined and discussed.

### Participatory evaluation of landscape perception and regional identity in German coastal regions

*Elke Wegener (University of Greifswald), Anne Cristina de la Vega-Leinert (University of Greifswald), Susanne Stoll-Kleemann (University of Greifswald)*

Sea level rise and higher frequencies of extreme weather events as a consequence of climate change will lead to severe impacts on Germany's coastal zones. The BMBF-project "Sustainable Land Management - Trade-Offs in Ecosystem Services" (COMTESS) addresses the question of necessary adaptation of future land use strategies. Damages caused by extreme weather events indicate that current land use management strategies are partly inappropriate and need to be adapted. However, the change of current land use induces modifications of the landscape; thus cultural ecosystem services, such as landscape aesthetics, are affected. The study focuses on the question how changes in land use influence people's landscape perception and thus their sense of regional identity and place. To approach this complex process three

land use scenarios are evaluated. Scenario one focuses on the maintenance of current coastal protection and land use strategies. Scenario two focuses on the change of land use by concentrating on flood tolerant vegetation in order to prepare farmers for changing climate conditions. In scenario three the dike lines are partly removed to retain low land areas free of land use for renaturation and further for carbon sequestration. Two case study areas in Germany were selected: the Baltic Sea region (the peninsular Fischland-Darß-Zingst, Mecklenburg-Vorpommern) and the North Sea region (the north west of the county Aurich, Niedersachsen). In order to appraise local people's perspectives and to acquire a broad spectrum of research data a participatory approach was applied. People's perceptions about different potential future land uses are evaluated based on photographs taken in the study areas. These show single landscape elements which are presented to selected audiences in World Café meetings as a set of ten pictures for each of the three land use scenarios. Participants are given the opportunity to make statements on the particular appearances of the landscape and whether they feel comfortable with such scenery. Further, the participants are invited to compose their preferred future landscape scenario. The underlying hypothesis is that the participants compose their future land use scenario based on one's own perception and affiliation to landscape and nature. For example, it is assumed that regional farmers have a high interest in retaining the existing coastal dike line and land use strategies, as they directly profit from coastal protection measures in terms of their livelihoods. Land loss, however, does not only lead to a loss of livelihoods but possibly to the loss of regional identity and belonging. Therefore it is assumed that for different stakeholder groups various factors can be identified that influence the landscape perception and thus the sense of regional identity. The consideration of such factors supports decision makers to integrate adaptation strategies into future land use planning.

### **The German North Sea Coast as a Place of Identity/"Heimat"**

*Daniela Siedschlag (Helmholtz-Zentrum Geesthacht)*

The German North Sea coast is a unique natural landscape which is affected by falling and rising tide, maritime climate and continuous storm surges. It is also an inimitable cultural landscape - enclosures for land reclamation reflect people's struggle against the sea in the past and today. And of course the German North Sea coast is also a place of social interactions. The paper deals with the following research question: - What role do the natural landscape, the cultural landscape and the social interactions play in how people - living on the German

North Sea coast - identify with their region? Or in other words: - What does 'Heimat' mean to the people living on the German North Sea coast? The research is embedded in the theoretical concept of 'Heimat'. In this context 'Heimat' is determined by spatial components (natural landscapes, natural phenomena, special places ...), social components (family, friends, ...) and emotional components (language, intimacy, traditions, ...) (Schwineköper 2005). The empirical case study is a quantitative household-based survey on the island Pellworm (500 households) and the North Friesland mainland (200 households) (Germany) and additional qualitative in-depth interviews. First results of the ongoing research will be presented. These show that the people are bound to this region and feel connected to the sea in their everyday lives.

## SE 20-01 - Soil erosion and terrestrial carbon cycling

*Chair: Verena Dlugoss, Nikolaus J. Kuhn*

### The magnitude of agricultural erosion and its impact on the global terrestrial C cycle

*Sebastian Doetterl (UCL), Kristof Van Oost (UCL - TECLIM), Johan Six (UC Davis - Department of Plant Sciences)*

The effects of erosion resulting from agricultural land use on the soil-atmosphere carbon exchange have recently received growing attention. Large scale assessments are needed to understand its global significance, but reliable global scale data on the extent and rates of soil erosion are scarce and large uncertainties remain. The main objective of this study was to test the assumptions underlying existing assessments and to reduce the uncertainty associated with global estimates of agricultural soil and SOC erosion using a hybrid approach: We used the extensive plot based USDA National Resources Inventory [NRI] to identify the key controls on accelerated erosion at the continental scale for crop- and agriculturally used grassland. We then parameterized a simplified erosion model driven by coarse global databases and calibrated using the empirical NRI database. The agreement between our model results and empirical estimates indicates that the approach presented here captures the essence of agricultural erosion at the scales of continents, and that it may be used to predict the significance of erosion for the global carbon cycle. However, the validation of our estimates using several independent assessments of soil water erosion outside the data cloud of our model calibration (Non-US crop- and grassland) and the results of a sensitivity analysis reveal an uncertainty of 30-70% on the total estimates. This means that even though our model can predict spatial patterns of erosion well, there is still considerable uncertainty in areas of specialized land use systems and/or extreme environmental conditions, mainly due to the lack of model testing in (sub-)tropical regions. We obtained a global soil erosion rate of 10.5 Mg ha<sup>-1</sup> y<sup>-1</sup> for cropland and 1.7 Mg ha<sup>-1</sup> y<sup>-1</sup> for pastures. This corresponds to SOC erosion rates of 193 kg C ha<sup>-1</sup> y<sup>-1</sup> for cropland and 40.4 kg C ha<sup>-1</sup> y<sup>-1</sup> for eroding pastures and results in a global flux of 20.5 (±10.3) Pg y<sup>-1</sup> of soil and 403.5 (±201.8) Tg C y<sup>-1</sup>. Our estimates are significantly lower than former assessments based on the extrapolation of plot experiments or the global application of erosion models. Our approach has the potential to quantify the rate and spatial signature of the erosion-induced disturbance on the C cycle at continental and global scales. Linking our model

with a global soil profile database, we estimated soil profile modifications induced by agriculture. This showed that erosion-induced changes in topsoil SOC content are significant at a global scale (an average SOC loss of 22% in 50 years) and that agricultural soils are highly dynamic systems influencing the spatial distribution of C in the landscape. Therefore it is crucial that future C models can integrate lateral soil fluxes as an important modifier when assessing the vertical C exchange.

### Topographic variability influences the carbon sequestration potential of arable soils

*Ngonidzashe Chirinda (Aarhus University), Lars Elsgaard (Aarhus University), Ingrid K. Thomsen, Mette Lægdsmand (Aarhus University), Goswin Heckrath (Aarhus University), Bjørn M. Petersen (Aarhus University), Jørgen E. Olesen (Aarhus University)*

There is presently limited knowledge on the influence of field spatial variability on the carbon (C) sink-source relationships in arable landscapes. This is accompanied by the fact that our understanding of soil profile C dynamics is also limited. This study aimed at investigating how spatial variability along a short catena influences C sink-source relationships and temporal dynamics of CO<sub>2</sub> concentrations in soils. In spring 2011, soil samples were collected from topsoil (2-5.5 cm) and subsoil (38-41.5 cm) horizons at upslope and footslope positions in a Danish winter wheat field on a sandy loam soil developed on glacial till. Bulk densities and C concentrations of the soils were characterized. From June 2011, gas samples were collected at least bimonthly from the same slope positions in four spatial replicates using stainless steel needles that were permanently installed at 5, 10, 20 and 30 cm soil depths. Concurrently, gas was sampled from 40, 50, and 80 cm depths using steel rods connected to a sampling port. Concentrations of CO<sub>2</sub> in the gas samples were analyzed by gas chromatography. The results show that at the upslope position, soils from the topsoil horizon clearly had higher C pools (5.2 Mg C ha<sup>-1</sup>) compared to those from the subsoil horizon (1.0 Mg C ha<sup>-1</sup>). At the footslope position, however, C pools in topsoil (6.9 Mg C ha<sup>-1</sup>) and subsoil (7.0 Mg C ha<sup>-1</sup>) horizons were similar but higher than those at the upslope position. The gas monitoring study is still ongoing, but preliminary results show that CO<sub>2</sub> concentrations generally increased with depth. At the upslope position, CO<sub>2</sub> concentrations ranged between 800 and 24000 ppm and were generally lower than the concentrations observed at the footslope position (3000-42000 ppm) for similar soil depths. The upslope position has been subject to soil erosion while the footslope position



has been a depositional site; thus the subsoil at the footslope position was to a large extent a buried topsoil horizon. The topographic relationship between the upslope and footslope position made the latter a sink for soil C transported through processes such as tillage erosion. This led to the presence of higher C pools and CO<sub>2</sub> concentrations at the footslope compared to the upslope position. Despite the fact that higher CO<sub>2</sub> concentrations with depth may be influenced by the relationship between CO<sub>2</sub> production and transport, our results indicated that variability across arable landscapes makes footslope soils both a larger sink of buried soil C and a bigger potential CO<sub>2</sub> source than upslope soils.

### **Fire impacts on landscape dynamics in Cyprus – Is black carbon qualified for tracing soil erosion?**

*Jens Brauneck (Universität Würzburg), Manfred Lange (Energy, Environment and Water Research Center, Cyprus Institute)*

A series of both natural and anthropogenic factors has led to severe land degradation on Cyprus in the past. In the forested areas of the Troodos mountain range, wildfires and post fire erosion exacerbate this situation by reducing the groundwater recharge rate of the aquifers located in this region. Additional exploitation of these resources for agricultural irrigation permanently lowers the water table. This leads to contaminations by saltwater intrusions into the coastal aquifers that affect the population of Cyprus in terms of extreme water shortage during the summer months. Due to the high amount of orographic precipitation, more than 100 dams and reservoirs were constructed in the foothills of the Troodos to maintain the islands water supply. The overall objective of this project is to investigate functional relationships between erosion processes and fire sites in the mountainous regions of southern Cyprus. A combined approach of terrain mapping and chemical characterization of black carbon will permit the classification of hazardous locations in terms of potential fires and erosion processes. Additional data will be provided by surveys of the APAESO project (Autonomous Flying Platforms for Atmospheric and Earth Surface Observations), conducted by members of the Cyprus Institute. There, UAS are used to generate high-resolution multispectral remote sensing data. The emphasis of the upcoming survey is concentrated on the investigation of exemplary catchments that are connected to one of the numerous valley dammed reservoirs. There, the use of macroscopic black carbon as an erosion indicator will be examined to enable a reconstruction of historic process dynamics and local fires. For this purpose, NMR (nuclear magnetic resonance)

spectral analysis of primary and secondary charcoal is used to draw conclusions on the fire conditions and to eventually trace the paths of eroded material inside the watershed. The results of this study may be used to improve water and sediment flow modeling for the eastern Mediterranean, for decision support and to develop further recommendations for action in terms of fire and erosion protection.

### **Model based analysis of soil carbon fluxes induced by soil redistribution processes**

*Verena Dlugoss (University of Cologne), Kristof Van Oost (UCL - TECLIM), Karl Schneider (University of Cologne)*

Soil redistribution on arable land significantly affects lateral and vertical soil carbon (C) fluxes caused by C formation and mineralization and soil organic carbon (SOC) stocks. Whether this serves as a C sink or source to the atmosphere is a controversial issue. In this study, the SPEROS-C model was modified to analyse erosion induced lateral and vertical soil C fluxes and their effects upon SOC stocks in a small agricultural catchment (4.2 ha). The model was applied for the period between 1950 and 2007 covering 30 years of conventional tillage (1950–1979) followed by 28 years of conservation tillage (1980–2007). In general, modelled and measured SOC stocks are in good agreement for three observed soil layers. The overall balance (1950–2007) of erosion induced lateral and vertical C fluxes results in a C loss of 4.4 g C m<sup>-2</sup> a<sup>-1</sup> at our test site. Land management has a significant impact on the erosion induced C fluxes, leading to a predominance of lateral C export under conventional and of vertical C exchange between soil and atmosphere under conservation agriculture. Overall, the application of the soil conservation practices, with enhanced C inputs by cover crops and decreased erosion, significantly reduced the modelled erosion induced C loss of the test site. Increasing C inputs alone, without a reduction of erosion rates, did not result in a reduction of erosion induced C losses. Moreover, our results show that the potential erosion induced C loss is very sensitive to the representation of erosion rates (long-term steady state versus event driven). A first estimate suggests that C losses are very sensitive to magnitude and frequency of erosion events. If long-term averages are dominated by large magnitude events, modelled erosion induced C losses in the catchment were significantly reduced.

## SE 21-01 - Sustaining ecosystem services in cultural landscapes: Analysis and management options 1

*Chair: Tobias Plieninger, Dan van der Horst*

### A framework for landscape services tested in urban open spaces. A comparative study in Ghent (Belgium) and Valencia (Spain).

*Maria Vallés (Universidad Politécnica de Valencia), Francisco Galiana (Universidad Politécnica de Valencia), Floris Moerdijk (Ghent University), Veerle Van Eetvelde (Ghent University)*

The ecosystem services approach has proved to be successful to measure the contributions of nature and greenery to human well-being. But not only ecosystems have an effect on the quality of life, also place or landscape, as a broader concept, can be responsible of providing people with a sense of well-being. Landscape is about the relationship between people and place, which also includes the built environment. The concept of landscape services, as compared with ecosystem services, involves the consideration of the spatial pattern resulting from both natural and human processes in the provision of benefits for human-well being. The focus on landscape, as defined in European Landscape Convention, also implies a balance between its material and immaterial dimension, and the consideration of people's perceptions of landscapes and its services. The aim of this paper is to propose a framework for the classification of landscape services and to test its suitability in urban open spaces at the local scale (case studies in two cities). The presented framework is built on the Common International Classification of Ecosystem Services (CICES) and existing literature on ecosystem services, landscape sustainability, social landscape value and quality of life. Three themes of landscape services are defined, each divided into several groups: provisioning, regulation and maintenance, cultural and social life fulfillment; the latter focusing on health, enjoyment, personal and social fulfillment. For the case, four types of green areas and public spaces are analyzed in two European cities: Ghent (Belgium) and Valencia (Spain): peri-urban parks, local parks in a living area, multifunctional city parks, special public places (station, university campus). The landscape services of the areas are mapped in both cities, combining expert knowledge and user's perceptions of landscape services. To collect the user's perceptions, enquiries were held in the parks. Results highlight the need of different knowledge - expert and stakeholder approach - for the identification of the different types of services, especially for the social and cultural services. The

adequateness of the typology of services proposed and the method applied in terms of difficulty for implementation, spatial representation and different source data integration are discussed.

### Adequate communication of appreciated ecosystem services can enhance the local support for cultural landscape protection

*Franziska Solbrig (University of Greifswald), Susanne Stoll-Kleemann (University of Greifswald)*

The protection of cultural landscapes is an important focus of UNESCO-biosphere reserves and consequently, many of the necessary protective measures are carried out close to human settlements. Therefore, managers of biosphere reserves need to integrate the local population in the management process. To achieve this, it is helpful to know which specific ecosystem services are appreciated among the local population. Based on such a characterisation of relevant ecosystem services, strategies to foster adaptive biosphere reserve management can be derived. Consequently, it is necessary to find answers to the following questions: Which ecosystem services - explicitly and implicitly - are perceived and appreciated among the local population? Do these ecosystem services reflect biosphere reserve aims and measures focusing on cultural landscape protection? And if so, can they contribute to communicate current biosphere reserve achievements as well as to foster future efforts? In a telephone survey conducted in autumn 2010, the inhabitants of four German UNESCO-biosphere reserves were asked to assess their particular region, landscape and biosphere reserve. In total, 1429 interviews could be analysed with the help of the computer program IBM SPSS Statistics. The 30 closed and 9 open survey questions did not explicitly ask to assess cultural landscapes and their services. Therefore, it is particularly remarkable that many of the appreciated aspects of both the region and its landscape actually represent a variety of ecological and cultural ecosystem services. Many of the identified cultural ecosystem services relate to different aspects of recreation, to the inhabitants' sense of place and identity as well as to cultural heritage values. Apparently, the local population appreciates several ecosystem services that often coincide with benefits from cultural landscapes preserved by UNESCO-biosphere reserves. Thanks to the personal relevance of ecosystem services (e.g. recreational values), the benefits of these services are self-evident to the people. This provides the management bodies with valuable arguments to promote cultural landscape protection. Those arguments can be more convincing than general claims for species protection, especially in cases of

non-charismatic ones. Although in the end the necessary conservation measures might be the same, people will be more ready to support them if they see a personal relevance. As a consequence, it must be discussed how the management bodies can properly communicate these benefits in order to raise the local support for cultural landscape protection. Since the ecosystem values and services were mentioned implicitly in the answers, the management bodies should try to use a language close to the expressions of the inhabitants. Here, surveys of this kind can provide valuable proposals and finally they can contribute to successful adaptive management of cultural landscapes.

### **Beyond Production: Multifunctionality in Australian agriculture**

*Robyn Bartel (University of New England), Elaine Barclay (University of New England)*

Productive land management in Australia has had a long history: from Aboriginal firing and production practices to modern industrial agriculture. The resultant landscape is a patchwork of intensive and less-intensive management, with so-called pristine ecosystems preserved in public reserves but also extensively on private land, usually agricultural land. The future productivity and sustainability of agriculture is dependent upon widespread adoption of sustainable production practices, but also multifunctional beyond-production practices. A nationwide survey of 5000 Australian farmers revealed that almost all farmers had implemented some type of sustainable management practice. The majority were deeply concerned about environmental degradation and recognized weeds, pest animals and water availability as their primary environmental concerns. Barriers identified to addressing these were a lack of time and money, and drought. Many were involved in Landcare or other informal groups concerned with natural resource management at the community level. More than half had preserved an area on their land just for its environmental benefits. Engagement in this beyond-production activity was based on landholders' subjective perceptions, namely place attachment and moral agreement with environmental laws furthering multifunctionality as well as the objective factors of community activity and experience of environmental problems. Subjective perceptions were more important than objective factors. Policy-makers are advised to support community initiatives, be cognisant of place attachment factors and provide financial assistance to hasten the adoption of beyond-production practices. These will not only assist in preserving ancient ecosystems but promote new agroecosystem management and conservation practices.

### **Perceptions, use, and management of biodiversity and ecosystem services in California's working landscapes**

*Tobias Plieninger (Berlin-Brandenburg Academy of Sciences and Humanities and Humboldt-Universität zu Berlin), Shasta Ferranto (University of California), Lynn Huntsinger (University of California)*

It has long been acknowledged that protected areas are too few, too isolated, too static, and not always safe from over-exploitation and therefore have to be linked with adjacent landscape units to increase the survival chances of plant and animal populations. Therefore, biodiversity conservation strategies need to be broadened to include private lands, but these remain widely understudied by conservation biology. Based on a California-wide survey of private forest and rangeland landowners conducted in 2008, we investigated whether landowners that are engaged in commercial livestock or timber production appreciate biodiversity and ecosystem services on their land in different ways than purely residential owners. Both specific uses and management practices and underlying attitudes and motivations towards biodiversity and ecosystem services were assessed. All landowners value intangible ecosystem services like natural beauty and way of life derived from owning forest and rangeland. More synergies than trade-offs among ecosystem services were expressed. In particular, correlation analysis showed one bundle of ecosystem goods and services (livestock, timber, crops, and housing) that are supported by some landowners at the community level. Another closely correlated bundle of ecosystem services includes recreation, hunting and fishing, wildlife habitats, and fire prevention. Perceived incompatibilities also became visible between some resource- and amenity-based uses of ecosystem services: Respondents that expressed demand for more livestock, timber or housing provision in their community do not support management for wildlife and more areas for recreation, and vice versa. Producers were more likely to ally with the first bundle and residential owners with the second. However, producers were much more active in management for habitat improvement and other environmental goals. With a diversity of uses and public benefits provided, California's forests and rangelands come close to the ideal of a working landscape. However, the viewpoints that landowners expressed in this survey reflect that tensions between natural resource extraction and conservation of intangible ecosystem services and biodiversity continue to be 'the overarching political and cultural struggle in much of the rural American West today' (Walker 2006), with competing visions for the future of rangelands and forests. Commercial livestock and timber producers show little preference for wildlife and other ecosystem



services beyond natural resources extraction, while residential landowners are supportive of conservation, but often do not provide the active work input that working landscapes require to be maintained or restored. This finding indicates that promotion of the idea of conserving multifunctional forests and rangelands and enhancing joint production of commodities and ecosystem services requires diverse strategies.

## SE 21-02 - Sustaining ecosystem services in cultural landscapes: Analysis and management options 2

*Chair: Tobias Plieninger, Dan van der Horst*

### Exploring the role of cultural ecosystem services for the preservation of terraced rice cultivation in the rural landscape of Ifugao, Philippines

*Vera Tekken (University of Greifswald), Susanne Stoll-Kleemann (University of Greifswald)*

The approach of Ecosystem Services is well suited to analyze the complex interlinkages and feedback processes of human-environment systems. In this context cultural ecosystem services often recede into the background, as due to their particularity they are less easily to analyze, generalize and applicable to other local contexts. So far, there is a lack of insights into social and nonmaterial functions of nature. However, cultural landscapes have been historically shaped by human activities under specific environmental conditions. Further, non-materialistic cultural ecosystem services such as religious rituals and cultural identity are key part of human well-being. Thus, next to ecological and economic drivers, socio-cultural drivers have an immense influence on ecosystem services of cultural landscapes. The uniqueness of cultural landscapes is reflected in the World Cultural and Natural Heritage list of the UNESCO. Adopted in this list are the traditional rice terraces in the Cordilleras (Northern Luzon) of the Philippines, the Ifugao Province, which are characterized by extensive subsistence rice cultivation over a period of approx. 2000 years. For the assessment of the role of cultural ecosystem services in the context of sustainable land management a participatory approach was chosen for the socio-cultural data collection. Next to semi-structured interviews on household level with regional farmers, participatory rural appraisal methods (i.a. focus group discussions) were applied to gain insights into traditional land management and socio-cultural drivers of change in the Ifugao Province. Historically, annual rice cultivation cycles have been synchronized to local environmental conditions as well as to social life cycles of the population. The conservation and the passing on to further generations of traditional agricultural cultivation techniques is an essential prerequisite for sustainable land management in the area. Recently, financial revenues from rice agriculture are almost exclusively insufficient to cover livelihood expenses for the local population. This leads to an emigration of labor force and a serious decrease of workers in the rice production, and thus to the abandonment and

degradation of the rice terraces. Cultural archives of traditional ancestral techniques of rice cultivation are getting lost, as well as the particular local identity. This loss of cultural values, and in particular of rice rituals has a negative influence on nutrient cycles and biodiversity, thus on provisioning and regulating ecosystem services. Results show that socio-cultural drivers of change currently outbalance other drivers, e.g. regional impacts of climate change. Further, findings point towards a substantial risk for the traditional rice production in the region due to the loss of traditional farming knowledge and a decrease of cultural identity, thus endangering the preservation of this unique cultural landscape.

### Promoting cultural embeddedness: Cultural and social capital generation in result-oriented agri-environmental schemes

*Rob Burton (Bygdeforskning), Gerald Schwarz (Johann Heinrich von Thünen-Institut)*

Despite over two decades of operation, action-oriented agri-environmental schemes (AESS) across Europe have broadly failed to induce the expected attitudinal or cultural change within farming communities. Recent research has suggested that the reason for this may be that, in failing to allow innovation in environmental provision, such schemes are unable to generate embodied cultural capital (skills and knowledge) which, in turn, restricts the development of social capital (networked access to shared group resources) based around environmental provision. By following an almost exclusively economic logic, conventional AES scheme design thus neglects the cultural value of agricultural landscapes and makes the cultural embedding of new environmental meanings difficult. In this paper we present a theoretical perspective on how result-oriented agri-environmental schemes may help resolve this issue. By allowing farmers to innovate, such schemes are likely to make the associated knowledge/skills developed economically valuable and, consequently, farmers who are knowledgeable/skilled in environmental provision valuable inclusions within social networks. Rather than simply rewarding prescribed behaviours with economic payment, the result-oriented approach may thus also reward culturally and socially and, critically, enable new behaviours and values to become embedded within cultural notions of 'good farming'. We contend that this should be an important consideration in result-oriented approaches and discuss some implications for scheme design.

### **Farmers management and their perceptions of trade-offs of ecosystem services and disservices from forest, trees and shrubs in an agricultural landscape in Southwestern Ethiopia**

*Tola Gemechu Ango (Stockholm University)*

In recent years, a growing number of studies have looked at agroecosystems and their contributions to biodiversity conservation. Despite this, there is a lack of a more detailed understanding of how farmer's decision processes and practices interact with local ecosystem functions. This study, which is part my PhD research, investigates small holder farmers' decision processes and practices with regard to trees and shrubs in agricultural land and in nearby forest and to what extent they target the management of these ecosystem components with respect to their associated ecosystem services and disservices. The research is underway in four purposively selected villages of Gera district in Southwestern Ethiopia. Most parts of the district have a long history of coffee based agricultural practices. Twenty households living in those villages were selected strategically. Empirical material has been collected through participatory field mapping, semi-structured interviews and focus group discussions. To understand farmer's knowledge regarding insects and their relation to agriculture, six different types of insects that include honeybee and ant were collected and used as interview material. The results of the study have showed that farmer's decisions and practices with regard to trees and shrubs in agricultural land and nearby forest are mainly based on the evaluations of the 'immediate' and observable pros and cons of the ecosystem components in relation to agriculture. Trees and shrubs were mostly retained in coffee fields, grazing lands and home gardens for shade and to meet households' wood demand for various purposes. In croplands, trees and shrubs were largely limited to field boundaries, and those retained inside arable fields were heavily pruned to reduce their impact on crops. On the other hand, most farmers have not recognized the link between the insects used as interview material and agricultural production. Whereas pest mammals such as baboons, bush pigs, giant forest hogs, monkeys and warthogs from nearby forest were reported as severe ecosystem disservices to agriculture. The types of pests and the severity of the damage they cause significantly diminish as one move away from forest edges. Pests have brought economic costs by damaging crops and requiring labor for protection and also led to more deforestation as early settlers have frequently welcomed migrants to settle at the forest edge. Hence, the study tentatively concludes that farmers' decisions and practices related to the studied ecosystem components are geared towards reducing their disservices to

enhance agricultural production. This may in the long-run reduce the availability of these ecosystem components and the services they supply. Further studies, however, are required to deepen our understanding on the use and management of ecosystem services and disservices from trees, shrubs and forests in agricultural landscapes.

### **It is not a paradox that shepherds and farmers do not work together: Power, trust and land degradation in two neighbouring areas of southern Crete**

*Thanasis Kizos (University of the Aegean), Theodoros Iosifides (University of the Aegean), Helen Briassoulis (University of the Aegean), Minas Metaksakis*

Many Mediterranean semi-arid, hilly and mountainous areas face Land Degradation and Desertification (LDD). The intensification of crop cultivation and grazing in the last decades has been considered as a major contributor to LDD. The island of Crete has supported diverse agricultural systems and large populations of grazing animals for many centuries. Many communities around the island have relied on mixed systems of cultivation and grazing for their livelihood. The resilience of many areas on the island has been recently challenged by the simultaneous intensification of crop cultivation and grazing and the separation between animal husbandry and crop cultivation. The neighbouring areas of the Messara plain, where a variety of crops were grown for many centuries, and the mountains of Asteroussia, where sheep husbandry has been the major livelihood option for centuries, constitute linked socio-ecological systems (SES), with transhumance from the mountains to the plain. In the last 30 years, the 'complementarity' of land management between the two areas has been ruptured and a gap has grown between the shepherds on the mountains and the olive and vine growers in the plain. Each area faces its own LDD problems: salinisation, water and soil pollution in the plain, overgrazing leading to soil erosion on the mountains. This paper examines contemporary responses to LDD along with the evolution of the two socio-ecological systems based on 20 in-depth qualitative interviews with local stakeholders - shepherds, farmers, representatives of local authorities, and environmental NGOs. Informed by the complex adaptive systems (CAS) paradigm, the paper shows how the multi-level interplay between environmental, social and institutional factors in the two neighbouring areas have generated a vicious circle of loss of socio-ecological resilience. The role of culture, power relations, social and institutional capital, state policies and market mechanisms in shaping contemporary responses to LDD are particularly highlighted. The discussion of the pathways of



the gradual loss of socio-ecological resilience in these areas resolves to a great extent the 'paradox' of non-cooperation - and, in many cases, open hostility - between farmers and shepherds along with the mutual avoidance of 'obvious solutions' to socio-economic and LDD problems.

## SE 22-01 - The social construction of cultural landscapes: New concepts of 'landscape' in social sciences, cultural studies and geography 1

*Chair: Winfried Schenk, Johannes Renes*

### Playing with Gadamer: Understanding landscape through conversation

*Karl Benediktsson (University of Iceland)*

What does the metaphor of 'conversation' (Benediktsson and Lund, 2010) bring to landscape studies? Suggestive of a dialogic relationship, it directs attention to the mutuality that is part and parcel of the human-landscape encounter: by being in landscape and moving through it, the human is affected by that landscape, and vice versa. Hence, studying landscapes becomes not only a matter of analysing the visual responses to their scenic characteristics, nor indeed of teasing out their social construction as in much recent landscape scholarship, but of exploring the reciprocal exchanges that take place between landscape and person. In this paper, the possibilities engendered by such a dialogic approach are explored further through an examination of two central concepts of Hans-Georg Gadamer. A key proponent of philosophical hermeneutics, Gadamer was concerned with elucidating the conditions by which understanding becomes possible. For this he introduced the concepts of 'horizon' (Horizont) and 'play' (Spiel), which, I argue, may be useful for landscape studies. In particular, the concept of play highlights an 'in-between' process that involves reciprocity and active participation by the players. It can be used to highlight the embodied and affective character of landscape encounters. Experiencing and understanding landscape involves a back-and-forth movement between the person and the landscape - a playful conversation to which both sides contribute.

### The social construction of landscapes: Insights from post-structuralism and historical institutionalism

*Ludger Gailing (Leibniz-Institute for Regional Development and Structural Planning), Markus Leibenath (Leibniz Institute of Ecological Urban and Regional Development)*

This paper highlights two specific ways of conceptualising the social construction of landscape, both of which have been developed at the interfaces of disciplines such as political science, sociology, history and philosophy: Post-structuralism and historical institutionalism. The first is closely related to thinkers such as Michel Foucault, Ernesto Laclau and - in the field of landscape studies - James Duncan. Post-structuralism emphasises discourses, the contingent nature of the social and the relations between language, society and the physical world. Historical institutionalism is linked to the works of Richard W. Scott, Douglass North and Renate Mayntz, to mention just a few. This strand of theory foregrounds the structuring effect of institutions, stability and change of institutions over time and the interplay between different types of institutions at various levels of policy-making. It has been adapted to landscape research by using the concept of path dependency. The aim is to briefly introduce both approaches and to compare them regarding their epistemological stances, the related key analytical terms, the ontologies of landscape which they imply, the question of how they conceive of the 'social construction of landscape' and finally the extent to which both approaches can be utilized to inform political processes. The comparison will be illustrated by findings from two research projects on the constitution of cultural landscapes. One project analysed the role of formal and informal institutions in local governance processes through which reified landscapes emerged as spaces for collective action. The other one focused on the production of landscape concepts in wind energy discourses at national and local levels in Germany and how these concepts were linked to political position in favour or opposed to wind power plants. Both projects were funded by the German Research foundation (DFG).

### Fragmentation and re-imagination – landscape and socio-economic change in East Pokot, Kenya

*Michael Bollig (University of Cologne), Clemens Greiner (University of Cologne)*

During the last decade the concept of complex coupled-social systems has served as an umbrella term to understand the complexity and the dynamics of human-environment interactions. However, usually such dynamics have been



analysed in a fragmented way. Institutions, resource-based strategies and policies and their repercussions on geo-biophysical dynamics were researched. In this way these approaches usually focussed on very specific and often isolated coupling processes. Local perceptions and conceptualisations of such dynamics were usually not taken into account. We suggest that a more holistic perspective on these coupling processes can help to understand them across different temporal and spatial scales. In this presentation, we assess if the concept of landscape can contribute to this end. In order to make our point clear we refer to a concrete social-ecological system: the semi-arid savannah and its inhabitants the pastoral Pokot. Based on data from two decades of ethnographic research on the pastoral Pokot and north-western Kenya, we will demonstrate, how human-induced processes become inscribed in landscapes, and how these landscapes provide blueprints for human action. The Pokot have been pastoral nomads until recently and they managed a non-fragmented pastoral landscape. This landscape had certain geo-biophysical characteristics (vegetation, soils), a specific livelihood system (pastoralism) and pastoral identities were inscribed into particular landscape features (holy mountains, initiation sites). Since about two decades, the growing importance of agriculture, increasing sedentarization, livelihood diversification, the implementation of wildlife conservation projects and the exploitation of geo-thermal power have led to major cultural and economic changes. The landscapes in East Pokot are increasingly characterized by processes of fragmentation of formerly communally used pastures. These dynamics are manifest at different scales: individual (farm level), communal (village territory) and societal (ethnic territory) and lead to a profound and highly conflictive re-structuring of Pokot society: individuation of property rights and elite formation, territorial re-configuration of communal access rights and inter-ethnic territorial conflicts with neighbouring groups. The result is a hardening of boundaries at different scales and a re-imagination of Pokot relations to the landscape they inhabit.

### **Themed Places and the Doubling of Landscape – a cultural approach**

*Jan-Erik Steinkrüger (Universität Bonn)*

This contribution would like to give an example of an interpretation of landscape from the perspective of the new cultural geography. Adapting ideas from Denis Cosgrove, James Duncan and Jeffrey Hopkins landscapes will be understood as a medium or as language. Themed places serve as an example, though some of the ideas presented might be transferable to other forms of landscape as well. Themed places, such as theme parks, themed restaurants and hotels,

zoological gardens etc., have become part of our everyday life. Even shopping malls or residential areas are becoming themed today. As Alan Bryman and Albrecht Steinecke point out, theming has become a strategy to create an atmosphere that increases the inclination to consume; it changes for example shopping into a shopping experience. Though many authors have addressed the (mostly economic) function of themed places in our society, only few such as David Kolb have taken a closer look at their mode of representation: they represent their theme as a landscape. In the case, that the theme is the representation of other times, places or spheres, we find a doubling of landscape: landscapes (as a medium) represent landscapes (as their content). This doubled character in themed places opens new questions on the relation of the presenting landscape and the represented landscape. Whereas the first can be explained through its social function, the second derives from culturally specific gazes on the world. How we represent landscapes in themed places tells us how we see the world. During my presentation I will argue, that the representations tell us what we see as different to our everyday life. This will be shown with several examples of themed places in theme parks, zoological gardens and shopping areas.

## SE 22-02 - The social construction of cultural landscapes: New concepts of 'landscape' in social sciences, cultural studies and geography 2

*Chair: Winfried Schenk, Johannes Renes*

### The public promenade as a structuring element of urban development and as an inducer of new ways of entertainment and sociability in Portuguese medium cities between 1840 and 1926

*Jorge Neves (CEG - Centro de Estudos Geográficos), Maria Alexandre Lousada (CEG - Centro de Estudos Geográficos)*

This communication aims to disseminate the results of an ongoing investigation into the cultural life in medium-sized cities of Portugal in the 2nd half of the nineteenth century and the 1st quarter of the twentieth century, comparing the spatial urban transformations occurring with data collected for this period on activities practices related to leisure and sociability. The strong expansion of facilities and cultural activities such as theater, musical performances, the press or the habit of leisurely family walks in public places, recorded, during the nineteenth century, in major European cities, were associated with urban models that spread, with different speeds and intensities, in smaller cities, according to dynamics resulting from various factors - in particular the views of elites with greater capacity for action and mobilization in the socio-cultural changes, the characteristics of local actors and options in morphological and functional terms, taken in the process of urban growth. The fashion of leisure in naturalized public spaces that the European bourgeois culture promoted during the first half of the nineteenth century, often associated with a charitable speech, gave birth to a movement to create boulevards, gardens and parks pooled benefits in terms of beautification, improving the urban environment and social life. The creation of lanes extended and improved by the presence of trees, was one of the recommended types, widespread, which is also widespread in many of the Portuguese under the name of "Passeio Público" (public promenade). Its realization associates the processes of urban growth with increases in the available time devoted to leisure practices and with the development of urban tourism. The present study focuses on three cities located in the center of the country, with different socio-economic dynamics, and compares the evolution and transformation of urban space, particularly the creation and revitalization of public spaces with recreational functions, especially the case of "Passeio

Público", with the results of data collection conducted to characterize cultural facilities and its location, related with the evolution of cultural life and the use of public space as a place of sociability (theater and other performances, accommodation, cafes, restaurants, a trade). The analysis of the first plans made in these cities and other documents that express the vision of the city of local decision makers, supplemented by consulting newspaper articles in local papers, show an "ideology" based on the defense of new urban forms and cultural practices being the "Passeio Público" a new kind of landscape particularly significant.

### Five dimensions of the social construction of landscape

*Ludger Gailing (Leibniz-Institute for Regional Development and Structural Planning)*

According to a positivist understanding, a landscape is a specific portion of the earth's surface. It is an objectively existing reality. Recent work in human geography and cultural studies has widened the perspective of landscape research: while the physical 'reality' of landscapes remains a point of reference, human agency, symbolic representations, and forms of cultural practice are acquiring importance. Thus, in this paper landscapes are to be understood as social constructions: landscapes are perceived as spatial entities, constituted in cultural processes. They are emerging from ontologisations and reifications. The paper proposes a systematisation of the complex process by which landscapes are socially constructed: the analytical construction by scientists: In this context 'landscape' is a sort of analytical tool for scientific approaches. 'Landscape' legitimises scientific approaches and programmes. the subjective construction: The subjective construction of landscape is the result of landscape perception by individuals. The landscape view is the mental ability to understand a plurality of visually observable phenomena in a certain portion of the earth's surface as a defined landscape. Landscape then, is a way of seeing. the material constitution: This aspect refers to natural structures as well as historical and actual land use structures. Landscape, in this sense, is a unique result of the intended and unintended interaction of human beings with their physical surroundings. The dimension of 'materiality' is often neglected in social sciences. the collective constitution: On the one hand, interpreting a landscape as collectively constituted can imply an interpretation of a landscape resulting from long-term processes. This focuses on the emergence of landscape representations or images. Such a collectively constituted landscape can form the regional basis of collective identities, of regional utopia, or of the heritage of a

bounded space. In a short- and middle-term perspective all these ontologisations can serve as a basis for collective political action. Thus, a landscape can be interpreted as a regional political space. the construction by the constructs 1.-4.: Making the social construction of landscapes a subject of research should not disguise the institutional effects of the existence of landscapes, once they are established as ontologisations or as regional political spaces. Social constructions of landscapes act, in turn, as second natures or symbolic environments and thus affect human agency in a perpetual and ongoing process. These interdependent aspects will be exemplified by discussing selected results drawn from case studies of landscape regions in Germany. The paper concludes with consequences for further geographical landscape research as well as for the management of landscapes.

### **Contested public space in Chinese context with case study of 798 factory in Beijing**

*Fei Che (CU office)*

Transformation and Rising of Chinese public space The research of the thesis is based on China's urban space revolution which has seen China's high-speed urbanization development and abundant civil class' coming into being. In the contemporary era, public spheres have been greatly disintegrated out of many causes, for example, the privatization of public space and the protective segregation of the residential community. A great deal of open and uncontrolled public space has become watched and controlled semi-privatization space. Huge suburban shopping malls have taken the place of the traditional urban pedestrian. Urban space is overwhelmed by the doctrine of consumption and the so-called Disney-land and suburbs sprawling have emerged out of it. Civil life - the activity of western cities and public space come to crisis of decline. But in rapidly-developing China, urbanization and association have been frequently changing its urban space and urban life. Along with China's economy's boost and the increasing growth of middle class in cities, will the public space of China's cities become prosperous swiftly and develop towards civil society? Will the urbanization and socialization of the Chinese cities be distinctive from the development of that in the westerns? Or has it already been distinctive? What future might it have? Case study of 798 factory in Beijing Under such a general situation, the Beijing 798 Factory has been an incredible surprise, where a variety of social communications and very real public spaces rarely seen in cities has materialised. In 2000 a great number of artists' studios and galleries appeared in the factory site. The idle factory buildings, with enormous

dimensions, cheap rents and, of course, a rather free atmosphere, attracted a lot of artists to gather there. Since then, various restaurants, coffee houses, artistic bookstores, bars, etc. have sprouted there in great quantities. 798, a once deserted area of the city, was all of a sudden bursting with youthful energy and endless charm. Its appeal lies in its maze-like vagueness and the absolutely open public space. In addition, there is also a kind of temporariness about it. And this vagueness and openness in space are even further strengthened by the previous sense of crisis concerning the possibility that it would be demolished as well as by its temporariness. 798 may have created a new type of urban space. There is no isolation. There are no forced boundaries. The vagueness in space, in its identity, in its temporariness and its completely open public space constitute the unique characteristics of 798. The essence of the contemporary crisis of public space lies in the fact that public spaces are increasingly retreating to private areas, and becoming separated from open spaces. It gives hope to those who feel exhausted in the crisis of contemporary public space.

### **Dialogue with localization and the production of the Hakka waterscape in South Taiwan**

*Shu-Chen Tsai (National Taiwan Normal University), Su-Hsin Lee (National Taiwan Normal University), Jing-Shoung Hou (Tung Hai University)*

The development and transformation of Hakka village in southern Taiwan were affected by natural and social environment, especially for waterscape. The water usage caused political, economic, cultural, and engineering issues and it also have been the major reason causing conflicts between racial communities. From 18th Century Ching Dynasty occupation, a large number of Hakka immigrants constructed numerous ditches system in southern Taiwan for agricultural demand, and the Hakka hydrological engineering network links became the main reason for their social settlement. During the 19th Century Japanese occupation, political forces were involved in water usage control, which inked the country's geographical projects to hydrological and agricultural industries, and this expanded the construction of hydrological and reconstruction water territory in southern Taiwan. This study suggested the water right of Hakka settlement concealed the country authority operation, where the Hakka became the land owner due to their succession of local hydrological technique, and the waterscape became a production and interaction of society and nature. The result were analyzed base on the theory of 'the production of natural' from Neil Smith (1984), through cultural and historical data verification field survey and coding in GIS. The results showed the time-space pattern of waterscape from



18th to 20th Century, and the factor of change was influenced by combination of society, politics, and nature. Water channels also influenced the process of Hakka localization in southern Taiwan. The human geography perspective of waterscape reflect important governance issues of who has the authority of water right control and who is the actor to reproduce local waterscape.

## SE 23-01 - Transition of energy systems and green industry development: The geographies of the German 'Energiewende'

*Chair: Britta Klagge, Harald Rohrer*

### Allocating greenhouse gas emissions in Germany: Federal governance and the new geography of electricity systems

*Stefan Scheiner (TU Darmstadt), Jochen Monstadt (Technische Universität Darmstadt)*

Currently both, climate mitigation policies and policies to phase out nuclear energy are key drivers for the transition of power systems in Germany. By means of a multitude of measures, federal and EU energy and climate policies have provided the basis for an ongoing shift towards a 'cleaner production' of electricity. As a preliminary outcome of these 'transition policies' over the last decade the share of renewable energies in the power generation has nearly tripled to 20%, half of the nuclear power plants have been shut down, the share of coal has slightly decreased and natural gas almost doubled its share. This transition of power supply systems includes distinct (re-)distributive effects not only across different energy sectors, but also across spatial territories and the capital, investments, R&D activities and workplaces in the energy industry are spatially reallocated. Traditionally, the geography of energy industries was shaped by the spatial vicinity of centralized power plants to the key industrial sites in Germany. Here, we could distinguish between those Bundesländer with a high share of coal (NRW; BB, SL) and those with a high share of nuclear energy (BY, BW, NI, SH; HE). Taking current developments and the on-going decarbonisation and denuclearisation into account, the traditional energy powerhouses in Germany are confronted with considerable economic burden to their regional (energy) industries which are only partially and spatially unevenly compensated by the benefits of the growing low carbon industries. On the other hand, windy regions in Northern Germany, rural regions with a high share of biomass, solar regions particularly in Southern Germany and regions with production sites of green energy technologies have clearly benefited from this industrial transformation. The question of our paper is how this transition of energy industries with considerable redistributive effects across spatial territories was implemented within the cooperative German federal system. We will explain, why this consensus-oriented federalism usually relying on various formal and

informal ways of the Bundesländer to participate in federal legislation and to enforce their economic interests allowed for an effective redistributive policy. For this purpose, we analyse the redistributive effects of the transformation of the electricity industry during the last two decades focusing on the level of the Bundesländer. We will identify the economic 'winners' as well as the 'losers' of this spatial reallocation of capital, investments, R&D activities and workplaces in Germany. Arguing from an institutional perspective we will analyse the key decisions in renewable energy policy and explain how redistributive policies were effectively implemented within the system of cooperative federalism given the heterogeneous interests of the Bundesländer.

### Reconfiguring regional infrastructures. Opportunities and limitations in Northeast-Germany.

*Matthias Naumann (Leibniz Institute for Regional Development and Structural Planning), Timothy Moss (Leibniz Institute for Regional Development and Structural Planning)*

While there is a growing body of literature on the technological and organisational dynamics of infrastructural change, especially in the energy sector, important gaps remain. First, very little research has been conducted on the different regional as well as local preconditions and outcomes of energy transitions. Different urban or rural settings are crucial for applied technological as well as institutional options. In consequence a 'patchwork-geography' of energy systems emerges, one reflecting existing regional differences. New energy infrastructures such as wind or biomass facilities can result not only in regional specialisations in the form of recently established 'energy regions', but also the shaping of new forms of urban-rural relations connecting places of energy demand with places of provision. Second, the interconnections between the transitions of energy systems and other sectors of technical infrastructure, such as water supply and wastewater disposal, transport, telecommunication, waste disposal are hardly mentioned in the literature. The paper argues that transformations in one sector of technical infrastructure have an impact on other sectors. Furthermore, sectoral transitions should be interconnected to enable more extensive reconfigurations of different regional infrastructures. The paper draws on findings from the research project 'Development of integrated land management through sustainable water and resource use in Northeast-Germany (ELaN)' funded by the German Ministry of Education and Research (BMBF). ELaN aims to develop a regionally differentiated and sectorally integrated perspective on the transition of energy systems at the interface between

decentralised energy and wastewater disposal technologies. The project investigates the use of treated wastewater in different rural areas in Northeast-Germany and its potential for biomass production in short rotation coppices for the energy supply of cities. By analysing connectivity between new decentralised forms of energy supply and wastewater disposal, it aims to support the reconfiguration of existing regional infrastructures towards sustainable systems and the reordering of urban-rural relations in the process. The paper argues that reconfigurations of regional infrastructures reach beyond technological issues to encompass new forms of infrastructural governance capable of integrating different modes and spatialities of infrastructure provision. Exploring the transition of interfaces between the social and the technical in socio-technical systems:

### **The German Helmholtz-Alliance ENERGY-TRANS as an example**

*Jens Schippl (ITAS / Karlsruher Institut für Technologie)*

Triggered by different causes such as climate security, energy security or strategies for improving international competitiveness, a transition of the energy system is of utmost importance for many countries. In Germany, such a transition was recently pushed by the political decision to phase out nuclear power. So, the German energy system needs to be transformed in a relative short time. Many visions and concepts exist that outline potential future designs of such a transformed energy system. Most of these visions have in common that they assume an increasing share in renewable energy supply. Usually, they develop ideas on how fluctuating renewable energies (wind, solar) can be integrated into the energy system. But in general such future oriented studies concentrate on the technical requirements for rebuilding the system. However, energy systems are not only a mixture of technologies and infrastructures; they are socio-technical systems. A transition of the system is not at all limited to technologies but also the interfaces between technologies and society will change; the relationship between societal actors and the technologies will have to be transformed as well. Some changes along these interfaces are already emerging others are anticipated in visions on future energy systems. Examples are: Ideas linked to the concepts of 'Smart Grids' or 'Smart Homes' in general encompass an adaptation of load profiles to the energy supply. More flexibility in demand patterns of the consumers will be needed to achieve such a shift of loads (e.g. usage of washing machines in off-peak hours). New business models enable energy suppliers to control small power plants which are located in the private buildings of the users; When it comes to the urgently needed

implementation of new power lines or to the installation of new wind turbines the directly affected population often reacts with fears and protest; In the mobility sector, new propulsion technologies, such as battery electric vehicles, will change the established routines of its users; Also in the industrial and commercial sector changes might occur in terms of new business models, new regulations or decentralised supply structures. In 2011, the Helmholtz Alliance Energy-Trans was established in Germany to look at the transition of the energy system with particular focus on the demand side and on the interfaces described above. The presentation will give an overview on the interdisciplinary research in the 5 years running alliance. In doing so, the relevance of improved knowledge on potential developments along these interfaces for the understanding and the governance of energy transitions will be discussed. The presentation will further consider methodological reflections related to the conceptualisation of socio-technical system on different geographical scales.

### **Market formation through market integration of green electricity: Analysis of actors and institutions in the context of transformation of the German electricity market**

*Sandra Wassermann (ZIRN University of Stuttgart), Wolfgang Hauser (ZIRN University of Stuttgart)*

The transformation of the electricity system under the condition of sustainable development and an accelerated nuclear phase-out is one of the crucial current challenges of the German economy. Due to an already successful policy support, electricity generation from renewable energies has gained a relevant share in the German energy supply system by now. For this reason enforced market integration and a more demand-oriented feed-in of electricity from renewable energies are considered as crucial next steps in the process of transformation. Hence, new regulation mechanisms are currently developed and discussed in order to ensure a smooth transition for renewable energy power plant operators from guaranteed feed-in tariffs to the liberalised electricity market. A variety of actors is involved in this development process as well as in the actual process of market integration. These actors' goals, strategies and options are examined in an interdisciplinary research project. The goal of the project was the development of an agent based simulation model as an instrument to analyse possible actions and interactions of the relevant stakeholders as well as their effects for the overall system in different regulatory frameworks. An important prerequisite for the set up of the agent based model was the thorough analysis of the relevant actors, how they were influenced by



the regulative framework, how they developed business models and routines, and how they tried to reshape formal institutions in order to meet their goals. The analysis took its analytical starting point at some theoretical assumptions of neo-institutionalism. The empirical work included literature reviews, guideline-based interviews with representatives of the important actor groups and an expert workshop which has been conducted in order to discuss and verify first results of the analysis. These results have then been translated into the formalised language of an agent based model, simulating the behaviour of producers of electricity from renewable energies and traders in Germany. We would like to present first project results with focus on the actor analysis in this process of market formation and integration. Firstly, this deals with the question how different actors have influenced the process of change. Secondly, the analysis focuses on the effect of newly developed policy frameworks for market integration of renewable energies on actors' goals, strategies, and behaviour as well as on actor networks and on the overall system.

## SE 23-01 - Urban landscape and nature 1

*Chair: Sascha Henninger, Olaf Kühne*

### Greening the shrinking city – new perspectives for US cities in decline

*Karina Pallagst (Kaiserslautern University)*

For many years, pointing at shrinking cities in the USA used to be a taboo, not fitting in the pattern of growth and progress anticipated by community leaders. Nevertheless, shrinking in terms of economic decline and population loss is an enduring phenomenon for many post-industrial US cities (Beauregard 2009). One negative effect of shrinkage is extended portions of vacant land with blighted and deteriorating buildings. To break away from a downward spiral of economic decline, some US shrinking cities (e.g. Youngstown, Cleveland, Detroit) recently started to initiate more pro-active planning, following a new paradigm of shrinking smart (Pallagst 2008). This trend includes actively dealing with vacated portions of land, seeing these spots as new assets on the way to more sustainable and livable cities. Some scholars argue that this form of shrinking smart might be breaking ground for more energy-efficient urban footprints (Mulligan, forthcoming; Audirac, forthcoming). The movement of greening, which is applied in shrinking cities, might have spillover effects for planning in general, possibly initiating a trend-reversal in US planning. While many European cities have implemented sustainable planning strategies with a wide range of efforts (Freiburg/Germany, Copenhagen/Denmark), for the US planning realm this is still a rather new trend (Benedict, McMahon 2006). The paper will present greening or green infrastructure development from the point of view of the US planning debate, emphasizing three forms of greening: right-sizing, urban agriculture, and waterfront development. Moreover, recent greening efforts will be highlighted with the examples Flint/Michigan and Detroit/Michigan, anchoring them in a debate of paradigmatic shifts and sustainable development. References Audirac, I. (forthcoming): Shrinking cities in the fourth urban revolution in Pallagst, K. et al, (eds.) Stories of Tough Times: International Perspectives and Policy Implications in Shrinking Cities, Routledge. Beauregard, R. (2009) Shrinking Cities in the United States in Historical Perspective: A Research Note, in Pallagst, K. et al (eds.). The future of shrinking cities - problems, patterns and strategies of urban transformation in a global context. Institute of Urban and Regional Development, Center for Global Metropolitan Studies, and the Shrinking Cities International Research Network

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### Living Space. A political interpretation of urban gardening.

*Chiara Certoma' (Sant 'Anna School of Advanced Studies)*

The growth of a global economy and new technologies has profoundly destabilised and reconfigured the idea the public space with the emergence of new political claims and actors. Non-state actors' practices are based on specific geographical places and rooted in defined social environments; by adopting new ICT they strengthen the map of transboundary claims, and produce new forms of non-cosmopolitic and non-diasporic global civic awareness. Place-based grassroots political practices it proposes can, by the means of common practices, make evident forgotten or ignored ecological relations, and explore the association of human and more-than-human aggregates in the co-constitution of inhabited space. This is the case of the emergent urban gardening. It is a spontaneous movement of citizens that reinvigorated global environmental consciousness and transformed cities into laboratories for political experiments, because it results in a form of engaged ecology by which cities' inhabitants engage in affirmative actions aimed at transforming neglected urban spaces in need of care. The gardeners contest the actual shape of the city, propose new forms of environmental planning, and prove practical feasibility of political ideologies they endorse. Throughout history, urban green spaces constituted a materialisation of political and social ideologies, and the loci where a number of political issues condensed. Critical gardening represents the most audacious use of public land scraped at the city peripheries and the marginal space of societal imagination. It may assume a number of diverse forms: allotments (namely, zones in cities claimed by the citizens and provided by local administrations for people to cultivate vegetable and flowers); community gardens (namely gardens autonomously created by people create because local governments do not, in order to reduce crime, increase social cohesion and clean environments); guerrilla gardening. Critical gardening allows a new environmental citizenship to emerge and addresses some of the most striking post-modern issues, such as the post-environmentalism, the subaltern and



antagonistic political theories, the new urban grassroots movements, the links between space and politics, the fragmentation of the individual self and the reconstruction of an innovative collective identity, the overcoming of a discourse-based political activity. In doing so, Critical Gardening brings us onto the variegated, dynamic and engaging lands where collective history takes form: the public space of gardens, allotments, flowers beds, wastelands and single spots of bare land in urban forgetfulness. It articulates urban politics in terms of inequality, division, exclusion, contestation, resistance and inclusion, and regards places as fluid space of complex power-geometries and thus, by spatialising the grand narrative of globalisation, allows plural and radical openness and a creative kind of politics.

### Urban gardening and urban climate

*Sascha Henninger (TU Kaiserslautern)*

Actually, in shrinking cities we have to deal with a particular phenomenon: Previously it was a deficiency, now there is too much, namely landscape and open spaces. Apart from the problem that these areas could become dilapidated, it also offers the possibility to create qualitatively new purposes of urban and spatial development, using these new open spaces in a sustainable way. Alternatives to the traditional urban development can thus be tested and discussed. From a new point of view the prospects of a sustainable city can move into the scientific focus. Among other things such new open spaces lend itself as areas of renaturation, as well as for flood control, reproductive cultivation accordingly to the new trend of urban gardening and, of course to improve the urban climate. It offers an opportunity of new forms of urban green spaces, which could e. g. influence the local urban energy budget by a different type of agricultural valorisation. For this reason, currently on two fields of experimentation sweet potatoes were cultured to proof how urban gardening could affect the ambient temperatures of a rooftop as a kind of cooling equipment reducing the local urban heat island effect. Decisive for the choice of sweet potatoes was finding a horticultural product, which could be exposed to environmental stress more easily: in this specific case high ambient temperatures and intensive solar exposure. Corresponding to this, sweet potatoes can grow under stressful conditions, have relatively high abilities of latent heat loss and photosynthetic carbon fixation in comparison to plant species. First results indicated that there are obvious differences in the surface temperature of the exposed rooftop and the vegetation coverage, reaching -15 K. This offered the conclusion that the shadowing of the plants causes a slightly

smoother increase of the temperature on the rooftop. This is comparable with the effects of rooftop and façade greening. Furthermore, because of higher ambient temperatures on the rooftop and the increased exposition to the solar radiation, an increased productivity of the sweet potatoes could be mentioned. Therefore, urban gardening should not be limited acting as a kind of repair service for ailing cities. Urban gardening must come across as one module for building ecological as well as sustainable urban development. Therefore it could be a serious addition to the previously publicized rooftop and facade greenery. This requires more current pilot projects and fields of experimentation. Only through targeted experiments the urban society attains the necessary procedural knowledge and flexibility to respond to upcoming climatological as well as ecological challenges in an appropriate way. Corresponding to that urban gardening, associated with the knowledge of the applied urban climatology, can afford an important contribution in the current discussion how to handle receivables of a sustainable urban development.

### Urban biodiversity management: Attitudes and behaviours

*Robyn Bartel (University of New England), Don Hine (University of New England), Methuen Morgan (University of New England)*

In Australia, many native ecosystems have been modified and cleared for agriculture and urban development. In concert with initiatives and regulation for multifunctional agriculture there is also increasing attention being paid to increase the area and quality of native ecosystems in urban areas. In this endeavour the attitudes and behaviours of urban dwellers in a representative regional centre were investigated. Both people participating in ecosystem recovery and the general community have been surveyed. Of those already participating, the majority of survey respondents (84%) were aware of the concept of biodiversity, and a majority (83.3%) also believe that we have a moral obligation to preserve urban biodiversity. Only 8% of those surveyed indicated that the loss of biodiversity in the community was not a problem. Almost all respondents (96%) felt that it was important the people have opportunities to experience nature in urban environments, with a similar number viewing our overall well-being and quality of life as being dependant on maintaining biodiversity. In the general community urban development is so far voted as the most extreme threat to biodiversity (44%), followed by other participant-specified threats to biodiversity (37%), the introduction of non-native animals (36%) and land clearing (35%). The results illustrate that overall awareness is high however other aspects of the study have demonstrated that few people are actively



engaged in ecosystem recovery so translating awareness into activity may be the key to successful urban management of biodiversity.

## SE 23-02 - Transition of energy systems and green industry development: The geographies of renewable energy production

*Chair: Britta Klagge, Harald Rohrer*

### Wind industry development and its geographical pattern

*Pedro Campos Silva (University Osnabrück)*

With the growing demand for renewable energy sources (RES), especially wind energy, worldwide, the wind industry expanded incrementally its location focus from the early centers like Denmark and Germany to attractive markets all around the world. Thus, the geography of the wind industry changed, not only in terms of new distribution channels, but also by building new production locations, research centers or establishing strategic alliances (joint ventures) with local partners. The resulting Global Production Network (GPN) of the wind industry is nowadays characterized by an increasing complexity due to changing production structures as well as transformed and interconnected flows of material, goods, capital and know-how. This Paper aims to present the changing structures of the wind industry, especially the manufacturing of wind energy turbines, through analyzing the industry's GPN as well as the underlying developments in different countries, namely Germany, Denmark, Portugal and Spain. The socio-political contexts of these countries are, as will be presented, in deed an influential variable within the industries development, because different policies to promote RES, varying industry policies, and the different (wind) energy markets directly have an effect on the wind industry's geographical pattern. In doing so, the important question of who controls the value producing and value enhancing network and who governs important processes, like R&D, will be addressed, as the resulting power asymmetries determine the wind companies' as well as the countries' position within the GPN. In addition, this paper tries to link these developments with the growing importance of (national) wind innovation systems, i.e. innovation policies and new innovation actors, to discuss the changing role of knowledge within the wind industry.

### Wind power planning and landscape perception in Spain (Alpujarra and Valle de Lecrín, Andalusia)

*Marina Frolova (University of Granada), Belen Perez (University of Granada)*

Due to its ambitious policies Spain has achieved a very successful implementation of renewable power. Wind and solar powers have become an essential factor shaping the present-day Spanish landscape. However the Spain's landscape policies are still out of step with the development of renewable energy policies, and new infrastructures develop in Spain without any specific instrument of land use planning. The aim of this paper is to analyse some key problems of wind power planning and wind power landscape perception in Spain through the case study of Alpujarra and Valle de Lecrín (Granada province, Andalusia). As it occurs in many other Spanish rural areas characterised by depopulation and socio-economic problems, wind power is seen in these localities as a way to increase income and to raise its economic activity, although a problem of a lack of coherent planning is raising tensions and conflicts with regard to land use and to natural and cultural resources management. Our study is based on written documents analysis, field observation and in-depth qualitative interviews with the different stakeholders involved in the development of wind power projects.

### Transitions in energy systems: The case of offshore wind farming

*Kira Gee (Helmholtz-Zentrum Geesthacht), Andreas Kannen (Helmholtz Zentrum Geesthacht), Christian Fischer (Helmholtz-Zentrum Geesthacht)*

Offshore wind farming is now well under way in Europe, driven by national renewable energy targets as well as the desire to exploit the technological advances it offers for industrial growth. As a spatially intense activity, it has precipitated a range of changes in how the sea is used. It has also given rise to a number of socio-political questions concerning renewable energy development. We seek to explore some of these against the wider context of scale and maritime governance. Unlike onshore wind farming, offshore wind farming is decidedly a game for centralized production modes. In Germany at least, community offshore wind farm projects have failed; because of the expense, only large players can afford to invest in offshore wind farming projects. As a result, offshore wind farming has grown to represent an international oligopoly with considerable power over future developments such as grids. Although it still seems carried by the confluence of public interest in renewables, political support and vested industrial interests, it also increasingly

competes with other sea uses and is in conflict with a range of other sea values at different scales. This raises two related issues: Firstly, how the costs and benefits of offshore wind farming are distributed, and secondly, who is involved in decision-making about sea space. Offshore wind farming is a case in point that decisions about sea space are increasingly the provenance of a small number of key players. Moreover, decisions about sea space (for instance energy grids) increasingly need to be taken at the international level, leading to a shift in scale in maritime decision-making. With no obvious decision-making body at the European level, what role does this leave for national and subnational decision-making bodies such as the local communities and Länder? Linked to this is a wider issue of scale, which is the question of how the costs and benefits of offshore wind farming are distributed. We argue an imbalance has sprung up between the use of maritime public goods and the distribution of the benefits derived from these goods. There is also the question of how to balance different types of value, for example how to weigh shareholder profit and the loss of other maritime goods and services against the generation of renewable energy. The presentation will look at these questions including distribution of costs and benefits linked to scales to illustrate this point at a qualitative level and discuss resulting challenges for planning and management.

### **Deep geothermal energy: Challenging common geographies of (renewable) energy production**

*Michael Stauffacher (ETH Zurich Institute for Environmental Decisions (IED) Natural and Social Science Interface (NSSI)), Matthias Gross (Helmholtz Centre for Environmental Research - UFZ)*

Geothermal energy offers the benefit of a renewable energy source demanded and supported strongly in the face of the recent 'energy turnaround' in many European countries. Social scientific studies on renewable energy, however, have pivotally focused on wind, solar, and hydropower whereas geothermal power has hardly received any attention. Recent technological developments have expanded the potential of geothermal energy ranging from the continuously improving heat pump technology to providing a significant share of the electricity and heat production. This presentation will thus reflect on the geographical scope as regards these novel developments. Innovations in deep geothermal energy technologies indeed expand their geographical reach by focussing not only on hot water but as well on hot rock as potential heat source. Some technical experts even claim that deep geothermal being the only option replacing the base load still produced by nuclear power. Besides the depth of

retrieving energy from the earth, these new developments point inter alia to the political valences of local energy versus centralized production, the dependence on large corporate industries versus energy autarky of communities and the dependence on abstract expert knowledge versus local knowledge in civil society initiatives. Some further characteristics of deep geothermal energy make it worth having a second look from a social scientific perspective: the residual risk and potentially high damages of induced seismicity, the human-made nature and the low personal control of these risks, a general feeling of 'tampering with nature' and the large infrastructure at surface (high visibility). For social scientists working on the siting of large infrastructure facilities, this set of characteristics points to some potential common framing as for instance the disposal of nuclear waste, even though they both show fundamental historical differences. As can be observed in the case of CO<sub>2</sub> storage, such similarities can effectively be used by interest groups to delay or block respective projects. Given that many of the recently launched geothermal power plants and the drilling technologies involved inhibit many scientific uncertainties and unknowns as regards induced seismicity, CO<sub>2</sub> leakage, groundwater contamination, and accumulated radioactivity (among other issues) research questions along the interface between geography, sociology, and environmental management appear to be of utmost importance. The presentation thus has two overall exploratory goals: Firstly, to outline possibilities and challenges for socio-spatial research on geothermal energy in relation to other types of renewable energy, and, secondly, to deliver suggestions on how to theoretically frame the tapping of these energy reservoirs by building on current insights from the sociology of ignorance, sociology of knowledge, Science Technology Studies.

## SE 23-02 - Urban landscape and nature 2

*Chair: Sascha Henninger, Olaf Kühne*

### Urban plant migration – invasion alarm?

*Götz Heinrich Loos (Ruhr University Bochum)*

The flora of urban areas within central European cities is characterised by high percentages of alien plants. Only a part of the present alien plant species is invasive and the invasion behavior of the taxa concerned is different from that outside the urban areas. Habitat change has obviously led to a change in dispersal behavior and the insertion of ecological niches. Anthropogenic influences cause dispersal and habitat changes directly, whereas the effects of climate change imply no direct causing. In the course of an investigation on the occurrence, distribution and dispersal of neophytes and especially invasive plant species in the Ruhrgebiet, the largest urban agglomeration in Germany and the former most extended European old industrial region, it was studied, where the invasive species originated in rural areas, whether they also be invasive in urban-industrial biotopes or if they lose their invasiveness. Likewise, it was examined, if neophytes, which are not invasive in neighboring rural areas, receive an invasive character in the cities. It was found that only a few species are invasive, both in urban-industrial biotopes as well as in more natural sites outside the cities. The ways in which invasive plant species arrive from outside the urban-industrial areas are primarily immigration and xenophytic introduction. On the other hand, within the cities the escape of cultivated plants can directly lead to an invasive behavior of these species. With most invasive species are escaped from cultivation (ornament and crops), however, they have spread into rural areas and return from there to cities virtually. Immigration routes into the cities are traffic lines (roads and railways) and streams, whereas the importance of the respective migration path from each of the type considered dependent. Additionally, note that some species migrate, be introduced and escape from cultivation at the same time. The landuse types of especially purely urban habitats restrict the number of invasive species. Therefore it cannot be formulated in general, that invasive species are present preferably in urban habitats. On the other hand, a larger number of invaders are present in industrial land and brownfield sites, so that a general summary of urban-industrial habitats not always makes sense.

### Beaches in a Metropolitan Environment: Multiple Features, Multiple Uses

*Mangal Padhyegogate (Valia College of Commerce)*

The city of Mumbai originally consisted of seven islands of Colaba, Old Women's Island, Mazagaon, Wadala, Mahim, Parel and Matunga-Sion. This group of islands was joined together by a series of reclamations over a period of time. Mumbai was ruled by Hindu, Muslim, Portuguese and British rulers. As the city grew, it expanded further to the north in the Salsette region. Presently it is considered to be the most densely populated city and the commercial capital of the country. As process of expansion continued, the Mumbai Metropolitan Region (MMR) was established in 1974 to address the challenges in planning and development of integrated infrastructure for the metropolitan region. MMR consists of Mumbai and its hinterland including 7 municipal corporations, 15 municipal councils and several villages. The total area is 4355 sq.km. It is linked with Mumbai through the suburban railway system and a large network of roads. MMR limits extend upto Virar in the north, Alibag in the south, Arabian sea on the west and a well demarcated boundary in the east. Its hinterland supplies raw material and labour, with the flow of goods and services maintained by fairly good transport network and communication. The impact of the region percolates to the hinterland through smaller cities. The region is rich in agriculture, fishing, dairy farming, vegetable farming and a number of small scale industries. It is endowed with several features of natural beauty that provide recreational services to the urban dweller. Being a coastal region, several beaches skirt the western front. Some are within the city proper, while some are at the periphery and beyond. Proximity and accessibility are prime factors in determining the popularity of every beach. However it is interesting to note that there are variations in the physical characteristics and level of besides popularity of the string of beaches. It was determined by a survey of 26 beaches (10 from Mumbai, 8 from Thane District and 8 from Raigad District). These beaches were classified on the basis of their physical characteristics such as length, width, texture, pH and colour as well as their efficiency for recreational purposes. The study has been conducted based on data, partly from secondary sources, but mainly from primary sources. i.e. extensive field survey. It brings out the significance of every beach in the urban landscape. In the present paper, the authors have attempted to identify the variations in the physical characteristics as well as the degree of attractiveness of beaches within the city limits and those beyond the city in the metropolitan region. **Rethinking Urban (Industrial)**

## Forests – Studies about Use and Perception of a Salutogenic Resource

*Thomas Claßen (University of Bielefeld), Björn Brei (University of Bielefeld), Claudia Hornberg (University of Bielefeld)*

Objectives Urban nature with green and blue elements is of high value for public health (e.g. in terms of physical activity, climate adaptation strategies, reducing hazardous substances). The industrial forest Rheinelbe (a former colliery) in Gelsenkirchen (Germany) also constitutes a health-promoting resource, especially for the local population. The extent to which this resource can unfold its various potentials, depends on how it is or is not used. Decisive factors may be how the public perceives the industrial forest Rheinelbe as well as eventual obstacles to its use. In order to determine non-use, perception and possible obstacles in various population groups, in 2008/2009 two studies were carried out from a Geography of Health perspective on the use (or non-use) of the industrial forest by the (local) population. Methods In 2008 a conceptual study was conducted on procedures for developing the industrial forest (on-site observation, surveying, interviewing experts). As part of a follow-up study in 2009, a mail survey (sample size: 1000, ~6%) was taken of the population in the adjoining city district (pop. total: ~20.000). The bilingual questionnaire (German/Turkish), developed specifically for this purpose, included quantitative and (semi-)qualitative items (e.g. attendance rates). The responded questionnaires (n=240, 24%) were evaluated as descriptive statistics and compared with the results of the conceptual study. Results The industrial forest is mainly used for rest and leisure, its road also for non-motorized transport. People visiting the forest report positive - mainly mental - health effects (e.g. relaxation, good air quality) and active/passive nature experience. While those surveyed in the forest reported coming there to visit it often, residents from the adjoining area came over less often. Furthermore, individuals with an immigrant background visited the forest less often than did natives. Potential obstacles to visiting the forest were feelings of low personal safety (dependent on gender and/or nationality), no knowledge of the forest, and little or no feelings of identity with the former colliery's area. Conclusions Visitors surveyed on site and people surveyed by mail in adjoining areas perceived the industrial forest as an important and long-term health enhancing factor. This salutogenic potential is of special interest in heavily built-up areas with e.g. high levels of traffic and air pollution. From a public health perspective, the salutogenic potential of natural urban green areas needs to be optimized and communicated more broadly and

clearly, so these areas will be used by as many population groups as possible. Further research is needed to determine how the effect of targeted, long-term, target group-specific measures can be embedded already at the planning stage.

## Sustainable uses of urban nature between modern and postmodern aesthetics: Reflections based on the social constructivist approach

*Olaf Kühne (Universität des Saarlandes)*

This lecture deals with the question of the social construction and the judgement of urban physical objects (as trees, streets, houses), which are perceived as natural. The society perceives nature ambivalent. Nature describes 'the primary and the good ['] that contrasts the society as the artificial and even destroying?. Nevertheless nature means 'the wild and the threatening, which is domesticated to protect the society' (Groß 2006: 5). In the city nature exists in a domesticated (e.g. as park) or in a less domesticated condition (e.g. as ruderal vegetation. The division of modernity and postmodernity is being discussed since more than 30 years in social sciences. Postmodernity has a constitutive aesthetic dimension. Concerning this point of view, modernity and postmodernity have different implications in the perception and assessment of urban nature. Especially the less domesticated nature contradicts the modern aesthetic scheme. It is assumed that the antagonism of legitimated and trivial culture is a substantial characteristic of modernity - which incorporates itself in a series of fundamental dichotomies like nature and culture (Fuller 1992). A typical approach of modern dichotomy is the construction of order and disorder. On the contrary postmodern aesthetics challenge and deconstruct these dichotomies (Sloterdijk 1987, 1988). Unlike the modernity postmodernity tolerates the less domesticated nature in cities which includes new possibilities of the composition of the cityscape, especially for ruined buildings and areas. Not only well-tended parks are assessed as desirable, but also untidy areas with sparse vegetation are interesting. The suggested lecture is structured in the following way: Reflections concerning the social construction of nature-culture and city-landscape Considerations about the different forms of appearance of nature in cities Characteristics: modern and postmodern aesthetics The appraisalment of urban nature against the background of modern and postmodern aesthetics Conclusion: Consequences concerning the practical planning One of the lectures aims is to open a social constructive perspective (in the tradition of Schutz 1976; Kühne 2008) and the subject-orientated perspective of the philosophic perspective of Croce (1995) for planning and design practice. Postmodern landscape planning and architecture does not mean 'anything



goes', but rather a pluralization of the population's associability (especially in the sense of the sovereigns in democratic societies). Additionally the results of empirical social scientific investigations will be presented concerning the social construction of landscape (Kühne 2006), also as results of participative observation in the practice of landscape planning (Hartz/Kühne 2010).

## SE 23-03 - Transition of energy systems and green industry development: Regional and country perspectives

*Chair: Britta Klagge, Harald Rohrer*

### Urban transitions towards sustainability

*Harald Rohrer (University of Klagenfurt), Philipp Späth (University of Freiburg)*

Innovation policies in the European Union are increasingly addressing 'grand challenges' such as climate change, resource depletion or aging societies. Such transformations go far beyond conventional product or process innovations and require a restructuring of broad socio-technical regimes, e.g. the built environment, systems of mobility, the energy system or the way we organize processes of production and consumption. The focus of research on socio-technical transitions has predominantly been a national or European level, while the role of place as well as the city level as part of multi-scalar governance systems has been largely neglected. However, the distributed nature and specific socio-technical dynamics of large-scale transition processes towards greater sustainability makes cities an important arena of infrastructure transformation and a crucial nexus between different levels of governance and strands of socio-political discourse. With a focus on the Cities of Graz, Freiburg and other European cities we will discuss what roles cities may play in transformation processes towards sustainable infrastructure systems, how opportunity structures for a greater urban role in such transitions look like and which limitations as well as specific advantages exist at the city level. We will be dealing with questions such as: - How can cities serve as a place of experimentation and social learning for sustainability transitions and how can they support the strengthening and growth of greener socio-technical configurations? - How are changes in the governance of infrastructures (e.g. decentralisation, market liberalisation) influencing the potential role of cities in sustainability transitions? - What is the role and dynamics of discourses and visions around urban sustainability transitions? How do such visions emerge? How do they interact with discourses and visions at different scales? - How important have external pressures (energy prices, particulate matter, new regulatory context etc.) been to destabilise the existing regime? How heterogeneous and inconsistent are urban energy or transport systems and to which extent can such frictions be used to promote change in certain parts of

the system? - How is it possible to create and keep up transition momentum? To which extent and with which strategies can urban energy transformations become irreversible, e.g. by social and material entrenchment? - Can we speak at all of 'transitions' at a city level? We are especially interested in the room for manoeuvring for cities that is left by institutional contexts and socio-technical networks beyond the city boundaries.

### Energetic regionalisations as processes for the transition to renewable energies

*Fabian Faller (Université du Luxembourg)*

The utilisation of renewable energies (RE) can be seen as one of the most important aspects of mitigation of climate change. Implementing them in decentralised structures additionally enhances the positive effects on environment, economy, and society. By that, RE development is a major asset for sustainability in regional development contexts. To achieve it, collaboration and cooperation of various regional actors is necessary. These actors differ in their perspectives on challenges for energy development as well as on the region itself. Hence, questions of space and scale are rising: If sustainable regional development can be achieved by the decentralised utilisation of RE, which 'region' develops? Or to put it vice versa: Which processes of regionalisations are initiated through the use of RE (energetic regionalisations)? The paper focuses on bioenergy production and related processes of regionalisations in the cross-border context of Germany and Luxembourg. On the one hand, the evolution of and transition to bioenergy production is focus of the theoretical analysis. Which institutional and structural (pre)conditions are fundamental for processes of regionalisations in the biomass industry? In which ways are they connected to the socio-technical development? These questions are addressed with the conceptual approaches of evolutionary institutionalism and socio-technical transition. The first building block concentrates on institutionalisations, relevance of structures for individual actions and impacts of individual behaviours on institutions. The latter building block focuses changes in technology and their social implications, social changes and their potentials for technological changes, and 'spheres' of socio-technical changes among niches, regimes and landscapes - all aspects with respect to bioenergy development. On the other hand the day-to-day practices of individual actors in the bioenergy market are focused. In which ways do practices influence regionalisations? The research motivation shifts to processes of constitution and reproduction of bioenergy-regions. Therefore, Werlen's theory of social geography of day-to-day



regionalisations builds the theoretical fundament. 'The bioenergy-regions' are produced through embodied practices and reproduce themselves within these practices. Hence, bioenergy--regions and -spaces do not exist per se, but are socially constructed. So on the one hand, the social use of spatial categories and contexts regarding bioenergy are analytical objects. On the other hand, the relation among society, practice and spatial connotations will be addressed. The paper focuses on the conceptual framework of an ongoing research project and discusses the underlying theoretical perspectives, their operationalisation as well as the methodological research design. In empirical terms, preliminary results from an exploratory pilot study will be presented.

### **Transition to sustainable energy services in developing countries – the role of community socio-economic structures**

*Carmen Dienst (Wuppertal Institute for Climate, Environment and Energy),  
Willington Ortiz (Wuppertal Institute for Climate, Environment and Energy), Julia  
Terrappon-Pfaff (Wuppertal Institute for Climate, Environment and Energy)*

Sustainable energy technologies are widely sought-after as essential elements in facing global challenges such as energy security, global warming and poverty reduction. Moreover, using renewable energy technologies offers multiple development opportunities to off-grid communities in emerging economies and developing countries. Several technical alternatives using renewable energy sources exist, which have proven adequate for responding to diverse sustainability challenges. However, although the deployment of renewable energy technologies has significantly increased in recent years, in both industrialised and developing countries, the share of renewables remains rather low in comparison to the widespread use of unsustainable and often centralized technologies. One of the most significant constraints to their adoption and broad diffusion is the socio-economic context in which sustainable energy technologies are supposed to operate. Social and economical barriers are often even more difficult to overcome than technical obstacles. Practical strategies dealing with the above mentioned socio-economic challenges are crucial elements for project design and, particularly, for the implementation of project activities. There is no one-size-fits-all solution for the successful implementation of climate friendly technologies, but each initiative, project or programme gives rise to new findings and know-how that can help accelerate the transition process in the specific geographical context. The same holds true for energy projects in developing countries supported by the WISIONS initiative. This initiative is run by the Wuppertal Institute and is supported by the Swiss-based foundation

ProEvolution. The aim is to improve the South-South and North-South knowledge transfer on good-practice implementation models for sustainable energy supply and analyse the long-term perspectives. In this study experiences from implementing community-based projects are reviewed in order to identify the practical elements that are relevant to overcome socio-economic challenges today and in the future. In order to systematise the findings an analytical framework is proposed, which combines analytical tools from the socio-technical transition framework and insights from participative approaches to development.

### **About the role of energy regions as part of the energy transition**

*Claudia Kölsche (Universität Bonn)*

Modern life is unimaginable without the continuous supply of energy. However, the use of fossil and nuclear fuels contradicts the aspiration for societal environmental change and resource depletion to escape. The dependence on energy supply from politically unstable countries and the associated drain of purchasing power as well as the fear of nuclear accidents reinforce the negative side of conventional energy generation. Within the meaning of the sociological systems theory of Niklas Luhmann, politics can not steer nor intervene the processes of the economy. With the Electricity Feed Act (Stromeinspeisungsgesetz) and the Act on Granting Priority to Renewable Energy (Erneuerbare Energien Gesetz (EEG)), the German government only led a framework to the energy transition - self-referential and autopoietic. Thus, the EEG is embedded in the overall environmental debate and by this, it refers to public opinion. In the political functional system, the EEG is internationally perceived as a showcase and it ensures further political discussions. Furthermore, it contains specific payment rates, which are designed for the "language" of economy. The economy is meanwhile made up of two modes of energy supply: 1. Energy supply by central, large power plants. 2. Small, decentralized individual power plants. Regarding central, large power plants: a few technical experts monitor processes and the energy network's voltage. Traditionally, fossil/nuclear fuels are used for energy generation. Nevertheless, the renewable energy industry meanwhile also runs remarkable power plants, which are integrated in the existing network structures. The avant-garde potential of renewable energy sources, however, lies in its use of power plants, which are small, decentralized and tailored to individual needs. These type of plants are in the hands of private individuals, small and medium enterprises and municipalities. The transition of energy supply turns out to be a complex social



negotiating process. Why are some decisions space-effective and others not? Where outweighs the energy policy objective, where the economic pressure of investment need and where public acceptance? And what consequences result from this? Interesting in this context appears the consideration of energy regions. Mostly these are seen as regional associations of municipalities. Often, however, energy-economic catchment areas and infrastructure networks or similar natural space/pattern of use occurrences play also a role in the distinction. While an established energy region on the one hand significantly reduces the complexity of the topic for politics, economy but also general public, on the other hand it enables direct touchpoints for further communication and decisions. Achieving a better understanding of the underlying structures can therefore help to better understand the social negotiation process of the energy transition.



# Risks & Conflicts

## RC 01-01 - Anxiety, biosecurity and conflicts

*Chair: Jonathan Everts, Ben Coles*

### **The communication on invasive plants: A paradoxical attitude towards social anxiety.**

*Marion Ernwein (University of Geneva)*

Anxiety is a physical and mental state that is linked with a feeling of rupture of the pattern of everyday life, and of uncertainty over future developments. It can be personal as well as social, and depends on the framing of a topic (Jackson & Everts, 2010). Environmental issues are factors of anxiety because of their potential for disruption and even annihilation of human life. Plant invasions are a global environmental issue, since their identification as one of the main threats to biodiversity in the 1990s. At a local scale, some invasive plants also pose considerable health problems. They thus represent a threat to biodiversity as well as human health. Their management is variable from one place to another. However, one pattern can be identified; it is their paradoxical relation to anxiety. Through the analysis of four focus groups conducted on this topic in Geneva, on the basis of a collective reading of three documents on ragweed and giant hogweed, I will show how the communication on these plants feeds social anxiety, and how anxiety shapes the relationship of the citizens to expertise and their willingness to eradicate invasive plants. Indeed, I will show that on the one hand, the information addressed to the public on this topic relies on the use of militaristic terms and dramatizing staging of science, which can be interpreted as announcing a dramatic forthcoming event. The use of metaphors and militaristic terms on this topic has received a lot of criticism from social scientists (Larson 2011, Fall & Matthey, 2011). On the other hand, the actors involved in the fight against invasive species try to turn the citizens into actors of the biological struggle. To convince them to get involved, they need to increase their accountability, especially after such controversies as BSE and GMs, which weakened the credibility of many authorities (Irwin, 2001). One way of doing so - that is also to be found in the treatment of many other biosciences issues - is through increased transparency of information and an explicitly more open, less confident treatment of science (Irwin, 2001). However, transparent information on plant invasions makes public the many uncertainties that characterize the topic: regarding the behavior of the plants that can be invasive in one place and not in another, the way they should be fought against, or their overall consequences on ecosystems. This uncertainty feeds anxiety because the

situation can be interpreted as out of control, and the role of the experts, that is to give reliable information, is challenged. The social order as well as the local environment therefore seem to be threatened. There are thus two sources of anxiety, one that is institutionalized as an agent of social change, and one that is involuntary and closely linked to uncertainty. Social practices related to biosecurity are therefore shaped through social anxieties.

### **Swine Flu in Mexico**

*Sebastian Köllner (University of Bayreuth)*

Swine Flu in Mexico is the geographical point of origin of the so called 'swine flu' A/H1N1 virus. From there, the new virus spread almost all over the world, through the nodes and hubs of the globalized world. But not only the virus started to conquer one national border after the other, also a wave of global anxiety spread through national and international media, which created new imagined geographies in different societies and materialized in new behavior and thinking, especially about Mexico. In my contribution I will analyze the inner Mexican discourse concerning the 'swine flu' and will try to compare it with international news coverage. I will investigate the different imagined spatial layers which stand behind the inner Mexican discourse on the one hand and the 'international discourse' on the other hand. In a second step I will show, how thinking about Mexico as a national state and thinking about different regions in Mexico lead to novel spatial practices and behavior. To deepen the findings I will add another discursive dimension, which is not reflected in newspapers, magazines or TV-headlines: personal stories. Narratives of Mexican inhabitants will add the dimension of the personal and local geographies concerning the phenomenon to answer one important question: how did the 'swine flu' affect the everyday life and the every day practices of the people living in the so called 'epicenter' of this global event of anxiety. Sebastian Köllner, B.Sc., University of Bayreuth

### **Feeling blue in the landscapes of Iceland: Conflicts about the origin of species**

*Karl Benediktsson (University of Iceland)*

Interesting and sometimes intractable social and cultural conflicts arise when biological agents that are introduced into a new ecosystem do not behave in expected ways. Such 'invasive alien species' are the subject of much anxiety in global nature conservation and discussions of bio-security, but actions to curtail



them prescribed by experts in ecological science often run counter to aesthetic or moral sensibilities of the 'lay' population. The picture can be further complicated by historical circumstances and events. Confronting a long history of unsustainable land use and land degradation, Icelanders imported during the last century a great number of plant species that were supposed to help in curtailing soil erosion and reclaiming lost vegetative cover. One of these was the Nootka lupin (*Lupinus nootkatensis*), a native of the west coast of North America. The seeds of this leguminous plant were imported to Iceland in 1945, and it was used extensively in soil conservation until very recently, not least because of its nitrogen-fixing ability. But its very vigour in these degraded landscapes has proved controversial: its conspicuous blue flowers now characterise large areas of the country in early summer, to the delight of some but alarm of others. In 2010, a programme of eradication was instigated by the Icelandic Ministry for the Environment. This involves some quite drastic measures, including the spraying of herbicides over parts of the central highland region where the plant has taken hold. Mildly put, the response to the programme has been mixed. Arguably, this is an example of politics of nature that are shaped by often strikingly unreflexive notions of naturalness and indigeneity - on both sides of the debate. This will be discussed in the paper in the light of recent critiques of concepts and categories that set the terms of the debates about bio-security.

## RC 02-01 - Broadening the IPCC focus: Extreme events, vulnerability to multiple stresses and adaptation options

1

*Chair: Jörn Birkmann, Susan Cutter*

### Climate and adaptive management: Are we doing and not learning?

*Roger Pulwarty (NOAA)*

Learning is of strategic importance in the decades-long process of adapting to climatic change and variability and in accumulating lessons from past and current practices. Much work and experience has shown that long-term environmental problems can seldom be dealt with by single discrete actions or policies but respond only to continuing, sustained efforts at learning, supported by steady public attention and visibility. Key gaps within the present context are that information on physical states and impacts are not optimally integrated into a coherent overall storyline, in real-time, to meaningfully characterize conditions, cumulative or intensifying impacts across climate timescales (such as during drought) are difficult to characterize. The concept of 'adaptive management' has been widely advocated as a bridge between science and policy. We discuss this idea in the context of climate adaptation but ground the discussion in the decision-making and implementation of actual adaptive management efforts. Adaptive management has three key tenets (1) Policies are experiments that should be designed to produce usable lessons; (2) AM should operate on scales compatible with natural processes, recognizing social and economic viability within functioning ecosystems; and: (3) AM is realized through effective partnerships among private, local, state, tribal and federal interests. In a watershed setting this can mean balancing equity goals, through hydropower production, conservation, and protecting cultural resources while experimenting and incorporating learning in the context of differing sources uncertainty and surprises. For this presentation we draw on the experience, both analytical and deliberative, within transboundary watersheds primarily the Columbia and Colorado River Basins in North America, which are longstanding efforts at adaptive management. Experiences, will also be drawn from other international watersheds in which the author and colleagues have been engaged, such as the Guadiana Basin between Spain and Portugal among others. One goal is to identify the strengths and weaknesses of an 'adaptive management approach' in the context of changing climatic extremes and baselines. Our approach is based on the premise that understanding how effectively common adaptation

goals are pursued, legitimized, and secured requires identification and evaluation of present systematic efforts (i.e. field-tested alternatives) to experiment, engage leadership at a variety of levels, credibly assess alternatives, and assess when initial assumptions may be failing. None of these can be designed optimally, apriori. We conclude by showing how the evolutionary or learning-based approach to 'assessment' can enter into regional and local activities in support of the goals of the IPCC and attendant assessments intended to support adaptation practice.

### Social and economic tipping points in adaptive capacity – empirical lessons from small scale adaptation

*Matthias Garschagen (United Nations University)*

Complexity and tipping points have become popular epistemic elements within conceptual debates around climate change impact and adaptation assessment. Yet while these ideas are conceptually appealing much less work has been trying to empirically measure, assess or even forecast tipping points with respect to climate change vulnerability or adaptive capacity - in particular with respect to the interaction of gradual changes and extreme events. In addition, tipping points have been linked predominantly to large-scale bio-physical systems in the literature (e.g. the instability of large ice sheets and the break-down of ocean circulation systems). Based on empirical research on small scale adaptation processes at household and community level in Can Tho City, Vietnam, the paper aims at breaking up and broadening the above mentioned epistemic coupling. The findings suggest that many types of tipping points can be observed in small scale systems (household or community level). Shifting the perspective away from the predominant hazard focus, the analysis emphasizes in particular tipping points in social and economic spheres of adaptive capacity and explores the factors influencing them, paying special attention to the interaction of multiple stresses. Based thereon, the paper provides a first ontology of tipping elements in small scale urban systems. It is argued that examining them in detail is of key importance for understanding vulnerabilities and adaptive capacities at the respective scales. The paper concludes by discussing lessons learned for risk and adaptation governance and suggests ways in which the findings can advance the currently emerging discourse on scenario building with respect to adaptive capacity, particularly within the framework of the IPCC.

### Community-Based Autonomous Adaptation and Vulnerability to Extreme Floods In Bangladesh: Processes, Assessment and Failure Effects

*Md Younus (Flinders University)*

The IPCC (2007) demonstrates the importance of adaptation to climate change. The IPCC warned that the Ganges Brahmaputra Meghna (GBM) will be at greatest risk due to increased flooding, and that the basin's poverty would reduce its adaptation capacity. A key issue in assessing vulnerability and adaptation (V & A) in response to extreme flood events (EFEs) in the GBM river basin is the concept of autonomous adaptation. This paper investigates autonomous adaptation using a multi-method technique which includes two participatory rapid appraisals (PRA), a questionnaire survey of 140 participant analyses over 14 mauzas in the case study area, group and in-depth discussions and a literature review. The study has three key approaches. First, it examines farmers' crop adaptation processes in a case study area at Islampur, Bangladesh, in response to different types of EFEs. Second, it assesses the V&A in response to three EFEs in 1998, 1995 and 1988. V&A are categorized on the basis of a weighted matrix index. The paper uses PRA methodology and makes an important methodological contribution for assessing V & A. Third, the paper assesses the economic consequences of failure effects of autonomous adaptation in response to EFEs. The results show that Bangladeshi farmers are highly resilient to EFEs, but the economic consequences of failure effects of autonomous crop adaptation (FEACA) on marginal farmers are large. These failure effects are defined as total crop loss against potential production, plus total agricultural cost multiplied by the number of flood events in the studied area. Total agricultural cost includes cost of seedlings, fertilizer, pesticides, land preparation, human labour, and watering. The paper estimates that the crop related loss plus plants and houses damaged due to extreme flooding in 1998 in Bangladesh was US\$14001.26 million. The paper contributes to current knowledge by filling three important research gaps as follows, 1) farmers' autonomous crop adaptation processes in response to various types of EFEs; 2) methodological contribution for assessing V & A through PRA; and 3) the economic consequences of the failure effects of autonomous crop adaptations. The findings of this study can act as a guide to policy decisions for effective allocation of adaptation funds at community level in Bangladesh. The paper concludes that urgent action is needed to improve the sustainable crop adaptation capacity at community level in the foreseeable future to cope with extreme floods under a regime of climate change.

### Crystal ball or support for decision makers? Exploring opportunities towards vulnerability scenarios and trends.

*Stefan Kienberger (University of Salzburg)*

Within the IPCC report on extreme events (SREX) a clear correlation between future climate change and certain hazard domains has been identified. Next to that, it can be observed that the two 'major schools' within the conceptualisation of vulnerability - climate change and disaster risk reduction - are getting closer in terms of concepts. As in the past, the major challenges in vulnerability science embrace concepts and associated (spatial) methods to achieve a quantification of different vulnerability dimensions. Future scenarios and trend analysis played a more marginalised role on the sub-national scale levels. Reasons for that are the 'challenges' within conceptual manifoldness, but also in having the focus on developing suitable indicators and methods. Next to that, the availability of and access to data for indicators has to be maintained for the targeted time period. Future projections have yet been largely untouched given the uncertainty within the projection of vulnerability indicators. Within this paper, the need for future vulnerability scenarios (next to a regular monitoring) is highlighted in the context of climate change adaptation and disaster risk reduction. This is furthermore discussed through the integration of novel spatial methodologies to establish such scenarios in light of the new scenario approach currently developed through the research community and IPCC. As a case study, in the context of a climate change research project future socio-economic flood vulnerability scenarios have been developed. These followed SRES projections for time steps 2000, 2020 and 2050 and has been modelled for the Salzach river catchment in Austria and the Brahmaputra in Assam, India. The approach was built on disaggregated spatial units integrating a condensed vulnerability index. This consisted of proxy variables, which have been identified out of a complete present-state vulnerability index and its indicators were projected under a correlation with future GDP and population scenarios. Results show that impact of GDP and population growth is highest in areas where levels of vulnerability are already high. Additionally the results depict that a slow growth in population with a concurrent rapid growth in GDP is important in reducing levels of vulnerability. Based on these experiences the possibility and associated challenges to develop vulnerability scenarios will be highlighted. An outlook will be provided how critical key indicators such as land use and population dynamics could be integrated in such an approach. Critical remarks should open the discussion towards the suitability of such scenarios within decision making in disaster risk reduction and climate change adaptation.





## RC 02-02 - Broadening the IPCC focus: Extreme events, vulnerability to multiple stresses and adaptation options 2

*Chair: Jörn Birkmann, Susan Cutter*

### Contextualizing social vulnerability: Findings from case studies across Europe

*Christian Kuhlicke (Helmholtz Centre for Environmental Research - UFZ), Anna Scolobig (International Institute for Applied Systems Analysis), Sue Tapsell (Middlesex University), Annett Steinführer (Johann Heinrich von Thünen Institute), Bruna De Marchi (Institute of International Sociology of Gorizia)*

Vulnerability is no universal theory; it is a middle range theory attempting to integrate theory and empirical research with regard to specific social phenomena. This implies its application is only meaningful if it is contextualised both empirically as well as conceptually. This paper presents findings from social vulnerability assessments conducted in different case studies of different hazards in Europe (Germany, Italy and the UK). The case studies relied upon a common set of comparable indicators, but they also adopted a context-sensitive, qualitative approach. A shared finding across the case studies was that it was not possible to identify a common set of socio-economic-demographic indicators to explain social vulnerability of groups and/or individuals for all phases of the disastrous events. Similarly, network-related indicators as well as location- and event-specific indicators did not have the relevance we expected them to have. The results underline that vulnerability is a product of specific spatial, socio-economic-demographic, cultural and institutional contexts imposing not only specific challenges to cross-country research concerning social vulnerability but also to attempts at assessing social vulnerability in general. The study ends with some reflections upon the methodological, practical and theoretical implications of our findings.

### Urban vulnerability - why and how to adapt to climate change in Santiago de Chile

*Anke Schwarz (Helmholtz Centre for Environmental Research - UFZ), Kerstin Krellenberg (Helmholtz Centre for Environmental Research - UFZ), Juliane Welz (Helmholtz Centre for Environmental Research - UFZ)*

The Metropolitan Region of Santiago de Chile is affected by at least two hydro-meteorological hazards: seasonal floods and very high temperatures. Both hazards will most likely be aggravated in the future by expected climate changes, going along with increased medium temperatures and changing precipitation patterns. Pronounced patterns of urban segregation as well as specific and permanently changing urbanization (land use) patterns within the city make different social groups and their housing especially vulnerable to the consequences. This contribution aims at presenting the exposure approach as well as the developed vulnerability indicators that form the basis for presenting and discussing adequate and concrete adaptation measures to flood and heat hazard in Santiago de Chile. The approach is based on an analysis of socio-economic and housing conditions and attempts to respond to the following research questions: 1) Which are the inhabitants exposed to both hazards and where and under which housing conditions do they live?, 2) What are adequate adaptive measures to respond?, and 3) Do multiple hazards call for specific or combined response capacities and activities? The results show that hazard exposure is not distributed uniformly: Whereas people with lower socio-economic status are more likely to be heat exposed, higher status groups are more exposed to flood. Accordingly, different locations within the city call for specific adaptation measures. Some recommendations that have been discussed with local stakeholders within a broad participatory process are presented, also addressing their feasibility to be implemented.

### Infrastructure adaptation measures and risk management opportunities towards extreme events and climate change

*Alexander Fekete (Federal Office of Civil Protection and Disaster Assistance)*

The IPCC SREX report - summary for policy makers - highlights certain events that all require adaptations of infrastructures. Sea-level rise, hurricanes and flash floods impose demands to improve protection types of infrastructure such as levees, mobile barriers, and early warning systems - but also how the exposed people deal with it. Heat waves imply strains to existing cooling systems, health and rescue systems. Droughts are related to land use, consumption patterns

and irrigation infrastructure. However, in an integrative and holistic risk management approach, the vulnerability of the population to the hazard impacts but also concerning their reliance and dependency on those types of infrastructures must be considered. False perceptions of safety, social vulnerability profiles, risk government motivations all contribute to adaptation risk patterns. New approaches have to be developed for combining existing research on spatial vulnerability assessments and indices with the topic of infrastructure adaptation. One approach is broadening the perspective on infrastructure adaptation in context to climate change. Infrastructures are drivers of climate-change, are protection and adaptation measures, but at the same time, infrastructures play a major role in supplying people and are susceptible to impacts by extreme and creeping events as well. This presentation will garner fresh insights for social vulnerability and climate change adaptation research by introducing theory and methods used in risk management, business continuity management and governmental programmes in critical infrastructure protection. It uses examples from Germany, North America, UK, and Sweden and compares different usages of protection efforts, risk governance and resilience management. It includes challenges and ideas for future programmes for the integration of spatial infrastructure assessments with place-based approaches for vulnerability & resilience. A proposal for new tools and research work streams is presented which includes a risk and adaptation measures navigator. This navigator showcases a typology of measures based on lessons learned by recent extreme events including cascading effects. The successive events in Japan impacting energy infrastructure indicated some maladaptations to extreme events, which can be used to spur the development of new risk reduction and adaptation measures. No-regret measures used in emergency management will be discussed as well as terrorist prevention measures and smart grids. The expectation of sudden impacts and creeping changes is a driver for the improvement of various types of protection infrastructure, but also for supply infrastructure - water, food, energy, or traffic. Therefore, climate change and infrastructures are a major linkage between hazards, changes in the economy, risk governance and the vulnerability of the people.

### **Urban growth and extreme events: understanding the dynamics of risk in Ho Chi Minh City**

*Harry Storch (University of Technology Cottbus)*

Asian cities located in deltaic settings such as Ho Chi Minh City, exhibit higher exposure levels to flood risk primarily as a result of their location, their low

elevation and if located in tropical regions, the significant annual variations of climatic and weather extremes they incur. In these often mega-urban, coastal regions, adaptation to climate change and disaster risk management have to focus on minimizing exposure and reducing vulnerability by increasing urban resilience to the future impacts of climate extremes. Scientifically predicted are the direct impacts of climate change on populations (i.e. by urban flooding) and the indirect effects through impacts on the climate-sensitive urban sectors (i.e. housing, energy system). Geographic context gives rise to the biophysical exposure, which includes factors such as topography, connectivity and urban structures which can be mediated by spatial planning or construction technologies. Further the urban fabric of a society underlies the patterns of social vulnerability, including issues such as population density, levels of income, education and risk awareness as well as institutional capacity. Here spatial planning measures to enhance the adaptive capacity should be directed towards decreasing biophysical exposures and the social vulnerability from the viewpoint of place-based risk assessments. Key urban impact and vulnerability indicators in megacities and metropolises vary considerably from settlement to settlement and even within settlements. The location, the urban structure types present, dominant building types, social-economic characteristics and existing institutional capacities are all key factors that affect the ultimate exposure, vulnerability and overall environmental performance of a settlement within a mega urban context. Exposure and vulnerability are highly dynamic factors with an important spatio-temporal dimension. Rapid urbanisation and settlement patterns driven by fast changes in socioeconomic development conditions are the key factors influencing the future levels in exposure and vulnerability to climate extremes. Traditionally only snapshots of the current urban situations have been partially integrated into risk assessments, resulting often for highly dynamic urban regions in an overestimation of climate extremes as a stressor of risk. Our impact assessment study highlights, that the influence of non-climatic stressors - like urbanisation as the spatial manifestation of socio-economic processes is still widely under acknowledged. An urgent need has arisen to readdress and improve the scientific methods and datasets to examine these non-climatic key drivers of future urban risk and to assess their relative importance for risk propagation compared to primary changes in climate. The most significant issue here is the integration of the future dynamics of urban development.

## RC 03-01 - Coasts at risk by extreme events I

*Chair: Andreas Vött, Helmut Brückner*

### Recurrence and magnitude of palaeotsunamis at the West coast of Thailand inferred from sedimentary evidence

*Dominik Brill (University of Cologne), Helmut Brückner (University of Cologne), Kruawun Jankaew (Chulalongkorn University Bangkok), Nicole Klasen (University of Cologne), Dieter Kelletat (University of Duisburg-Essen), Anja Scheffers (Southern Cross University)*

In December 2004 the west coast of Thailand was heavily affected by the Indian Ocean tsunami (IOT), generated by a mega-rupture of the Sunda Fault. Due to the lack of historical data, sedimentary evidence from geo-archives provides the best opportunity to improve the knowledge of recurrence and impact of potential predecessors. Crucial for the application of palaeotsunami deposits as an indicator for tsunami impact are (1) their positive identification, (2) the dating and correlation of events, and (3) the quantification of tsunami magnitudes. Ad 1) Appropriate geo-archives that provide all premises for positive identification - i.e. deposition of tsunamites, preservation over longer time scales and the possibility to discriminate them from autochthonous sediments - are rather scarce along the west coast of Thailand. In the ridge-swale successions of Ko Phra Thong and Ban Bang Sak, as well as a former lagoon at Pakarang, where evidence of potential palaeotsunamis could be detected, their discrimination from storm deposits constituted the most challenging aspect. Ad 2) At Pakarang and Ban Bang Sak the chronology of identified tsunamites was established using radiocarbon dating. On Ko Phra Thong, where AMS-14C was complicated by root contamination, optically stimulated luminescence dating (OSL) was applied. By this method, at least three prehistoric tsunamis that hit the Thai coast at 500-700, 1000-1200 and 1600-1800 cal BP have been documented. Furthermore, the chronological data allows the correlation of spatially isolated evidence, ranging from the intra and inter-swale correlation of discontinuous tsunami layers on Phra Thong island to a basin wide correlation of the 500-700 and 1000-1200 cal BP tsunamites from Thailand with contemporaneous evidence from Indonesia, India and Sri Lanka. Ad 3) To estimate the magnitude of prehistoric tsunamis, the spatial distribution of onshore deposits, as well as their depositional structure and composition have been employed, using the IOT 2004 as a reference to evaluate the approaches. Based on the spatial extend of contemporaneous tsunamites, inundation distances of several hundred metres

have been reconstructed for palaeoevents on Phra Thong; for the tsunamis of ca. 500 and 1000 cal BP an impact radius of at least the western Indian Ocean was revealed, implicating lengths of the triggering rupture similar to that of 2004. The faunal and mineralogical composition of tsunami deposits was applied to determine maximum offshore source areas, especially water depth and distance from the shoreline, as an indicator for transport distance and wave parameters. Furthermore, the application of inverse sedimentation modeling on onshore tsunami deposits allowed the estimation of onshore flow speed and flow depth.

### Parameter determination of high-energy dislocated boulders for wave transport equations by terrestrial laser scanning

*Dirk Hoffmeister (University of Cologne), Konstantin Ntageretis (Johannes Gutenberg-University Mainz), Helge Aasen (University of Cologne), Constanze Curdt (University of Cologne), Hanna Hadler (Johannes Gutenberg-University Mainz), Timo Willershäuser (Johannes Gutenberg-University Mainz), George Bareth (University of Cologne), Helmut Brückner (University of Cologne), Andreas Vött (Johannes Gutenberg-Universität Mainz)*

In this study, terrestrial laser scanning is used to determine parameters for wave transport equations of large boulders, dislocated by high-energy wave impacts. The dislocation and transportation of such boulders, which may be tilted or even turned upside down, can be recognized, for instance, by rock pools, adhering remains of sub-recent marine fauna, algal rims and notches. In this case, dislocated boulders in coastal areas in southern and western Greece were surveyed. These coasts are directly exposed to the Hellenic trench, the major tectonic zone in the eastern Mediterranean. Thus, this region shows one of the world's highest seismo-tectonic activities and is well known for its high tsunami risk. Historical accounts and geo-scientific traces of palaeotsunami events indicate that these coasts have been repeatedly affected by tsunami landfall during the Holocene. In this study, we surveyed dislocated boulders within their topographical context using a Riegl laser scanner in combination with a DGPS. With this approach, it is possible to obtain highly accurate volumetric data of dislocated boulders by 3D reconstruction. Further parameters, such as inclination, elevation above sea level or the boulders' distance to the sea can be extracted from the 3D model of the study site. Moreover, density data of rock samples from each boulder were achieved in the laboratory for mass calculations. All parameters were incorporated into selected wave transport equations, which regard the variable "mass" as a direct input parameter for the calculation of wave heights and velocities needed for boulder dislocation. Our

results were compared to data based on manual measurement of boulder axes and roughly estimated rock density values in order to check the differences in accuracy. Our results show that terrestrial laser scanning in combination with DGPS and rock density measurements is capable to derive reliable parameters for wave transport equations resulting in an accuracy better than achieved by approximations, which are still the common method in scientific studies on boulder dislocation. Based on our data set from Greece, we found that estimated volume data together with density approximations result in a considerable overestimation of the mass of dislocated boulders. As a consequence, calculated minimum wave heights and velocities are additionally overestimated, in our case studies by up to 28 % and 83 %, respectively. Thus, we recommend that parameters for wave transport equations calculated in case studies all over the world, using "mass" data derived from measured axes and density estimations are considered with reservation until more accurate volume and mass data of dislocated boulders are available.

#### **Morphodynamic response to episodic storm events: Forty years of surveys of an Australian coastal system, 1972-2012**

*Roger McLean (University of New South Wales)*

Bengello (Moruya) Beach is located on the south coast of New South Wales, about 250 km south of Sydney. It is a typical crescent-shaped beach compartment with an island and tombolo to the north, and a river and headland to the south, a distance of approximately 6 km. The offshore wave climate is energetic and variable. Storm waves ( $H_{sig} > 3$  m) may occur in any month. Tides are semi-diurnal with mean spring range of 1 m. The active beach is backed by a succession of dune ridges, 5 to 8 m high that have developed as a transgressive-regressive sequence during the Holocene. Since January 1972, four beach profiles have been surveyed in the south centre of the beach. Surveys were initially undertaken at fortnightly intervals until January 1976, subsequently at monthly intervals through January 1989, and since then several times a year at approximately six-week intervals to the present. The profiles are located in the most exposed central portion of the beach so as to receive waves from the greatest range of directions. Here we review the entire data set highlighting the time-series of changes in beach volume and trends in erosion and accretion over the past 40 years. The magnitude of profile change clearly illustrates the significance of the major storms (East Coast Lows, ECL) in the mid-1970s that resulted in severe erosion of the shoreline. Recovery from this erosional state took several years and it was not until the early 1980s that the

beach achieved its pre-storm antecedent condition, through incremental accretion and the development of a new foredune. Since then storms associated with ECL have impacted the beach on several occasions and the effects of these episodic events is documented here. The most notable storms since the 1970s occurred in mid-2007 and in May-June 2010. Sea conditions and beach response to these events is compared. Changes in volume and profile morphology were broadly similar though the location of the active beach profile was quite different. Similarly the recovery times (defined as the time taken for beach profile and volume to return to its antecedent condition after the erosional phase) were different. In the mid 1970s this took several years, whereas in 2007 it took a few months. Reasons for these differences are discussed. Although such events can serve as clear reminders of the potential impact of ECL storms, coastal managers should be aware that the scale of shoreline retreat during these more recent events is completely dwarfed by those of the period 1974-78, when the shoreline was some 50-60 m landward of its average 200-2012 position.

#### **Geological and geomorphological impacts of two large typhoons from central Vietnam**

*Adam Switzer (Nanyang Technological University)*

Typhoons Xangsane (2006) and Ketsana (2009) left behind geological and geomorphic evidence of their landfall near Lang Co and Chan May in central Vietnam. In both instances, the events caused the evacuation of several hundred thousand people, considerable deaths (at least 70 and 160, respectively) and damages to infrastructure of more than US\$600 million each time. Storm surges and waves associated with both events left sandsheet deposits and scattered cobble to boulder size clasts on the coastal landscape of this rapidly developing coast. This study details our initial investigation of multiple storm deposits from the Vietnamese coast. These deposits provide modern analogues for the study of past events regionally and globally. In each situation, the deposits show characteristics unique to their setting. In one location, Canh Duong Village, at the northern end of Chan May embayment, the Xangsane event deposited well-defined populations of cobbles (rock) and soil clasts that allows the identification of the sediment source. In a second location, several hundred meters west of Chan May Port and at the southern end of the embayment, the presence of a large tree stump with encrusting intertidal bivalve molluscs and tube worms provides a minimum transport distance for the Ketsana event. When combined with generic information on the extent, height above sea level and sedimentary



properties of the storm-deposited sandsheets, the unique qualities of the different deposits allow an accurate reconstruction of the inundation characteristics of the recent storms. Comparison of run-up data implied by the geoscientific data suggests that tide gauge analysis on this coast is not sufficient for adequate risk assessment.

## RC 04-01 - Conflicts evolving from (re)constructing regions and borders based on historic geographies 1

*Chair: Sabine von Löwis, Nora Lafi*

### Socio-economic disparities in Poland in the light of relict boundaries

*Michał Dolata (University in Poznań), Robert Perdal (University in Poznań)*

The contemporary territory of the Republic of Poland was defined as a result of political conclusions reached in the end of World War II. As soon as military actions came to an end and vast commuting seized, a slow-paced process of shaping new socio-economic space began. Until 1989 the Polish state was developing in the framework of so called Eastern Block, politically and economically subordinate to the USSR. A turbulent process of systemic transition began only in 1989, getting Poland closer to the Western countries and culminating in 2004 with the accession to the EU. The period of gradual social and economic integration of Polish territory did not wipe off relict boundaries - old political boundaries distinguishable in socio-cultural and economic milieus. Boundaries are often revisited considering the context of spatial differentiation of socio-economic development, transport infrastructure or voting preferences throughout the country. Differentiation of socio-economic space in Poland is analyzed mostly at regional level, i.e. voivodeships. In years 1975-1998 this set was composed of 49 fairly small units. Since 1999 the set is formed by 16 large administrative regions. In both sets the administrative borders were only partially and to a limited extent related to former political divisions in Middle-East Europe (relict boundaries). Due to this most geographic analyses did not picture the spacial differentiation, or at least did not allow to reveal the actual outline of "edges" of spaces varying in terms of social and economic development. Such divergence could only be detected at local level and also at subregional level. However, regarding the limited accessibility of statistical data these researches were undertaken merely within single voivodeships. The aim of this paper is to present the internal differentiation of socio-economic space in Poland against the background of the most significant relict boundaries. The research is carried out for the set of NUTS 4 units and focuses on the following aspects: socio-economic level of development, economy structure and labour market situation as well as political preferences of local communities. In the analysis two sets of former state boundaries are considered: in years 1815-1914 (between Empires of Germany, Austro-Hungarian and Russia) and in years 1919-1939 (between Germany and Poland)

with respect to the most relevant political, social and demographic conditions bound to their outline and undergoing changes thereof. The paper is a substantial part of the first stage in a research procedure of a project financed by the National Science Centre (N N306 791940) entitled "Socio-economic development and the pattern of growth and stagnation areas" implemented by the Regional Analysis Department in the Institute of Socio-Economic Geography and Spatial Management of the A. Mickiewicz University in Poznań.

### Identity, Politics, and Persistence of Norms: Evidence from a Natural Experiment in Ukraine

*Leonid Peisakhin (Center for Advanced Studies in the Social Sciences)*

In this paper I make use of a natural experiment that divided a homogenous population of ethnic Ukrainians between Austrian and Russian empires in the late 18th century to demonstrate that historical legacies are not always a proxy for differences in factor endowments. I show that when otherwise identical communities are exposed to different institutions during the pivotal moment when group identity is being created, the behavior of affected communities starts to differ. Differences in behavior and attitudes between previously identical communities usually persist for a long time even when institutions that initially helped shape the change in primary identity have long disappeared. Data from a survey of 1,395 individuals in 195 settlements situated within 16 miles of the long defunct Austrian-Russian imperial border in western Ukraine demonstrate that despite numerous institutional and material perturbations the populations residing either side of the former imperial border are still very different today when it comes to political and economic behavior and attitudes. They vote for different parties, hold diverging views on both Ukraine's past and its future and do not see eye to eye when it comes to the practice of collective farming or the rule of law. I advance a theoretical explanation to account for this puzzling variation and consider plausible alternatives.

### Unraveling buried borders in South-Eastern Lithuania

*Dagnosław Demski (Institute of Archaeology and Ethnology)*

Shifting borders make changes in political, historical, social and cultural life. Some regions had history of relatively more such transformations than other in Europe. Replacement of one state after another makes social and cultural landscape adjusted with several old traits buried less or more deeply, and what one can find reflected in various dimension of people living everyday practice.

The same is in case of South-Eastern Lithuania. People living together in the contemporary time make references to distinct periods of the past - Soviet Union, midwar period, nineteenth century, etc. The aim of the presentation based on an extensive fieldwork is to show how and why hidden borders matters today, not only as potential cause for conflict. To accomplish this survey the everyday practice was chosen as a medium through this subject of re-constructing was considered and analyzed. As everyday practice I mean not only language, schools and church, but also several other aspects of everyday life (celebrations of festivals, telling specific anecdotes, expressing peculiar verbal ways of provoking assaults on each other often reflecting taboo topics in mutual encounters, and variety of cultural incompatibility). Constructions and re-constructions cause reshuffling of spatial divisions through politics of memorials oriented in a different way to the previous political states of order. The paper also highlights the diverse historical and even mythical references of normative ideas operating behind these re-constructions, tensions between locally rooted people versus newcomers, main themes of stories published in press both official and peripheral, and the case of foreign media (television) that shapes an informational local space intensively.

### **The development of Slovenia and its historic borders**

*Matej Kralj (Universität Erfurt)*

Staaten schaffen nicht nur einen einheitlichen politischen Raum, sondern synthetisieren auch eine damit korrespondierende Geschichte. Wie der Raum, gründet auch das soziale Gedächtnis auf der Grundlage der Differenz, und zwar in der Unterscheidung zwischen dem, was institutionell erinnert und was vergessen wird. Die zeitlichen und die räumlichen Komponenten lassen sich analytisch trennen, obwohl beide im dominanten Selbstbild des Nationalstaats strukturell miteinander verknüpft sind, indem sie gleichsam auf den In- und Ausschluss von kulturellen Praktiken, sozialen Gütern, geschichtlichem Wissen, Menschen, Vorschriften etc. verweisen. Die Verbindung zwischen den politisch-räumlichen und den geschichts-politischen Konstruktionen ist in einer Reihe von postsozialistischen Staaten beobachtbar. Das Beispiel Slowenien ist interessant, da die Slowenen in 1991 den eigenen Nationalstaat zum ersten Mal bildeten. Im neuen politischen Raum wurden auch die Grenzen historisch aufgeladen und objektiviert:(a) Die Grenze zwischen Slowenen und Kroaten wurde nicht nur durch die innerjugoslawischen Konflikte der 1980er relevant, sondern durch die spätere Bestrebung Sloweniens, sich von der sozialistischen Vergangenheit zu lösen. Über den genauen Grenzverlauf herrscht bis heute eine

Auseinandersetzung, bei der es weniger um einige Quadratkilometer Land und Meer geht, als vielmehr um symbolische Fragen der eigenen Zugehörigkeit und Auseinandersetzung mit der Geschichte des Eigenen. Nachdem eine zwischenstaatliche Grenze etabliert wurde, die das früher zusammengehörige trennt, wurde sie schnell als eine historische gerechtfertigt: Sie wurde zu der ältesten Grenze in Europa erklärt, einer zwischen der K&K-Monarchie und dem Osmanischen Reich, gar dem Heiligen Römischen und dem Ungarischen Königreich. (b) Im Unterschied dazu ist die Grenze zu Österreich eine, die symbolisch für die Verbundenheit mit Österreich stehen soll und welche also weniger auf Differenzsetzung als auf Einheitsbildung zurückzuführen ist. Sie markiert zum Einen die Hinwendung Sloweniens zu einem gedachten europäischen Kulturraum, zu dem man sich nun geschichtlich zugehörig fühlt; zum anderen wird auch diese Grenze historisiert, womit die Neuentdeckung der eigenen K&K-Geschichte der Slowenen einhergeht. An den empirischen Beispielen zeige ich, wie das Erinnern an historische Räume von gegenwärtigen räumlichen Strukturen bestimmt ist. Damit wird vor allem deutlich, dass historische Grenzkonflikte mehr mit dem Heute als mit dem Gestern zu tun haben; vorrangig erklärbar sind sie als Konflikte der Gegenwart, die in die Vergangenheit projiziert werden.



## RC 04-02 - Conflicts evolving from (re)constructing regions and borders based on historic geographies 2

*Chair: Sabine von Löwis, Nora Lafi*

### Internal Displacement of Communities in Manipur Hills and its Effect on Livelihood System

*Periya Raikham (North Eastern Hill University Shillong)*

Racism has been one of the main factors influencing force displacement as it has been witnessing in different countries around the world. The persons who have been or being forced to flee or leave their homes or places of habitual residence they are known as displaced persons. Displacements are most frequently caused by various factors like natural calamities, climatic changes and socio-economic factor, cultural and political causes. Inter-ethnic violence has become one of the common factors in almost all over the world. In North-East India, the politics generally follows the ethnic path. Ethnic-cultural mobilization and movements launched by various ethnic groups in the region has remained an ongoing process. Many ethnic groups have launched entirely new type of movements in some cases. Such ethnic movements create tremendous hardship to the people living in the area and faces force migration and thus they are displaced from their homeland. Manipur is not far from such crises and due to political aspirations and other reasons among them creates incoherent environments in the state that led to armed conflicts. In the hills four of the five districts are associated with the Naga freedom movement, thereby causing communal tension and on the other hand Kukis are demanding Kuki homeland. The feud between the two tribes Nagas and Kukis have been traditional historical and geographical, each of them try to gain political and geographical supremacy on the other from the previous century. The communal violence between Nagas and Kukis re-emerged in 1992, which was dormant after the 1919's violence. From the middle of 1992 the conflict between the two groups took an ugly turn and within a short span of time, it led to wanton killing and kidnapping, burning of houses and destruction of private and public properties as a regular practice and thus people suffer such hardships. The Naga- Kuki conflict in the hills of Manipur has led to the displacement of about 11000 Kukis and Nagas since 1992. The casualties on both sides have been severe. More than 11,000 houses belonging to both tribes have been torched in arson. More than 600 villages have been uprooted. The conditions of the displaced people are pathetic. The non-existence of formal government funded relief camps; the

displaced have faced more hardships. For this study four hill districts have been chosen i.e Senapati, Tamenglong, Chandel and Ukhrul district. It is mainly because these districts are populated with Naga and Kukis where ethnic conflicts are continuing and socio economic conditions are disturbed. The objective of study is to understand the changes of livelihood system of the internally displaced Nagas and Kukis in the four hill districts of Manipur after they returned to their original villages.

### Historical reconstruction of the rural settlements of indigenous peoples of the North-East of Russia

*Antonina Savvinova (North-Eastern Federal University), Viktoriya Filippova (North-Eastern Federal University)*

The processes of globalization are accompanied by serious social and environmental costs, faced by indigenous peoples. Traditional areas of their settlement are usually situated in the center of economic interest, so for example in the North-East Russia natural resources associated with the mining industry and the commodity nature of development. These same areas are located in the homelands of indigenous peoples of the North, where there is traditional natural resource management: reindeer herding, hunting, fishing within the boundaries of nomadic tribal communities. Thus, there is the challenge of intensive industrial development and traditional ecological nature management in the same area. Since the beginning of the industrial development in the North and in Siberia have increased number of industrial cities, settlements of indigenous people closed as "unpromising" and the people were moved in large municipalities, which led to a reduction in their traditional areas of rural settlement. For the historical reconstruction of rural resettlement of indigenous peoples of the North-East of Russia as the main source used various maps containing information about their resettlement. Study of literary and archival material showed that the territorial organization of life of Indigenous Peoples of the North has been dictated by administrative measures, an important role in shaping the settlement system has played an administrative-territorial division. Knowledge of the dynamics of grass-roots administrative division has a special significance for the organization of spatial information, without restoring the history of the system of administrative-territorial division is impossible to conduct spatial analysis of information on the territory for a sufficiently long period. Calculation of areas of settlement of small peoples and study their interactions with the administrative-territorial boundaries allows for the reconstruction of the resettlement of Indigenous Peoples of the North-East of Russia. We made the approbation of



the spatial reconstruction of the borders and the settlements of Yakutia - one of the major subjects of the Russian Federation. For the monitoring of changes in political divisions of Yakutia we've done the work on analyses of the maps of XX century - were analyzed maps of 1914, 1927, 1941, 1953, 1962, 1989 and 2000 years. Map, scale 1:2 500 000 for the final overlay map was chosen because it allows to track changes over time and space. The calculations showed that the area of traditional settlement of indigenous peoples in Yakutia XX reduced, areas of settlement and natural resource people located within different administrative units, which affects the maintenance of cultural, economic relationships.

### **Across the boundary. Strategies of urban space management in the city of Sarajevo.**

*Elena Bassi (University of Milano - Bicocca)*

This ongoing PhD research focuses on the case study of Sarajevo and its territorial partition and investigates the way in which strategies of town planning and territory management symbolically define and shape the urban spatial reality. Considering the presence of the administrative boundary that separates Sarajevo from East Sarajevo, the analysis shows that such strategies involve definitions and interpretations of reality that confirm a logic of separation and emphasize the symbolic meaning of the boundary. The Inter Entity Boundary Line (IEBL) institutionalized by the Dayton Peace Agreement signed in 1995, separates the two entities of Bosnia and Herzegovina (BiH) - Croat-Bosniak Federation (FBiH) and Republika Srpska (RS) - and at local level divides two cities that before the war were part of the same urban system: Sarajevo, including the historical neighborhoods of the city and part of FBiH, and East Sarajevo, a suburban area now included in the territory of RS. Behind its administrative importance, the boundary holds a symbolic meaning that dates back much earlier than 1995 and originates from geographical narratives that stress the connection between land and nation [Kostovicova, 2004]. Considering the presence of three constitutive peoples in BiH - Croats, Serbs and Bosniaks - such link becomes even more relevant since through time different spatial narratives have supported nationalistic claims that lead to conflicts over control of territory [Dell'Agnese, Squarcina, 2002; Kostovicova, 2004; Rumiz, 2011]. Drawing on the idea that analyzing processes and dynamics at urban scale can provide significant results also at wider level [Ashkenasi, 1988; Brown, 1993; Friedland, Hecht, 1996; Bollens, 1998a; 1998b; 2000; 2001; 2009; Calame, Charlesworth, 2009], this work investigates the role played by strategies of

urban space management in reinforcing or undermining the symbolic meaning of the boundary nowadays. Considering the characteristic of the context, Sarajevo appears a significant case study: the absence of shared infrastructures and public services between the two cities and the use of signs and symbols that constantly remark the presence of different collective identities highlight the role of town planning strategies in confirming the symbolic relevance of the territorial partition. Far from being neutral technical prescriptions, the tools through which urban policy interventions are implemented involve in their normative frame specific definitions and interpretations of reality [Lascoumes, Le Galès; 2004]. Moreover the feature of urban landscape and the way in which space is shaped and organized represent concrete manifestations of such definitions and interpretations; the analysis here presented focuses on these elements in order to shed light on the symbolic value still held by the boundary.

### **Geopolitics of a transborder region: Cultural regionalism in the Fergana valley. How to make geopolitics research in Central Asia.**

*Isabella Damiani (UMR 8586 PRODIG/CNRS)*

This paper proposes a geopolitical analysis of a centrasian transborder region, the Ferghana Valley, which is today divided between the Republics of Uzbekistan, Tajikistan and Kyrgyzstan. This division and the following boundary materialisation caused many types of border conflicts : resource management, movement limitations for transborder populations and growth of nationalisms. The topic of the research is hence the analysis of power rivalries between 'territorial actors' over the 'territorial stake' of the Fergana Valley, a fertile basin of strategic location within the larger geopolitical context of Central Asia. Always a stake disputed by various territorial actors over time, the Fergana Valley now experiences power rivalries from contemporaneous territorial actors first and foremost on the border and transborder levels. By doing so, the paper introduces a new actor in the classical geopolitical pattern of analysis: the cultural regionalism. The dissertation hence offers a detailed presentation of the cultural regionalism as well as an evaluation of its past and current importance. First focusing on the centrasian context and the peculiarities which stem from its borders, the introduction presents the 'stake' Fergana and its economic and physical resources which explain its importance as a territory.

## RC 05-01 - Development-induced displacement: Addressing conflict and impoverishment

*Chair: Andreas Neef, Jane Singer*

### Hidden Losers of Development: Impacts of Displacement on Urban Locality and Settlers - a case-study of the railway project in Metro Manila

*Narae Choi (University of Oxford)*

This study seeks an understanding of the complex ways in which people are affected by the consequence of development-induced displacement (DID), with a particular focus on settlers remaining in the locality after displacement takes place. Displaced people have been the central concern of DID research as they bear the most obvious social cost of development in the form of forced displacement. However, few studies have addressed the fact that other people might have been adversely affected within a DID context without being physically displaced. By investigating non-displacement impacts, this research aims to identify these 'hidden' losers of development, who may be less visible than those physically displaced but who can also experience significant changes in their life. Three sets of questions are explored for the purpose of understanding non-displacement impacts on the locality and its settlers through an empirical case study of the railway upgrading project in Metro Manila, the Philippines. First, who remains in the locality after the forced displacement event? How are they able to stay on whilst others are displaced? Second, how has the locality changed since the mass- displacement? In what ways is the remaining population affected by such changes in the locality? Third, how are diverse and complex modes of living affected in different ways? Who becomes more vulnerable and who remains resilient? These questions are contextualised within the specifics of the urban area under study and also in view of broader urban changes. The complexities of both urban living and urban displacement are untangled and then reorganised into an analytical framework that was developed from analysis of the data. Data were collected through semi-structured qualitative interviews with the people living alongside the railway. Interestingly, many of the interviewees turned out to be either temporary or permanent returnees from relocation sites. Their presence was so prevalent that the field research incorporated displaced, as well as non-displaced, people, which enriched the analysis. Empirical findings confirm that physical changes in the locality, compounded by the mass-scale displacement of informal settlers, have

changed the socio-economic environment of the area significantly, which further impacts on livelihoods and the social relations of individual households. By showing that impacts of a developmental change can be more diverse and complex, this study challenges and expands the current conceptualisation of development impacts in DID research and practice, which is primarily focused on forced displacement and resettlement. This calls for a critical rethinking of the developmental change that requires human displacement, since questions remain unanswered with regard to whether such diverse and complex impacts can be addressed by policy interventions.

### A political economy of displacement and resettlement in Andhra Pradesh. The case of the Polavaram dam.

*Chiara Mariotti (School of Oriental and African Studies)*

This paper adopts a political economy approach based on the notion of adverse incorporation in order to investigate the effectiveness of a concrete instance of resettlement in preventing the impoverishment of people displaced by development. The concrete instance investigated is the Polavaram dam in Andhra Pradesh. The dam, whose construction started in 2004 and is still in progress, will lead to the submersion of 177 villages and the displacement of 200,000 people. Of these, the greatest majority is poor and belongs to Scheduled Castes and Scheduled Tribes. The investigation dwells on the findings of a fieldwork conducted in the affected area in 2009, specifically on the results of a survey and a choice experiment, as well as on government documentation concerning the Andhra Pradesh Resettlement & Rehabilitation policy (R&R) and the Polavaram R&R package. The paper claims that resettlement of people displaced by development projects must be understood as a process of adverse incorporation, and that this approach allows the identification of the structural factors that limit the ability of resettlement to prevent the impoverishment of the displaced people. What makes resettlement a process of adverse incorporation, is that fact that it is required to dispose of people expropriated of their sources of livelihood and made redundant by the same process of development. To the extent that resettlement takes place in conditions where the agrarian sector does not guarantee sustainability and subsistence, and economic growth does not create enough employment to accommodate everyone, the displaced population is adversely incorporated into the very same process of development and thereby impoverished. The paper applies the notion of adverse incorporation to the case of the Polavaram dam. It finds that the resettlement of the Polavaram displaced population will come with

an alteration of the terms of access to the sources of livelihood, and that this in turn will produce an increase in landlessness, fragmentation of landholdings and causalisation of labour. That is, resettlement will have important dynamic consequences which ultimately will lead to the adverse incorporation of the displaced population into the local process of economic development. The paper further shows that these dynamic consequences are the results of three major shortcomings of the Polavaram R&R package: the inadequate handling of land compensation, the exclusive focus on cash compensation, and the neglect of the creation of employment opportunities outside agriculture. Finally, these shortcomings are found to depend on the interaction between the poor design of the package on the one hand, and the socio-economic characteristics of the displaced population, the features of the relocation areas and the development path undertaken by the specific context on the other hand.

### **Fostering participation for dam-displaced ethnic minority groups in Vietnam**

*Jane Singer (Kyoto University)*

Construction of large hydropower dams to meet Vietnam's burgeoning electricity demand has displaced hundreds of thousands of highland residents in recent decades. Many of the displaced communities are already marginalized indigenous ethnic minorities, for whom resettlement and the loss of productive land has spelled increased, often long-term impoverishment. While that has been the prevailing narrative for the past several decades, several recent developments give promise of improved outcomes. As part of a wider grassroots democratization and economic reform process, the Vietnamese central government has enacted legislation in recent years that improves terms of land and asset compensation and allows villagers a greater voice in resettlement planning and decision-making. Intergovernmental organizations that have participated in dam projects in the region, like the Asian Development Bank and World Bank, have adopted stringent resettlement guidelines promoting greater resident participation and implementation of benefit sharing mechanisms to allocate some power authority revenues for local development activities, raising hope that dam-induced displacement can be transformed from being little more than an agency for impoverishment to being a vehicle for improved livelihoods. However, achieving positive results require transcending a host of institutional hurdles, including Vietnam's tradition of top-down, centralized rule, government distrust and condescension towards ethnic minorities and poor implementation by local government officials. In this paper the author reports on

field studies of several resettled villages in the highlands of central Vietnam and the questions they raise about the prospects for more equitable and participatory resettlement.

### **Involvement of the local population in large-scale land acquisition projects – insights from Mali**

*Kerstin Nolte (German Institute of Global and Area Studies), Lieske Voegt-Kleschin (Greifswald University)*

Lately, large-scale land acquisition in developing countries (LaSLA) has received considerable conflicting media attention: Proponents conceive of LaSLA as much needed investment into the formerly neglected agricultural sector. Opponents focus on the negative social consequences of the phenomenon, pointing out that for many, especially poor and vulnerable social groups, access to land constitutes the main basis of livelihood. Thus selling or leasing land results in loss of livelihood for these people. However, LaSLA commonly targets state owned land, that is, land to which local people do not have legal property rights. Thus from an official angle no formal rights are violated. The paper presents field study data from the Office du Niger (ON) region in Mali, which has witnessed a surge of interest in the last decade. The Malian government encourages investors to undertake large-scale agricultural projects in the area in order to tackle much needed infrastructure work and development of the land. A large number of leases or bilateral agreements have been concluded recently. We look into three recent cases of investment projects in the ON, all of which are in the phase of being implemented: Two sugar investments by a Chinese-Malian investor and a public-private partnership with Malian and Western partners, as well as a huge Libyan rice project (whose future is unknown in view of the current developments in Libya). In October and November 2011 we conducted semi-structured expert interviews with government officials, civil society, and investors, and held six focus group discussions (FGDs) in three villages directly affected by the planned investments. We shed light on the process of a land acquisition in the ON and the involvement of the local population. We put a special focus on sensitization and information of the population, displacements and compensations. Moreover, we analyse the expectations of the population towards the investment. The government claims that investors bring much needed development to the area. We discuss whether this development includes the local population or benefits only few. In particular, we focus on local people who do not have legal property rights to land. We argue that in cases where land constitutes the main base of livelihood, the



leasing or selling of land can be conceived of as a violation of this human right to an adequate standard of living (UDHR, Art. 25,1) irrespective of the existence of legal property rights to this land. We acknowledge that erosion or loss of access to land can be compensated for by improving access to other capital assets and propose to employ the capability approach to evaluate what could qualify as adequate compensation.

## RC 06-01 - Early warning systems for natural hazards – technical challenges and social demands

*Chair.: Thomas Glade, Jürgen Pohl*

### Integrative landslide early warning systems

*Rainer Bell (University of Vienna), Julia Mayer (University of Bonn), Benni Thiebes (Nanjing Normal University)*

Landslides occur frequently throughout the world and cause numerous fatalities as well as severe economic damage each year. To reduce landslide risks and negative consequences early warning systems are a very good option. However, in the past early warning systems often failed. One important reason for this is that the early warning systems were merely technical systems, which did not take into account the needs of local actors and threatened people. Thus, integrative approaches are needed, which incorporate not only various natural sciences but also engineering, economic and social sciences. Within the research project ILEWS (Integrative Landslide Early Warning Systems) such an approach was applied. The methodological architecture of ILEWS spans from field installations of novel sensor combinations and near-real time landslide modelling to end-user optimised action advises. The monitoring of the landslide comprises continuous to periodic measurements of surface and sub-surface movements (tachymetry and inclinometers), soil moisture (2D-resistivity, TDR-probes, tensiometers) and climate data. Three different approaches are applied to model the stability of the slope and to predict slope failure. A central data analyses, visualisation and early warning platform was established using innovative geoinformation approaches and modern geodata infrastructures. Furthermore, end-user needs were explored to ensure that the early warning system meet their needs. Finally, protection goals and damage potentials were defined. The presentation will roughly summarise the main project results and then focus on 15 general principles which should be considered when new early warning systems are to be set up. These, of course, are not only valid for landslide early warning systems but also transferrable to many other hazards.

### User needs and economic benefits of early recognition of droughts in Switzerland

*Sylvia Kruse (Swiss Federal Institute for Forest, Snow and Landscape Research), Irmi Seidl (Swiss Federal Institute for Forest, Snow and Landscape Research)*

Drought monitoring, forecasting, and early warning is only a promising investment if it provides benefits to water users. This is the starting point of the project DROUGHT-CH 'Early recognition of critical drought and low-flow conditions in Switzerland' (Funding Swiss National Science Foundation; 2010-2012). Embedded in an interdisciplinary research design the project links the hydrological and meteorological characterization and early recognition of critical drought and low-flow conditions in Switzerland with the identification of the needs of stakeholders vulnerable to droughts and decision makers from administration in order to develop an information and early recognition platform. The paper will present first results from the socio-economic work packages that focus on the specific user requirements for drought forecasting and on potential economic benefits of an early recognition information system. The main objectives of the socio-economic research are twofold: First, to assess the specific needs of Swiss water user groups with regard to an early recognition system; and second, to investigate the potential benefits regarding early recognition systems for selected economic sectors. This stakeholder based approach will ensure that the development of the information platform within the further research meets the needs of the anticipated users. Based on a survey and stakeholder workshop we have identified drought and low-flow indicators that are most important from the point of view of different user groups in Switzerland. The survey and workshop included representatives from different sectors: agriculture, forestry, energy production, water supply, shipping, nature conservation. The results show that for effective early recognition, additional information about relevant drought indicators needs to be made available (e.g. average, deviations); more importantly, information needs to be processed and interpreted according to the needs of the target group (e.g. a bulletin for low flow conditions for shipping) and transferred to the user in an adequate way (e.g. internet, sms alert). The results of the survey and stakeholder workshop therefore also show which are - from the perspective of the user groups - adequate forms and channels for information. The potential economic benefits have been assessed by using expert interviews and a semi-standardized survey focusing on three economic sectors: agriculture (fruit-growing), energy (hydropower) and forestry. First results can show what (economic, ecological, social) impacts droughts and low flow conditions can have for the different

sectors, what are currently used strategies and measures to mitigate or reduce harm/damage and what are the benefits of early recognition to prevent damages.

### **Cyclone Warning Systems in Coastal Districts of Andhra Pradesh With Special Reference to S.P.S.Nellore District**

*Nagula Nagabhushanam (S.V.University), D.Chandrasekhar Reddy (S.V.University)*

Among all the coastal districts of Andhra Pradesh, the southern most is Sri Potti Sriramulu (S.P.S.) Nellore district. It is very prominent with a lengthy coastline of 165 kms lying adjacent to Bay of Bengal. The district was exposed to repeated and more number of cyclonic storms of severe intensity accompanied by storm surges, caused un measurable devastation of people, livestock, settlements, crops, soils, properties etc. This loss can be prevented by the application of timely available efficient Cyclone Warning Systems (CWS), creating proper awareness among the people about disasters and their likely impact and adopting appropriate advance measures for disaster reduction. Since, a sound early warning system is a prerequisite for effective disaster management, the state of art of forecasting and warning by Indian Meteorological Department (IMD) in mitigating the intensity of disasters in various parts of the country is briefly discussed in the present paper. The main objective of the present study is to discuss the cyclone detection and warning systems established by Indian Meteorological Department (IMD). The cyclones, storms, depressions over the Indian seas are detected and tracked with the help of conventional meteorological observations, High-power cyclone detection radars and satellites. The Geostationary Indian National Satellite (INSAT) provide continuous surveillance of the cyclones and no cyclone can go undetected in the Indian Ocean by the INSAT satellites. The cyclone warning process in coastal Andhra Pradesh, the mode of dissemination of warnings and cyclone warning centres established in the district and their functionalities are discussed in detail in the present paper. \* 1. Professor, Head and Chairman BOS, Dept. of Geography, SVU, Tirupati. 2. Research Scholar, Dept. of Geography, SVU, Tirupati.

### **Impact of bank erosion hazard on human occupancy in the Jia Dhansiri River basin in Assam, India**

*Rana Sarmah (Pandu College)*

Magnitude of river bank erosion in the Indian part of the Jia Dhansiri River basin is studied by comparison of differently dated satellite data. Bank line layer of the river for the years 2006 is superimposed on the layer of 2000 in GIS environment and the spatial change therein is calculated and recorded. A village layer is created using revenue circle map of the study area. This layer is superimposed on the bank line layers, and erosion areas under each village are calculated. Erosion area data of villages are classified into three classes and on this basis villages have been categorized. These categories are high erosion affected villages (loss of more than 30% area of the total village area), medium erosion affected villages (loss of 30% - 10% area of the total village area), and low erosion affected villages (loss of less than 10% area of the total village area). It is found that out of 302 villages of the study area 74 villages were affected by river bank erosion hazard during the period under study. The river has engulfed 21.43 km<sup>2</sup> (7.64%) area of the erosion affected villages during 2000-2006 which are basically intensively cropped agricultural lands and homestead areas. Socio-economic survey on the erosion affected villages reveal that over 15% families give up primary occupation for losing landed property. Majority of persons of these families compelled to took secondary and tertiary occupation after loss of their agricultural lands. As such, 69% and 2000% number of families increased in secondary and tertiary occupation during 2000-2006 after shifted their household due to bank erosion hazard. This study also reveals that over 48% families resettled acquiring government land within 2 km distance. It further reveals that loss of principal crops and other household properties has gone to the tune of '80/family/year which is quite a high amount for poor peasant whose average income is '550/family/year. Rise of bed level and development of braids, floods, coarse texture of bank materials, man made structural controls, floods, are examined to be principal causes/processes of bank erosion. Three bank erosion hazard zones of the study area viz. high, medium, and low are proposed and demarcated based on (i) location of in channel features such as large channel bar, shoal, thalweg position, etc.; (ii) structural controls such as bridge, spur, etc.; (iii) location of floodplain features adjacent to channel such as wetlands, floodplain gullies, and tributary rivers; and (iv) location of village in respect of alignment of river banks. Some measures for mitigation of bank erosion hazard and protection of local resources are made here.



## RC 07-01 - Emerging risksapes and the spatial dimension of risk

*Chair: Ragnar Löfstedt, Detlef Müller-Mahn*

### Anthropogenic Threats and Risks to the Development of Ukraine Geosystem: Analysis of the Factors and Causes

*Olena Dronova (Institute of Geography of NASU), Leonid Rudenko (Institute of Geography of NASU)*

Anthropogenic Threats and Risks to the Development of Ukraine Geosystem: Analysis of the Factors and Causes Olena Dronov', Leonid Rudenko 1. Human development and its economic activity has led to a significant concentration of both the population and production, which is followed by focusing of raw materials, products and wastes of various level of danger to humans and living organisms. At the same time, the ecological characteristics of the natural components of geosystems are destroyed as a result of application of imperfect technologies and engineering. Different types of emergencies combined with the dangerous geological and hydrometeorological processes appear and greatly increase the risks and threats to development. 2. We can consider Ukraine as a classic example of intensive unsustainable development during few last decades with irrational economic management of the territory and sizeable regional disproportions arisen. Despite the advantageous geographical location, flat country and temperate climate, there are many threats to human life every year due to the technical condition of the majority of industrial enterprises and social infrastructure where the main production facilities are worn by about 60 percent. In 2010, the 254 technogenic, natural and social emergencies were registered in Ukraine that had caused human casualties and financial losses. 3. The main factors causing the anthropogenic risks and threats remain: around 2.8 million cubic meters of solid radioactive waste located in various places; a huge amount of industrial waste occupying about 160 hectares; more than 1000 facilities that use or store hazardous chemicals; about 1500 explosion and fire facilities; the emergency condition of infrastructure/housing; outdated industrial processes etc. 4. The executed spatial analysis of the causes of anthropogenic risks in Ukraine geosystem allows establishing cause and consequence links of interaction/influence of various reasons as well as the reactions in human society and ecosystems in regional aspect. On the base of statistic data, correlation analysis and mapping the functional zoning of Ukraine territory has been developed identifying the types of anthropogenic pressure following from the

different contribution of various factors. 5. The root reasons of anthropogenic emergencies in Ukraine are investigated in the plane of fundamental macroeconomic and demographic problems and linked, above all things, with the specific of common man attitude to the nature and the existent social and economic situation in the country. The appropriate scientific and practical ways for the risk minimization and elimination have been substantiated by means of strategic planning instruments aiming to achieve the sustainable development of Ukraine geosystem.

### Risk reduction – an integration task

*Stefan Schneiderbauer (European Academy), Stefan Kienberger (University of Salzburg)*

Societies all over the world face increasing risks to suffer from external shocks or stresses. Reasons for that are manifold and include environmental (climate) changes, societal changes and the combination of both. As a consequence, risk reduction is an increasingly important task in communities worldwide. Nowadays it is widely accepted that risk reduction strategies need to be embedded in a holistic risk governance approach, the basis of which is an integral, spatially explicit assessment of risk, bringing together the hazard, exposure and vulnerability components. Theoretical frameworks to do so are numerous whilst the process of transferring them into application in practice is thorny. Based on the experience of a number of applied risk assessment (and climate change vulnerability) studies, we identify integration as a major task and name four different conceptual levels of integration striving for more standardization, comparability and transferability of risk assessment methods: Concepts The dominating schools of thoughts that tackle various aspects of risk assessments differ in approaches and focus of study and/or terminology. Ideally they are at least partly merged. A minimum requirement is to be aware of the potential ambiguity of certain use of terms and to be transparent about the approach that has been applied. Methods Different spatial, non-spatial, quantitative and qualitative assessment approaches exist; certain approaches integrate statistical or expert-based weightings. For a holistic assessment most often a 'combined-methods' approach is best. In the end the choice of methods is target- (thus user-) driven and strongly relies on the study's spatial and temporal context. Policies and programs A number of risk assessment exercises depend at least partly on funds related to specific programs, initiatives or simply institutions. The development of risk assessment approaches for example in the EU is financed by the EC's SPACE, Environment and transport program. Risk



assessment with an emphasis on development paths are supported by UNISDR, UNU, the World Bank etc. Each program follows specific policy objectives and sets its focus accordingly whilst the risk assessment often could benefit from combining them. Data fusion is available in different quality originating from various acquisition methods with different spatial references (admin boundaries, pixel sizes). They often need to be aggregated and/or disaggregated to allow for integration and comparison. A holistic risk assessment integrating concepts, methods, data and policy objectives of various approaches is required in order to ensure that funds are used in the best way. The researcher's role and responsibility is to be informed and aware about the different integration needs, to apply integration activities at all required levels and to formulate such needs and relevant shortcomings as policy recommendations.

### **Riskscape of Pandemic Emergency Response**

*Jonathan Everts (University of Bayreuth)*

Riskscape of Pandemic Emergency Response Jonathan Everts (University of Bayreuth) The 2009 A H1N1 pandemic (swine flu) proved right continuous warnings against emerging viruses and pandemic risk. At least since the late 1980s, the 'emerging disease worldview' became a staple of global health politics and discourse (King 2003; Lakoff 2010). National public health centres and authorities began increasingly to 'gear up' for pandemic emergency response since the 2001 Anthrax attacks, SARS in 2003, and the increasing spread of highly pathogenic avian influenza (H5N1) in 2005-2006. Looking at severe complications and the death toll due to H1N1, swine flu seems like a small pandemic event. Nevertheless, response measures were oriented at the risk of a possible H5N1 pandemic with likely mortality rates over 50 percent. In consequence, public health officials and experts worked initially under the extreme conditions of an anticipated very lethal and quickly spreading disease. Although H1N1 was acknowledged to be generally mild within a month of its first laboratory confirmation and response measures were backtracked, the riskscape initially laid out and communicated was that of a major global disease event. Analysing the construction of this specific riskscape, we would expect to find public health and scientific practices at the forefront of its creation. However, based on empirical work within the US, the riskscape produced by eminent public health agencies is neither freewheeling nor uncontested product of expert practices. Instead, we find the emerging pandemic riskscape as negotiated and overlapping with riskscape defined by international organisations, national governments, economy, the media, and the public. In

discussing processes announcing H1N1's multilayered riskscape, I seek to demonstrate more broadly the contested spatial and social dimensions of risk, risk management, and risk communication.

### **Uncertain topographies, landscapes of fear and geographies of violence in Sri Lanka**

*Benedikt Korf (University of Zurich)*

This paper investigates the uncertain topographies and landscapes of fear that emerge out of the geographies of violence that shape contemporary warscapes. In his seminal work on humanistic geography, Tuan (1978) studied landscapes of fear as inscribed in mental processes of imagined geographies. In this paper, a conceptual framework is developed that goes beyond Tuan's experiential approach and territorializes landscapes of fear in the material topographies of risk and uncertainty that emerge in the interplay of war and survival economies in civil warfare. These topographies of risk are manifested in territorial orders and spatial vulnerabilities as these become confined in different time-spaces. The framework is illustrated using ethnographies from the civil war in Sri Lanka that studied the survival economies and livelihood strategies of farming and fishing families in the east of Sri Lanka in the period of 1999-2002. The empirical material will demonstrate how livelihood vulnerability and local agency are territorially confined through uncertain topographies and landscapes of fear.

## RC 08-01 - Flood risks under conditions of global change: Dealing with uncertainties and dynamics of flood risk in urban areas 1

*Chair: Laurens Bouwer, Volker Meyer, Christian Kuhlicke*

### Assessing the exposure to climate-related flood risk in the highly dynamic urban setting of Ho Chi Minh City

*Nigel Downes (Brandenburg University), Harry Storch (Brandenburg University)*

Delta-cities such as Ho Chi Minh City (HCMC) exhibit higher exposure levels to flood risk primary as a result of their location, their low elevation and if located in tropical regions, the significant annual variations of climatic and weather extremes they incur. Our assessment highlights that for exposure to tidal flooding, rapid urbanisation driven by socioeconomic development (including population and economic growth) is proportionately more important for emerging deltaic Asian megacities, like HCMC, than projected sea-level rise up to the year 2100, under a high-emission scenario. Furthermore the large increase in the built-up extent exposed to flood risk can also be seen as an indicator to the risk associated with a corresponding increase in both terms of population and assets. These will be ultimately exposed following rapid social-economic transformations and urbanisation which are projected for the coming decades. Interestingly from the implementation of the land-use plan up to 2025/30 with an extreme sea-level rise of 1 m for 2100, two-thirds of the total estimated exposure of the built-up area results from the planned urban expansion into low-lying areas, which are widely known as flood-prone at the current max-tide. The assessment into the future impacts of urban development on the urban hydrology additionally highlights the dominant role of that rapid urbanisation processes play in future risk. With the implementation of the future development plans up to 2025/30 the impervious coverage will be seen to double for the entirety of HCMC. This act would significantly double the amount of surface-runoff - a current major cause of urban flood problems. Interestingly however, most scenarios for climate change risk, still predominantly focus only on the potential pathways of climate change, rather than integrating the socio-economic and vulnerability pathways, such as the future spatial development patterns of mega-urban agglomerations. Here focussing on improving the resolution of the climate change data is not the most critical issue, rather more important is the adoption of a more pragmatic approach to work with the

existing data at the local scale. Integrating an urban development scenario - i.e. based on the official land-use maps up to the year 2030, provides more realistic and tailored assessment results. Our study highlights, that the influence of non-climatic stressors - like urbanisation as the spatial manifestation of socio-economic processes are still widely under acknowledged. An urgent need has arisen to readdress and improve the scientific methods and datasets to examine these non-climatic key drivers of future urban risk and to assess their relative importance for risk propagation compared to primary changes in climate. The most significant issue here is the integration of the future dynamics of urban development.

### Risks in mega-cities under a changing climate: Water shortage and floods in Pearl River Delta, China

*Liang Yang (University of Hamburg)*

Urban cluster of the Pearl River Delta (PRD) in southern China is usually portrayed as an area of water abundance. However, the view should not be static all the time. Along with the changing climate, water problems of PRD mega-cities fall into two extremes. At one extreme is the monsoon period between April to September when the area becomes flooded due to heavy rainfall within the whole river basin and some typhoon or tidal events. At the other extreme is the dry season between October to March when the cities become water stressed due to low and unsustainable water availability. Water shortage in these mega-cities is characterized by seasonal insufficient precipitation, seawater intrusion, increasing water pollution, poor water facilities as well as decreasing water amount per capita due to increasing population. While it's possible to deal with the risks when we know there would be a flood or drought, the uncertainty of climate change and its effects on water resources seems to be more frightening. This uncertainty causes a new severe risk which is that we don't know where the risk is. Besides, additional risks posed by climate change to these cities and their people will likely enlarge the disaster scale and force people to spread attention on more small troubles. Thus mitigating floods and ensuring enough water availability are the two major water resources management challenges for PRD mega-cities. This paper discusses several prior strategies to address the water issue and especially the new risks under climate change: (1) learn from and carry forward positive water engineering; (2) enhance the ability of individuals or families to respond to water risks, encourage 'own' activity based on 'their' context; (3) develop flood/drought insurance to share disasters in large scope and long period.

Finally, this paper stresses that the cities' authorities should revisit the region's development plan to develop a long-term, integrated water management strategy that recognizes the added risks from climate change and rapid development.

### **Invisible Dwellers, Visible Slums: Effects of Slums on the Health of Accra, Ghana**

*Simon Mariwah (University of Cape Coast)*

In developing countries, about half of the city dwellers live in slums. However, since city authorities do not plan for or manage slums, the people lack access to municipal services such as water, roads, sanitation and sewage. This attitude to slum dwellers and approaches that disregard them, perpetuate the levels and scale of poverty, which impacts on the cities as a whole. The paper draws on existing literature and GIS data to examine how the neglect of slums increases the vulnerability of the entire city of Accra, especially during flooding. The study found that most of the perennial flooding in Accra greatly affects slums and unplanned areas, leading to the outbreak of cholera and other sanitation related diseases, which spread to other areas of the city and thereby affecting both the slum and non-slum dwellers. The study recommends that city authorities should employ a more inclusive approach to planning and land management if they are to sustain all the people who live in them.

### **Are areas affected by flood and stagnant water associated with poorer health outcomes in urban slums of Dhaka and adjacent rural areas?**

*Md. Mobarak Hossain Khan (Bielefeld University), Oliver Grübner (Humboldt-Universität zu Berlin), Alexander Krämer (Bielefeld University)*

**Background and objectives** Globally Bangladesh is one of the worst victims of excessive rainfall and floods. Unfortunately the frequency of floods has increased substantially in recent decades due to both natural/climate-related and man-made factors. Frequent flooding in Bangladesh is a serious concern because each flood could hinder the overall economic growth, jeopardise the development activities, break down normal life, health and well-being of the affected people. Particularly megacities, coastal areas, cities and urban slums are more affected by floods and related problems such as water logging and sanitation. Higher surface runoff accumulation and lack of drainage provision and pumping facilities to remove the stagnant water cause water logging in the

cities. In Bangladesh, all the big cities are prone to regular floods. Particularly Dhaka city experiences flood almost every year during the monsoon season. Comparatively slum dwellers who constitute about one-third of the urban population are at higher risk of flooding because of low quality dwellings, lack of effective flood-proofing devices, and poor socioeconomic and environmental conditions. Considering this background, we aimed to explore whether areas affected by flood and stagnant water (FSW) have an influence on health outcomes of adults living in urban slums of Dhaka megacity and adjacent rural areas. We also assessed the differences of individual, household and area level characteristics between people living in FSW affected and non-affected areas. **Methodology** Data were collected from 3,207 adults through baseline surveys conducted in two consecutive years (2008 and 2009). Twelve big slums in Dhaka and three adjacent villages were selected for our questionnaire surveys. Face-to-face interviews using a multidimensional pre-tested questionnaire were conducted by trained university graduates. We performed various types of analyses ranging from simple frequency analysis to multivariable logistic regression modeling. **Results** Our empirical findings suggest that slums are more affected by FSW as compared to rural areas. People living in areas affected by FSW are more vulnerable in terms of individual, household and area level characteristics than non-affected people. Similarly affected people suffer more from health symptoms (namely fever, cold/cough, weakness), communicable diseases (namely diarrhoea and gastric), and poor mental well-being. However, the burden of non-communicable diseases is lower among people in FSW areas affected. **Conclusion** Well-designed and comprehensive public health interventions focusing on the individual and the community level as well as structural interventions may reduce flood-related consequences and hence improve health-related outcomes among people living in urban slums of Dhaka.

## RC 08-02 - Flood risks under conditions of global change: Dealing with uncertainties and dynamics of flood risk in urban areas 2

*Chair: Laurens Bouwer, Volker Meyer, Christian Kuhlicke*

### Solving the riddles of the flood in Central Plain, Thailand in 2011

*Chaiyan Rajchagool (Payap University)*

Some floods are more explainable, hence, possibly preventable than others. The flood in Central Plain, Thailand in 2011 is extremely enigmatic, not to say about its scale of disaster. Different state authorities, different civil organizations and, not to understate, different social classes and political groups have given their respective 'explanations' and, their related preventive measures. Given a few exceptions, all these pundits are categorical in their perspectives. They range from 'climate change', the mismanagement of water resources, the unregulated urban development, the power struggle among socially-grounded residents, etc, to even a far-fetched 'conspiracy theory' with ominous political motives. The proliferation of explanations as well as people's conviction themselves could well be a subject of sociological and political study. Similar to other debates of scientifically as much as politically heated issues, each position has increasingly become entrenched. The ground of communication has been eroded rather than constructively bridged. This paper, with no professional agenda and even less so political flag to carry, is an attempt to subject the significant explanations of the flooding to a critical examination. The scrutiny begins with their conceptual approaches as well as their underlying assumptions, then to read each 'findings' in relation with one another. In addition to the data of the amount of rainfall, of the reservoir capacities, of the water demand speculation, the paper will go beyond the conventional approach of supply/demand analysis. With the built-environment and human efforts from different sources and the author's own theoretical perspective, it is hoped that the paper, distancing itself from a mono causal mode, could shed some additional light on the academic and political controversies. Additionally and more importantly, it might be able to offer some preventive measures that could be relevant to future Thailand and, not least, to other developing countries in monsoon regions in general and in Southeast Asia in particular.

### Adaptation to global change: Can private households contribute to flood risk reduction in German cities?

*Heidi Kreibich (German Research Centre for Geosciences - GFZ), Philip Bubeck (German Research Centre for Geosciences - GFZ)*

Damage due to floods have increased during the last few decades, and further increases are expected due to climate change and an increase in vulnerability. To address the projected increase in flood risk, a combination of structural and non-structural flood risk mitigation measures is considered as a promising adaptation strategy, since they take into account that flood defence systems may fail, and prepare for such unexpected crisis situations. Non-structural flood risk mitigation measures like shielding with water shutters or sand bags, building fortification or safeguarding of hazardous substances are often voluntary, and it demands self-dependent action by the population at risk to undertake such measures. It is believed that these measures are especially effective in areas with frequent flood events and low flood water levels, but some types of measures showed a significant damage mitigation effect also during the extreme flood event at the Elbe River in August 2002 in Germany. However, information is still scarce about factors that motivate people to undertake such measures, the spread of different non-structural measures in different areas and their damage reducing effects. To gain further insights into these aspects, computer aided telephone interviews have been undertaken in the cities of Dresden and Cologne in Germany. The interviews contained various questions about non-structural measures undertaken, flood experience, risk awareness, coping appraisal and suffered flood damages. The presentation will compare the situation in terms of non-structural measures in Dresden and Cologne. Questions covered are: How many households have undertaken specific measures and why? Which policies are effective to stimulate the implementation of such measures? What measures were particularly effective in reducing damage?

### Challenges for the evaluation of flood risk driving forces and the development of urban adaptation strategies in the context of global climate change

*Sebastian Scheuer (Humboldt-Universität zu Berlin), Dagmar Haase (Humboldt Universität zu Berlin), Martin Volk (Helmholtz Centre for Environmental Research - UFZ), Andreas Neumann (Humboldt-Universität zu Berlin), Volker Meyer (Helmholtz Centre for Environmental Research – UFZ)*

If flooding and flood risk is seen in an integrative, holistic manner, it can be regarded as being steered by characteristics of elements at risk (i.e. their spatial distribution and value) and of the flood hazard (i.e. by its intensity and probability). Climate change is estimated to lead to regionally diverse changes in precipitation intensity. Whilst an increase of precipitation is expected for Northern Europe, a decrease is estimated for the South. It is further estimated that the number of extreme precipitation events will increase. These changes will feed back on hazard intensity - or hazard probability respectively - and thereby affect flood risk. Global change, i.e. land-use changes as well as population dynamics will additionally affect flood risk by altering the quantity and value of elements at risk. In this context, risk needs to be seen as a dynamic rather than a static measure. To support emergency planning, flood risk management and the development of urban adaptation strategies it is necessary to evaluate future effects of these driving forces on flood risk. We present a loose-coupling, spatially explicit modelling approach to assess flood risk driving forces in the context of global climate change. Thereby, we seek to appraise the influences of flood risk drivers and to identify future hotspots for adaptation and planning. We also aim to deduce uncertainties and shortcomings of current model approaches and projections. The case study is carried out for the Mulde catchment located in Saxony (Germany). This region has been hit by numerous large-scale flood events, e.g. in 2002 and 2006. The study focuses on the effects of climate change, population dynamics and land-use change. We couple selected hydrodynamic models (SWAT, IHACRES, TRIMR2D) with a population model (PDE) and a cellular automaton for the prediction of land-use changes (MOLAND) to create the input data for the multicriteria flood risk assessment (FLOODCALC). The case study uses projections until 2030/2050 to estimate future flood risk as a basis for the identification of regional hotspots and the development of adaptation strategies.

### Knowledge and Networks – Integrated Flood Risk Management Planning in Goal-directed Networks

*Gerard Hutter (Leibniz Institute of Ecological Urban and Regional Development (IOER))*

Integrated Flood Risk Management Planning (IFRMP) is an ambitious task. Institutional actors ('organizations') from different governance levels and societal spheres need to work together under time pressure, resource constraints, and the possibility of misunderstanding due to limited previous working experiences and heterogeneous 'intellectual capital' (Van den Bosch et al. 2006). Consequently, research about networks and partnerships suggests that institutional actors should not work together unless it is really necessary to reach an important goal at the network level (Huxham & Vangen 2005, Provan & Kenis 2007). Against this background, the paper shows that the concept of 'goal-directed networks' is a useful concept to analyze and assess the conditions of IFRMP based on social relations between institutional actors from different levels and societal spheres. The concept of 'goal-directed networks' has been developed in a series of papers from the network literature in the social sciences (see Kilduff & Tsai 2003, Provan & Kenis 2007, Raab & Kenis 2009). Goal-directed networks are networks of organizations (at least three) that are legally autonomous (e. g., state and local authorities in Germany) and that share - to some extent - a goal at the network level (e. g., formulating and implementing a plan to reduce flood risk in a flood-prone area through structural measures, Hutter 2007). Goal-directed networks are organized through establishing a network governance form. The paper distinguishes between (1) 'self-governed network', (2) 'lead organization network', and 'network administrative organization' (Raab & Kenis 2009). The analysis refers to a goal-directed network established after the Dresden flood disaster in August 2002 ('Weisseritz-Regio') and to two other networks of different size and governance form that address specific planning challenges of IFRMP in the context of climate change adaptation in urban regions ('KLIMAFit' and 'REGKLAM'). It is the aim of the paper (1) to describe the three examples from a network and strategic planning perspective on IFRMP, (2) to assess the examples under specific criteria (such as 'Integration of different forms of knowledge') and (3) to derive conclusions that are relevant for risk governance in urban regions.

## RC 09-01 - Free flow or better stay at home? Changing practices in the management of international mobility.

*Chair: Martin Geiger, Harald Bauder*

### Migration in Control Societies: Governmentality without Territory

*Joshua J. Kurz (Ohio State University)*

This paper responds to the call for research on the practices motivating and promoting changes in the management of international mobility, the social consequences for migrants and societies resulting from mobility-related practices, with a view toward elaborating normative ideas of a "no borders" politics. Contemporary practices of policing migration flows no longer follow a logic of inclusion/exclusion because the border is no longer the primary site of enforcement and the goal of such practices is no longer to keep mobile populations out of a territory. Western ("receiving") states rely instead on myriad techniques that implement three broad strategies: the internalization and externalization of policing, and the excision of territory. By shifting migration enforcement away from borders, the governance of human mobility has become dislocated from territory, contributing to the rapid rise in the securitization of migration precisely because of this dislocation. This paper explores various technologies of migrant policing and their relation to, production of, and ambivalence toward various territorialities. Using Gilles Deleuze's analysis of "control societies," the author orients these technologies as mechanisms that modulate population flows in ways that produce "inclusive exclusions" and "exclusive inclusions," where migrant presence or absence is approached as a process of filtration rather than exclusion. The author argues that these control mechanisms, or modulating technologies, help to produce a generalized condition of precarity, which facilitates state and economic interventions that would not otherwise be possible. The paper concludes with a consideration of potential political subjectivities produced by and through governmentality without territory. Rather than a project of "open borders," the author explicitly locates these subjectivities as operating in a politics of "no borders," paralleling the territorially dislocated technologies of population modulation. New spaces, literally and figuratively, for politics and resistance are opened as an incitement toward articulating a stronger "no borders politics."

### The IOM's Role in the Implementation of the EU-Russia Readmission Agreement

*Oleg Korneev (European University Institute)*

Based on the fieldwork conducted in Brussels, Moscow and Central Asia, this paper analyses the involvement of the International Organisation for Migration (IOM) in the EU-Russia bilateral cooperation on migration management. The main questions addressed in this paper relate to the formal role of the major implementing partner that the EU has assigned to IOM and to the actual 'behaviour' of IOM on the ground. This analysis is situated in the theoretical framework describing international organisations as bureaucracies and within the discussions about international migration governance and international migration management. The paper describes the context of the EU-Russia migration management cooperation and identifies major activities of IOM in Russia. Treating international organisations as bureaucracies that pursue their own interests, the paper argues that far from being a mere implementing body, IOM is an actor that, to a significant extent, has shaped the outcome of EU-Russia migration dialogue, while it is the context of this bilateral cooperation that has allowed IOM to strengthen its position vis-à-vis both Russia and the EU. Most of the existing studies on EU-Russia cooperation relating to migration issues focus on these two actors - for the purposes of research often reduced to single units, presented somewhat as 'black boxes' - without paying attention to various internal forces that underlie their policy choices and to the context in which this bilateral cooperation is forged. However, both the EU and Russia are complex objects, each representing a web of stakeholders with multiple political agendas. Moreover, this formally bilateral cooperation involves other important actors, in particular international organisations (IOs). Thus, the results of this cooperation are shaped by multiple arrangements established between these various organizational forces. The EU-Russia Readmission Agreement (2006) provides a good case for a study of such arrangements, since IOM - a global leader in so-called migration management - is involved in its implementation. This paper is divided into four parts. The first part introduces some theoretical reflections on international migration governance, international migration management and on IOs as bureaucracies. The vision of IOs as competing bureaucracies is then applied to IOM. The second part describes the context of EU-Russia cooperation on migration management focusing on the EU-Russia readmission agreement. The third part looks at IOM's activities under the projects financed by the EU in Russia. The fourth part discusses the complex

relationship between EU institutions, Russian authorities and IOM, and the multiple roles played by IOM in this setting.

### **"Migration as adaptation strategy": The promotion of migration management in the face of climate change**

*Romain Felli (University of Manchester)*

Numerous recent reports by non-governmental organisations (NGOs), academics and international organisations have focussed on so-called climate refugees or migrants. This paper examines the turn from a discourse of 'climate refugees', in which organisations perceive migration as a failure of both mitigation and adaptation to climate change, to one of 'climate migration', in which organisations promote migration as a strategy of adaptation. Its focus is promotion of climate migration management, and it explores the trend of these discourses through two sections. First, it provides an empirical account of the two discourses, emphasizing the differentiation between them. It then focuses on the discourse of climate migration, its origins, extent and content and the associated practices of 'migration management'. The second part argues that the turn to the promotion of 'climate migration' should be understood as its way to manage the insecurity created by climate change. Furthermore, the promotion of migration management is justified through its supposed developmental benefits, thus turning the discourse of climate refugees into one of utilitarian international labour migration.

### **Transnational practices of migrant care workers in the EU – On the institutionalisation of illegalised cross-border mobilities**

*Anke Strüver (University of Hamburg)*

Taking transnational domestic and care workers from Eastern Europe in Germany as example, this contribution focuses on the multiscalarity of economic and social relations. As a consequence of neoliberal transformations in European welfare states, demands for personal domestic services increase and are met by Eastern European female migrants. On an individual level, these migrants' activities rely on two strategies, namely rotating between places and between care and career. However, with respect to broader migration regimes and mobility politics, the labour practices of care workers rely on 'irregular' border crossings. For, despite both the (assumed) growing integration within the European Union and the intensification of cross-border labour mobility between the EU-members and their neighbouring states in the East, the free movement of

workers and full acknowledgement of their qualifications have not been established yet. Current cross-border labour politics thus result in the production of irregular migration in general and illegalised migrants in particular. Against this background, the paper specifically addresses (1) the questions of social consequences for individual migrants and involved societies (receiving societies and societies of origin) and concentrates (2) on underlying normative ideas of (the management of) human mobilities, transnational practices and cross-border migration. These points are discussed with reference to empirical research disclosing irregular cross-border mobilities of transnational care workers - as both risky and promising way of life for the migrants themselves, - as both risky and curative for the receiving societies at the same time (applying 'curative' in its literal and symbolic sense), and, finally - as a way to replace the increasingly acknowledged 'institutionalised porosity of the EU's (external) borders' with a regime that depends on the 'institutionalisation of illegalised cross-border mobilities'.



## RC 10-01 - Geographies of violence 1

*Chair: Derek Gregory, Benedikt Korf*

### The Art of War in the Age of Digital Producibility

*Oliver Belcher (University of British Columbia)*

In recent years, the US military has adopted and deployed a wide-ranging array of digital technologies to visualize and store information on 'insurgents' in Afghanistan and Iraq. From geospatial intelligence and full-motion video from drones, to biometrics and digital database management, the US military has made it clear that the future of warfare will not be in analog. Instead, the certainty of a future battlespaces will be guaranteed through digital 'reality mining' and social network analysis based on digital forensics. As one New York Times reporter recently put it, '[a] citizen in Afghanistan or Iraq would almost have to spend every minute in a home village and never seek government services to avoid crossing paths with a biometric system.' However, digital imagery, as it pertains to the certainty and meaning of 'the real,' presents us with rather idiosyncratic problems. For thinkers as disparate as Heidegger, Jameson, and Benjamin, pre-digital modernity was predicated on an ontological distinction between 'reality' and 'representation,' with a representation 'here' indexing a physical reality somewhere and some point 'out there.' For Heidegger, it was between material reality and representation where certainty and the modern experience of meaning emerged -- what he famously called, "enframing." But, what happens to the status of this index when the technocultural apparatus through which (re)presentations are produced has transformed from a photographic reproducibility (Benjamin) to a digital producibility? How does the myth of certainty get woven through digital presentation? I will discuss theoretical problems associated with this 'digital event' in the context of the US counterinsurgency campaign in southern Afghanistan, where digital imagery is used to determine the extent of entire 'enemy spaces' outside of Kandahar City.

### Contested Sovereignty and the Emergence of New Spaces of Violence. The Example of the Afghan-Pakistan Borderlands.

*Conrad Schetter (Rheinische Friedrich-Wilhelms-Universität Bonn)*

The sovereignty triangle – the connection between statehood, the monopoly of violence and territory – has undergone tremendous changes in the past decade.

The drone attacks carried out by the US-military in the Federally Administrated Tribal Areas (FATA) of Pakistan are an exemplary case for both, the legitimacy discourse and the new forms of violence; both are particular tied to space. So the paper aims to explain why the FATA are a prime example and sketches a new US-military doctrine based on the creation of such new spaces of violence. On the theoretical level this paper intends to trace the development of such new spaces of violence through the contestation of sovereignty from the debates about fragile statehood, human security, via the „war on terror“ to the idea of „ungoverned spaces/territories“. Hereby the theoretical discussion intends to reflect on the ideas of Carl Schmitt, Giorgio Agamben and Zygmunt Bauman.

### Political rule in warscapes: Theoretical reflections and the empirical cases of Abkhazia and Nagorno-Karabakh

*Franziska Smolnik (Stiftung Wissenschaft und Politik/Berlin)*

The paper will argue that the understanding of violent conflict as warscape - introduced by ethnographers and picked up by political geographers - is well suited to also expand knowledge related to violent conflict in the discipline of political science. This will be demonstrated by exploring political rule in the South Caucasus 'de facto states' Abkhazia and Nagorno-Karabakh. In offering a more nuanced analytical lens to violent conflicts, the notion of warscape helps one to differentiate the various impacts violent conflict has had on political rule in these entities. To explore how specific configurations of political rule emerge in such setting the paper draws upon Bourdieu's analytical tools of capital and field, thus trying to present an additional perspective on warscapes that focuses on how the warscape is interrelated with complex arrangements of political rule that actors not only have to navigate but are also engaged in (re-)producing.

### Exploring the labyrinth of battlefields: A gender perspective on wartime narratives and representation

*Stela Arar (Durham University)*

In the summer of 1982, the IDF (Israeli Defence Force) invaded Lebanon all the way to Beirut with an objective to drive out the PLO (Palestinian Liberation Organisation) leadership and destroy its guerrilla forces. Three years later, the IDF withdrew from the capital and created a buffer zone in southern Lebanon known as the security belt or, in popular parlance, 'the Strip'. Such a decision was deemed necessary, according to Israel, in order to prevent terrorist attacks from targeting its northern territories. Consequently, the security belt, a strip of





rural area with an average width of 15 km along the borders, comprising 10% of the country - fell under the Israeli occupation for more than 18 years and it was soon depopulated and virtually cut off from the rest of the country since hardly any Lebanese not from the Strip ever step foot there. For many years the status of this narrow strip of land was considered strategically critical as it remains the last military active frontier of the Arab- Israeli struggle. Moreover, hosting an array of protagonists (UN observers, IDF forces with their proxies and Hezbollah fighters), the area witnessed frequent assaults and, caught in between, Strip-dwellers were forced to make compromises necessary to survive. The paper seeks to explore not only the complex means, through which the battle space was shaped, but moreover, it examines the narratives through which a representation of the Strip was produced in the imagination of the Lebanese population.

## RC 10-02 - Geographies of violence 2

*Chair: Derek Gregory, Benedikt Korf*

### Violence in Shangri-la: Post-conflict politics and the establishment of the new Republic of Nepal

*Andrea Nightingale (University of Edinburgh)*

Nepal's political transition has captured the world's attention as it attempts to write a new constitution and establish a Federal Republic. Recent ethnographic research indicates that violence and coercion along with patronage are becoming the norm, with a variety of domains of everyday life becoming increasingly politicised along political party lines. This paper explores the spaces and practices of 'post-conflict' to interrogate how violence intersects with patronage relations to build a logic of rule. Drawing on ideas of governmentality and other work on political violence, we focus on resource governance as a key context wherein various ideas of 'democracy', 'authority' and 'legitimacy' are contested and (re)produced. Through this lens we interrogate the contours of the new Republic of Nepal.

### Drought, Economic Shocks and Civil War Violence: A disaggregated Study of Somalia

*Niklas Harder (University of Kiel), Vincent Kahl (University of Hamburg)*

Various studies have found robust correlations between economic factors and civil war onset. As this correlation suffers from severe problems of reverse causality, several authors use climate data as an instrumental variable. However, the focus on civil war onset overlooks the spatial and temporal dynamics of climate variables, economic indices and civil war violence. The proposed paper seeks to analyze whether regional factors can help to explain location and timing of civil war violence. The paper uses monthly observations from 18 different regions of Somalia (time-series cross-section) to examine the relationship between rainfall, economic stress and civil war intensity. The paper develops a theoretical model that differentiates between those patterns of violence that can be explained by strategic interaction and those patterns of violence that can be explained regional economic and climatic factors. The paper shows considerable and significant effects of regional factors on the spatial and temporal patterns of violence in civil war. The paper is largely based on theoretical literature from the field of Political Science conflict research but seeks

to use Geographical data and methods to enhance the understanding of spatial and temporal dynamics in civil war.

### Climate Wars Redux? On Climate Variability and Armed Conflict in Asia.

*Gerdis Wischnath (Peace Research Institute Oslo (PRIO)), Halvard Buhaug (Peace Research Institute Oslo (PRIO))*

Climate change to be a driver of conflict seems undoubted in policy and media. Contrarily, the empirical literature on the topic is lacking robust findings and has not been able to support the public claims on a risk-inducing effect of climatic changes on internal armed conflict. However, most of the quantitative work in the field suffers from overly aggregated research designs and has mainly focused on linkages between climate anomalies, economic decline and armed conflict via the state level. To overcome those shortcomings, this study takes a closer look at possible linkages at the local level. Neither climatic change nor armed conflict equally affect countries as a whole. By focussing on local geographical characteristics, actor's motivations and group dynamics we argue that conflict is most likely to break out where climate extremes interact with ethno-political marginalization, population density and other local features that make some areas more prone to climate-induced shortcomings than others. We move the traditional focus away from Africa by focussing on Asia instead and we apply a disaggregated research design that captures subnational differences in climatic, social and geographical characteristics. Nonetheless, the empirical analysis finds no support for a risk-inducing effect of climate extremes on the local likelihood of conflict outbreak. Conversely, we find weak evidence for the opposite effect: conflict onset being less likely in times of climatic stress.

### Space and Conflict: Religion, Politics and Violence in Ayodhya, India

*Basabi Khan Banerjee (Georg-Eckert-Institute), Georg Stöber (Georg-Eckert-Institut)*

Space and Conflict: Religion, Politics and Violence in Ayodhya, India According to the notions of space, the relationship between space and conflict is polysemic, comprising the area where a conflict takes place or the subject of conflict where various actors give different meaning to a locale / space and construct conflicting issues. These issues might be on the rights / control over a space, access to the space, or on its usage. Eventually the space might become a 'place of remembrance' (lieu de mémoire) for a specific conflict and ensuing

events. This presentation will look into the conflicts around the Babri-Masjid which evoked wide-spread violence extending from the locality, Ayodhya in the federal state of Uttar Pradesh (Northern Province), to the regional, national and even international scales. The Babri Masjid built in 1527 by order of Babur, the first Mughal emperor of India, and named after him, became the subject of controversy when Hindus claimed the same site as the birthplace of the Hindu deity, Lord Rama. Idols were placed in the Mosque (illegally?) on December 23, 1949 which became a judicial issue. After 1986, Hindu Nationalist groups and political parties took up this claim for their political achievements and as a means for mass mobilisation. The Masjid was destroyed in 1992 to build a new Rama temple on that site. Further development of this conflict is characterised by an outburst of communal violence in India, Pakistan and among South Asian diaspora communities abroad. In the course of time, not only the number of actors grew, but the perception of the conflict underwent changes, posing threats to : religious cohabitation the secular nature of Indian constitution and posing a challenge to the geographers, transition theorists and even economists about the cruciality of the cultural meaning of 'space'. Despite the deep involvement of the - independent - judiciary, conflict on the right to the disputed site is not yet resolved, still is a burning issue with the potential to erupt again. Additionally, Babri Masjid site has manifested into a symbol of politicised religion, communalism and fundamentalism. This presentation will try to analyse the role of conflict and impacts of violence, the interplay of various actors with their diverse positions and aims, changing and evolving through time and over space.

## RC 11-01 - Indigeneity, state power and struggles over space

*Chair: Judith Miggelbrink, Bernd Belina*

### Melanesia's violent spaces: The case of Solomon Islands

*Matthew Allen (The Australian National University)*

Melanesia's violent spaces: the case of Solomon Islands This paper draws upon Michael Watts's work on governable spaces and "economies of violence" in the Niger Delta (2004a, b, c) and Colin Filer's concept of the "ideology of landownership" in Papua New Guinea (1997) to explore the interplay of resource capitalism, the state, identity, and conflict in the case of the so-called 'ethnic violence' that took place in the post-colonial Melanesian nation of Solomon Islands between 1998 and 2003. Against a backdrop of the commodification, alienation and 'mobilisation' of customary land that has been taking place in the context of globalisation and rapid socio-economic and agrarian change, this schema of the political ecology of violence is elucidated with reference to three governable spaces: customary landownership, indigeneity, and nationalism. I demonstrate the ways in which the territorialising and exclusionary logics of these governable spaces antagonised, problematised and contradicted one another, and, in doing so, gave rise to violent conflict. In sharp contrast to the resource determinism, state-centrism and ahistoricism of much of the 'resource conflict' literature, attention to governmentality and scale elucidates the highly contextual and contingent nature of the resource-related violence that took place in Solomon Islands. As has been the case elsewhere, Melanesian societies, identity groupings and nations are not blank slates upon which resource capitalism has etched linear and predictable pathways of conflict. Rather they are spaces of pre-existing forms of governance - fields of power - that have been brought into a relatively recent encounter with particular types of capitalist and statist projects. At the centre of these encounters one invariably finds struggles over access to, and control of, land and natural resources; and the Solomons case provides a salutary reminder that these struggles can only be robustly understood with reference to 'local histories and social relations' (Peluso and Watts 2001).

### From Conflict to Understanding to Transformation

*Marvin Drake (University of Tübingen)*

Jos, a large city in central Nigeria formerly noted for its mild climate, warm hospitality and as a haven for tourism, now largely consists of completely segregated Christian and Muslim neighborhoods, each marked by a mood of anxiety, apprehension, hostility and fear toward the religious "other". The major bone of contention in what has become known as 'The Jos Crisis' is the indigene-settler syndrome, and the key question is 'Who owns Jos?'. Autocratic military regimes governed Nigeria for all but five years from 1967 until the return of democratic rule in 1999. In 1991 President Ibrahim Babangida created the Jos North Local Government Area (LGA), allowing a minority ethnic group, the predominantly Muslim Hausa, to gain political control of the central area of the city, and relegated the three majority and predominantly Christian indigenous ethnic groups to the new Jos South LGA. The indigenes interpreted the unilateral decision as a deliberate scheme to place the city under Muslim economic and political control. In the absence of an acceptable resolution a political dispute evolved into a protracted sectarian conflict, and thousands of innocent men, women and children on both sides have since been murdered just because they were Muslims or Christians. The 1999 federal constitution clearly defines the criteria for Nigerian citizenship. But it also distinguishes between indigenes and settlers in particular localities. An indigene is someone whose ethnic group has a 'homeland' in a particular politically-defined locality or state, and who was also born in the same area. Nigerians who were born and have lived their entire lives in a particular state but whose ethnic groups are native to another locality or state are always considered to be 'settlers'. No provision exists for changing someone's identity from a settler to an indigene. Settlers are at the mercy of local government officials who have the power to grant or deny citizenship rights to them, meaning they are subject to be denied: employment for certain jobs; civil service appointments; admission to secondary and tertiary educational institutions; scholarships; and opportunity to seek political offices. A research project beginning in 2012 will study the stereotyped perceptions and attitudes of individuals and groups toward the religious 'other', and how they can be dramatically changed by framing them in terms of the foundational tenets of their respective religions. The knowledge and understanding to be acquired will be applied to peacebuilding strategies beginning in 2013. The indigene - settler issue demands a political solution, but the practice of 'love of neighbor' can do much to restore peace and harmony to Jos.

## Gorkhaland Movement in India: A case of indigeneity and / or a struggle over space?

*Basabi Khan Banerjee (Georg-Eckert-Institute), Georg Stöber (Georg-Eckert-Institut)*

Gorkhaland Movement in India: a case of indigeneity and / or a struggle over space? Multicultural concerns have been a core element in Indian constitution, in its political decisions and functions to accommodate the country's vast social and political diversity ('unity in diversity'). But these efforts of integration have been continually challenged by demands / movements for separate statehood or sovereignty since independence. New states came into existence, carved out of the initial federal states, multiplying in its numbers. Most of these struggles or movements were based on linguistic or ethnic issues. In this backdrop, Gorkhaland is another case but a special one. The Gorkhas, originally an ethnic group from eastern Nepal, were brought in the region in large numbers by the British as workers in tea and cinchona plantations. This colonial encounter is a very important historical background to understand Gorkhaland movement which is lingering for over almost three decades with the demand for a separate state, seeking independence from the federal state of West Bengal, but not from India. The demand for a statehood started as early as 1907, became stronger since 1982. The formation of Gorkha National Hill Council (GNHC) made the region somewhat calmer for a short period of time. But the attempt to include the Darjeeling Hill Council in the Sixth Schedule of the Indian Constitution could not meet the popular aspiration of the Gorkhas to create a 'diasporic public sphere' (Appudurai). Gorkha homeland question is not any more about autonomy only. Questions were raised about the representative claims of the Gorkhas over the entire Nepali population of India and on their claims of being the majority group. Since they are not the original inhabitants (Adivasis) in the claimed region, the issue has become more complex. Also the economic potential of the region concerned and political power play between the state and the other interest groups add to this complexity. This presentation aims to examine the Gorkhaland issue and tries to analyse the developments of the same to understand conflict and power struggle over space and its various forms of legitimisation in the context of a post-colonial country. The attempt will be to probe, whether the essence of the statehood demand here stems from the congruence between the federal political boundary and the ethno-linguistic boundaries of the people, or from the alleged hegemony of the West Bengal Government and its negligence. Or is it an attempt to reclaim lost territory as a consequence of partition in 1947. Or is it just the lust for power? Demands for

political autonomy in case of Gorkhaland portrays the difficulty of fitting it in a clean category of indigeneity. This struggle over the control on space is not only a multi-faceted one with many actors and interests, but is also a burning issue in India.

## Antagonistic struggles over political space in Ecuador

*Carolyn Schurr (Universität Bern)*

'Surprisingly enough, relatively little critical reflection has been devoted to what constitutes the proper political domain, to what and where is "the political"' (Swyngedouw 2008). 'This political space I am occupying is a space from which women and especially Shuar women have always been excluded' (interview with an indigenous national deputy of the Ecuadorian Asamblea Nacional). Reading the interview quote from the Shuar deputy against Swyngedouw's reflection, we have to ask not only where the political is located but also who is in- or excluded in the spatiality of politics. In this paper, I engage with the question how spatialities of politics can be conceptualised in a way that the power relations and resulting hegemonies and marginalization that constitute these very spatialities become visible. Departing from Gregson's and Rose's performative approach to space, I suggest that their notion of performative space is inherently political as it situates power relations at the centre of their understanding of space. At the same time, I want to push Gregson's and Rose's argument further by elaborating conceptually on the antagonistic power relations that constitute the spatialities of politics. By bringing Mouffe's notion of politics as antagonism/agonism into dialogue with the concept of performative space, I intend to shed light on the way spaces of politics are brought into being, materialise hegemonic political orders and are subjects of contestation. I think through this theoretical dialogue between Mouffe and Butler - via Gregson and Rose - along my empirical research about transformations in local spaces of politics in Ecuador in three steps: First, along the (post)colonial history of Andean politics, I ask how a spatialised political order is established and maintained. Second, focusing on indigenous movement struggles in Ecuador's recent history, I highlight how Butler's notion of subversion and Mouffe's concept of disarticulation are suitable to frame counterhegemonic struggles that contest the hegemonic political order. Third, taking up Mouffe's idea of agonistic pluralism, I discuss whether the Ecuadorian political imaginaries of interculturalidad and plurinacionalidad could actually expand the categories of the political towards an agonistic democracy. Finally, I turn back to Gregson's and Rose's performative



thinking of space, summarising how their concept needs to be further developed to turn it into a vital tool for political geography.

## RC 12-01 - Local Responses to Natural Disasters 1

*Chair: Andreas Neef, Rajib Shaw*

### **Coping with Floods in Dhaka's Marginal Settlements: Why is Social Capital so Powerful?**

*Annika Salingré (Universität zu Köln), Tibor Abheuer (University of Cologne), Boris Braun (University of Cologne)*

The urban poor in marginal settlements (slums) face two major problems: Everyday life is characterised by the struggle of earning enough money and thus securing food and shelter, not even talking of bigger investments like education for children or medical treatment. On top of this, natural disasters put poor people at the edge of survival many times because they have to rely on meagre livelihoods. Due to the high exposure of many Asian megacities to natural disasters large numbers of slum dwellers are threatened. However, there is an ongoing academic debate on the potential of social capital to support people to overcome crises and even to adapt to natural disasters in the long run. Literature provides substantial evidence that despite a lack of financial and physical resources and a lack of sound disaster management by the government poor people are able to cope with many things from everyday challenges to severe disasters. On the basis of an extensive standardized field survey and additional qualitative interviews in Dhaka's slums, our paper uncovers the important role of social capital in providing strong resources to the urban poor. We shall particularly elaborate on the significance of social capital to slum households in coping with severe floods. Our results show that most of the slum dwellers are able to apply various kinds of coping strategies and most of these strategies are related to components of social capital. A high prevalence of trust enables people to borrow food, clothes and money within their slum communities. Informal employment supports people to escape from the vicious circle of indebtedness. The social fabric of the households is redundant and well based on cultural and religious norms. Therefore, our empirical results support current findings in academic literature on the decisive role of social capital in enabling poor people to overcome times of crisis. This is true for severe external shocks as well as for everyday life. Thus, it must be kept in mind that these coping strategies only allow for survival. Extreme events do prevent households from accumulating economic wealth and therefore disturb long-term socio-economic development.

### **People's Perception on Natural Disasters and Local Survival**

**Strategies in Sundarban Region: A Study of Gosaba Block in South Twenty Four Parganas District In West Bengal, India**

*Tarun Kumar Mondal (University of Kalyani)*

Sundarban is the largest active delta in the world lying at the estuaries of the Rivers Ganga and Brahmaputra. This region is rich in biodiversity and declared as World Heritage Site by UNESCO. This delta region is prone to severe natural disasters as well as man-induced catastrophic events. Gosaba Block which is identified as the study area located in Indian part of the Sundarban delta, in South Twenty Four Parganas district in West Bengal puts forward an ideal portrait for people's struggle and survival strategies against natural disasters. An attempt has been made in this paper to study the perception of the main occupational groups on the effects of major natural disasters viz. floods, tidal surges and cyclones in Gosaba Block. An endeavor has also been made to explore local survival strategies which are effective for their sustenance in this vulnerable region. 300 persons from different occupational groups i.e. people engaged in agriculture, fishing, crab collection, tiger prawn seed collection, wood collection and honey collection have been surveyed through pre-designed questionnaire. Six Focus Group Discussions have been conducted, in which each of the group comprises six members from a particular occupation. The study has revealed that all the occupational groups perceive threats differently from natural disasters and their perception varies according to their level of exposure to the environment. To cope up with the natural disasters, each occupational group has developed distinct survival strategies. For proper management of natural disasters in Sundarban delta region, the perception of people with different livelihoods and their survival strategies should be incorporated.

### **Role of Local Institutions in Climate-related Disaster Risk Reduction in Japan**

*Rajib Shaw (Kyoto University), Yukiko Takeuchi (Kyoto University)*

The current study shows four examples from the small and medium sized towns and cities in Japan, which has faced climate related and geological hazards in recent past. These are: Reihoku in Kochi prefecture (early 2000 mountain disaster), Tosashimizu in Kochi prefecture (2001 flood disaster) and Saijo in Ehime prefecture (2004 typhoon disaster). All these towns and cities are characterized by higher forest and mountain cover, aged population, and lack of

economic activities. The paper shows three innovative activities of disaster risk reduction: in Reihoku by local NPO (non-profit organization), in Tosashimizu by the Voluntary Disaster Preparedness Organization (VDPO) utilizing local resources and community activities, and in Saijo by local government through school disaster education, through linking with the local business sector and revitalizing local economy. Although the nature of local institutions is different, its prominent roles in the local disaster risk reduction activities ensure its effectiveness and sustainability. Although there are limitations of these local institutions, future disaster risk reduction strategy needs to focus on the balanced approach of utilizing the local institutions, and linking these to external stimuli.

#### **The relationship between community supports and resident behavior after the Tohoku Pacific earthquake: The case of Hitachi City, Ibaraki Prefecture**

*Tomoko Kubo (Meiji University), Toshiki Yamamoto (University of Tsukuba), Michihiro Mashita (University of Tsukuba), Konstantin Greger (University of Tsukuba), Misao Hashimoto (University of Tsukuba), Tom Waldichuk (Thompson Rivers University), Keisuke Matsui (University of Tsukuba)*

The Tohoku Pacific earthquake caused incalculable damage in eastern Japan. The national and local governments designate evacuation sites, and residents are trained to move to these sites through evacuation drills. These evacuation sites are operated by local governments, but communities and school personnel play important roles in their practical operation, while also assisting in the reconstruction of their neighborhoods (Ishii et al., 1996). Residents' activity- fields are confirmed within walking distances during disasters, which stimulate the formation of many types of communal societies (Fujioka, 1996). Despite the fact, the relationship between community supports and the behavior of residents after an earthquake has not been sufficiently examined. Communities are expected to take account of their residential environments and attend to the needs of their weak residents. This study aims to analyze the relationship between community supports and the behavior of residents after the Tohoku Pacific earthquake in the regions surrounding the disaster. We have a special interest in Hitachi city, Ibaraki prefecture. This paper will examine above mentioned issues by way of the following process. 1) We will review Japan's natural disaster prevention regimes. 2) We will examine the result of a field survey conducted in Hitachi city detailing the city's natural disaster prevention procedures and the operation of some neighborhood evacuation

sites. 3) The behavior of residents following the earthquake is analyzed. In this part, questionnaires were sent to 2000 households, of which 492 (24.6%) were collected and used for this analysis. The earthquake and tsunami destroyed lifelines for several days in the city. According to the city, a total of 65 buildings were judged to be in dangerous condition, 251 as requiring care, and 478 were only partially damaged. The most serious damage was found mainly in the city's coastal areas, where a total of 85 houses were entirely or partly damaged, and 483 houses were flooded above the floorboards by the tsunami. On March 11th, a total of 69 evacuation sites opened, and 13,607 residents rushed into them. After the disaster, residents initially tried to go back to their homes. Depending on the damage done, they either stayed there or moved to a relative's house, or to a neighborhood evacuation site. Due to the failure of the lifelines, transportation systems, and the damage caused by the disaster, most residents had to stay within an area more limited than usual, around which they could walk or bicycle. Residents had only the human and physical resources of their neighborhoods at their disposal. Therefore, the characteristics of their local communities affected how residents behaved during and after the earthquake.



## RC 12-02 - Local Responses to Natural Disasters 2

*Chair: Andreas Neef, Rajib Shaw*

### Narrative of Disaster Resilience in L'Aquila Recovery

*Giuseppe Forino*

In this paper the framework of responses to natural disasters is disaster resilience. Although guide lines related to disaster management suggest to strengthen grassroots capacities in post disaster recovery, often these are overwhelmed and/or marginalized by top down, centralized interventions from national governments. In this way, according to Manyena, 2006, differing paths of disaster resilience exists: one is covered by the State, aiming to reach a paternalistic and centralized outcome of assumed efficiency, and the other by grassroots, that autonomously and spontaneously try to reorganize their life. Here disaster resilience is considered in the second path, as 'a deliberate process (leading to desired outcomes) that comprises a series of events, actions or changes to augment the capacity of the affected community when confronted with singular, multiple or unique shocks and stresses, places emphasis on the human role in disasters' (Manyena, 2006, 439). The aim of the paper is to understand this process of disaster resilience in the recovery of L'Aquila, Italian city hit by the earthquake of 6th April 2009. The paper considers the necessity to analyze disaster resilience beyond a normative way, toward a new its objectification (Cannon and Muller-Mahn, 2010), and understanding power relations and different strategies from different actors (Kuhlicke, 2010; Keogh et al, 2011). In this sense, the research proposes a narrative of resilience through a qualitative methodology, based on semi- structured interviews to members of local associations and spontaneous committees born after the earthquake and taking part in the reconstruction process of the city. An highlight of the differences between two different paths of disaster resilience enacted by Italian Government and grassroots is proposed. · Cannon T, Muller-Mahn D, 2010, Vulnerability, resilience and development discourses in context of climate change, *Natural Hazards*, 55, 621-635 · Keogh D.U, Apan A, Mushtaq S, King D, Thomas M, Resilience, vulnerability and adaptive capacity of an inland rural town prone to flooding: a climate change adaptation case study of Charleville, Queensland, Australia, *Natural Hazards*, 2011, 59, 699-723 · Kuhlicke C, 2011, Resilience: a capacity and a myth: findings from an in-depth case study in disaster management research, *Natural Hazards*, online first, DOI

10.1007/s11069-010-9646-y · Manyena S.B, 2006, The concept of resilience revisited, *Disasters*, 30(4), 433-450

### Communal political access and government responsiveness – evidence from India and Vietnam

*Olivier Rubin (Roskilde University)*

Although disaster victims are often portrayed as passive (almost apathetic) and helpless victims of nature's unpredictable wrath, recent research has brought convincing evidence to the contrary: most disaster communities are not passively waiting for the government to provide assistance in the aftermaths of natural disasters. Instead they are actively pursuing a diverse range of coping strategies to mitigate the suffering from natural disasters. Much research has focused on the communal capacities for information sharing, self-organization, and informal insurance through the conceptual prism of social capital (Aldrich, 2012; Aldrich, 2011; Adger et. al., 2005; Dynes, 2006; Nakagawa and Shaw, 2004; Adger, 1999). This paper will focus on one particular communal coping strategy: exerting a political pressure on the local government to provide emergency assistance. The aim is to address the use of political pressure as a communal coping strategy, and provide empirical examples of how the lack of such political pressure adversely affects the disaster response from the local government. In doing so, the paper will attempt to integrate findings and arguments from the literature on social capital and disasters with the political theory of government responsiveness in times of distress. In lack of a better expression, the capacity of local communities to exert a political pressure on government institutions to provide disaster assistance will here be coined political access. The political access of communes is determined by the overarching political institutions in place, as well as the specific socio-political composition of the commune in question. Drawing on two empirical cases within very different political contexts, the paper will provide evidence of how the lack of political access can have adverse effects on the government response to the disaster. The first case is Vietnam where authoritarian political institutions limit the electoral pressure that can be exerted by the local communities. The case is based on fieldwork (interviews and survey) conducted in the Vietnamese province of Quang Nam in 2011. The political institutions in place appeared to impede on communal political access resulting in a lack of devolution of power and a technocratic bias in local disaster management. The Vietnamese case will be contrasted to India where the political system at the local level is pluralistic and highly competitive. Still, however, the lack of political access among the

most vulnerable groups had strong adverse effects on the local government's response. The case will draw on fieldwork conducted in 2007 of starvations deaths in a village in West Bengal. The extensive politicization of local governance, where public policy beneficiaries are selected per political affiliation rather than need, undermined political access for marginalized groups in the village during the food crisis.

### **Vulnerability and Resilience to Natural Hazards: A Double Edged Sword?**

*Erin Joakim (University of Waterloo)*

Within the context of communities affected by natural hazards, reducing vulnerability and increasing resilience has been identified as a key strategy to reduce the risk of future impacts of hazardous events. While researchers have identified that some relationship exists between vulnerability and resilience, there is some discrepancy in defining the nature of this relationship, particularly within the context of recovering communities. Some argue that vulnerability and resilience are the positive and negative aspects of a singular concept that can be represented along a continuum (see Berkes, 2007; Birkmann & Wisner, 2006; Barnett, Lambert & Frey, 2008), while others argue that the nature of the relationship is more complex (Doberstein, 2009; McGuire & Cartwright, 2008; Cutter et al., 2008). The complexity of the relationship between vulnerability and resilience can also be observed in contexts where increased resilience can lead to increased vulnerability (Gunderson, 2010; Doberstein, 2009). This research project explores the complex relationship between vulnerability and resilience through a case study of the recovery of specific villages after the 2006 Yogyakarta, Indonesia earthquake event. In-depth interviews with affected villagers, government officials, NGO practitioners, academics and other stakeholders were conducted in order to provide an understanding of the various issues and concerns related to vulnerabilities and resiliencies in the recovery process. This place-based approach provided an inherently geographic focus on discrete communities whereby local vulnerabilities, resiliencies and livelihood strategies were placed within the context of larger scale social, economic, political and institutional processes. This helped to provide an understanding of the actors impacting varying degrees of vulnerability and resilience among affected communities as well as the methods for strengthening resilience to future disaster events. The results demonstrate that the relationship between vulnerability and resilience is neither linear nor simple - in fact, the relationship was found to be more complex than originally anticipated. Various

indicators of vulnerability can have both positive and negative feedbacks on aspects of resilience. This paradoxical relationship was seen in many areas, including experience with hazardous events, strength of government institutions, faith and religious beliefs, education levels, income levels, and strength of local leaders. This indicates that the relationship between vulnerability and resilience is difficult to define and may be highly dependent on the local context.

### **Factors of local vulnerability – Reflections from participatory exercises in Africa and Asia**

*Stefan Kienberger (University of Salzburg)*

Community-based disaster risk reduction programs are widely implemented in different developing countries through NGOs and donor organisations. Many of these programs focus on early warning or improve response and relief capacities at local levels. However, vulnerability reduction is also key and has been targeted through different programs. Within this paper, experiences gained on vulnerability factors identified at the local level through participatory methodologies will be discussed and methodologies integrating novel mapping approaches will be presented. The following three key questions will guide the outline of the paper/presentation: **\*\*What are specific factors that determine the degree of vulnerability and resilience among disaster-affected communities?\*** A methodology has been developed which aims to map vulnerability at the community and district level. For the identification of suitable indicators, experts but also local communities have been consulted in a participatory manner. Their inputs have been integrated through brain-storming and weighting exercises. Initially the methodology was developed in Mozambique, but has now been applied in different communities in Bangladesh, India, Malawi and Madagascar mainly in the context of floods. Results and experiences from this 'global' assessment of local communities' perceptions on key vulnerabilities will be presented and critically been discussed. Commonalities and differences will be explored and related site-specific drivers identified. **\*\*How can external expert knowledge and local wisdom and experience be creatively combined to enhance communities' preparedness for natural disasters?\*** As stated above, the identification and weighting of these factors was further integrated into maps. Community maps have been produced in the above mentioned case study areas based on participatory mapping with satellite maps. In a second attempt, the identified factors were represented as indicators and weights applied to map vulnerability on the district level. In this context the specific role of 'maps' - as expert tools - will be discussed and how they are integrated into



local level planning. Recommendations are built on the case studies in Africa and Asia, but in-depth analysis will be provided on the Búzi case study in Mozambique. \*\*Which theories, conceptual frameworks and methodologies can inform vulnerability assessments at the community level?\*\* As a final question the usability of frameworks arising from the academic community will be explored and how they have been applied in these local case studies. An essential conclusion here is that, the frameworks mainly guide the assessor and less the local users. However, a clear agreement on key terms is required which all involved parties need to agree on.

## RC 12-03 - Local Responses to Natural Disasters 3

*Chair: Andreas Neef, Rajib Shaw*

### Perceived Coastal Distress and Psychological/ Behavioural Resilience to Climate Change in Tsunami Affected Andaman Islands of India

*Ruchi Mudaliar (BSSS College), Parul Rishi (NITTTR Bhopal)*

Islands are examined due to their increased importance and their increased vulnerability to climate change related hazards. Out of the several projected impacts of climate change in India, coastal zones are apprehended to suffer the most devastating effects. India has been identified as one amongst 27 countries which are most vulnerable to the impacts of global warming related accelerated sea level rise (UNEP, 1989). Climate change in islands is associated much with stressors related to flooding, sea-level rise, land inundation, storms, cyclones etc. The high degree of vulnerability of Indian islands can be mainly attributed to frequent occurrence of cyclones and storms. Most of the people residing in islands are directly dependent on natural resource bases of coastal ecosystems. Any global warming-induced climatic change such as increase in sea surface temperature, change in frequency, intensity or tracks of cyclones, sea level rise may aggravate the potential risks to islands. New Delhi work programme (2007) to implement article 6 of the IPCC stressed six elements starting from education to training, public awareness, public access to information, public participation and international co operation. Under public awareness, a special effort to foster psychological/ behavioural change has been stressed. In view of this, a psychological assessment of Indian islanders' perceptions, stressors and resilience to climate change was conducted in Tsunami affected Andaman islands of India on a sample of 100 adult respondents selected through purposive sampling technique. Islanders' Perception to Climate Change Inventory (IPCCI) consisting of 26 items based on 5 point Likert type rating scale was used classified into different subsections like Climate Change Perceptions, Islanders' Distress, Coping/Adaptation and Psychological Resilience. Survey type research design was used and multivariate analysis of variance and correlational analysis were carried out. Results indicated respondents having reasonably good level knowledge of climate change related concepts. A moderate level of coastal distress was also being experienced by islanders, however, in spite of coastal distress, resilience was also found to be high indicating the psychological strength of the islanders of India to with stand all

odds as they were the people who experienced one of the first Tsunami of this geographic region. Results were discussed in line with human-climate interface and psychological variables in order to suggest the trade offs between individual, community and institutional responses to natural disasters so that resilience can be further promoted in islanders along with the Subjective Well Being(SWB) to overcome the anticipated distress from Tsunami like environmental events.

### Social attitudes towards natural hazards in Southern Poland

*Anita Bokwa (Jagiellonian University), Jaroslaw Dzialek (Jagiellonian University), Wojciech Biernacki (University School of Physical Education in Krakow)*

Our paper discusses results of research on social attitudes towards natural hazards (flood, storm and landslides) conducted in 13 communities in Southern Poland. Several criteria were used to select places to be surveyed: objective degree of risk, prior experience of extreme events, size of community, strength of social bonds, social capital and quality of life. More than 2600 responses were gathered from the survey. Our main research questions were following: - does settlement size have an impact on social attitudes towards natural hazards, especially on mitigation behaviour? - are urban inhabitants less adapted to natural risks be upheld and do rural communities show more activity in the face of natural disasters? - how are attitudes differentiated according to the type of extreme phenomenon? - what are attitudes of communities recently affected by major natural disasters? - how do communities suffering frequent occurrences of extreme phenomena adapt to this situation? - are there differences between attitudes in those communities depending on how frequently they have experienced extreme phenomena? Three dimensions of social attitudes towards natural hazards were analysed: cognitive (knowledge and awareness of local hazards), emotional (feelings towards hazards, like concern and anxiety); and instrumental (actions taken in response to a potential natural disaster). A combination of these three dimensions produces various types of perception and behaviour towards the perceived hazard (Raaijmakers et al., 2008): ignorance when the local population is unaware of a threat and therefore develops no concern and takes no preventive actions; safety

### **Community Renovation after Natural Hazards: The Tao-Mi eco-village in Taiwan**

*Chien-Ping Lee (National Changhua University)*

Geography by nature is about the relationship between people and land. Natural hazards happening everywhere remind us that the earth is fragile, especially so with intensifying environmental disasters in recent years. How societies perceive and respond to natural hazards continues to intrigue geographers hoping to improve the understanding and provide strategies for earth inhabitants. The second-deadliest quake recorded in Taiwan, the 921 earthquake, also known as Ji-Ji earthquake, was a 7.3 Ms or 7.6 Mw earthquake with 2,415 people killed, 11,305 injured, and US\$10 billion worth of damage. Tao-Mi, located right in the most damaged area at Pu-Li, central Taiwan, is a community successfully transformed into an eco-village in the aftermath of the disaster over the last decade. The study reviewed literature on cultural ecology, recorded memories about the 921 quake for Tao-Mi locals, explored the process of its rebirth and discussed its significance and prospects. The methods included field study, in-depth interview and discourse analysis. The Tao-Mi community has been developed into an eco-village of organic agriculture, environmental conservation, ecotourism and educational foundation through coordinated planning and reconstruction of governments, businesses, academics, and locals. Its achievements in local businesses, community living and ecological environment after natural disasters shed lights on the path of sustainable development. Key Words: natural hazards, cultural ecology, Tao-Mi Eco-village, sustainable development.

### **Greening the rubble and filling the gaps: Two community responses to the Christchurch earthquakes 2010-2012**

*Roy Montgomery (Lincoln University)*

Since September 4, 2010 a series of earthquakes and aftershocks have shaken Christchurch, the third largest city in New Zealand, causing multiple fatalities and the destruction of much of the central business district. Large areas of residential housing have been condemned and it is likely that entire suburbs will become abandoned for several decades and perhaps permanently where future ground instability and liquefaction potential is judged too great. The rebuilding process is high on central and local government agendas since Christchurch and the surrounding Canterbury region are crucial to the national economy. The various programmes for recovery being developed at the present time rest principally on

funding from central government and the settlement of insurance claims. One of the principal challenges arises from uncertainties over insurance payouts and reinsurance, particularly in the private sector. To that extent it appears that Christchurch will be a city of demolition sites and vacant lots for the best part of a decade if not longer. Furthermore, although local and national Civil Defence Emergency Management systems have been activated during the most severe seismic events their response operations have not always reached those most in need as promptly as might be expected. Residents in a number of communities and neighbourhoods have thus found themselves thrown upon their own resources during the first days of major aftershock events. Because metropolitan infrastructure remains brittle and will require extensive repair and replacement over many years and despite some of the lessons learned in the civil defence and emergency response sectors local residents are now conscious that when disaster strikes they are still likely to have to fend for themselves under certain conditions. This paper documents and evaluates two specific responses to the Christchurch earthquakes. The first response is a community-based project called 'Greening the Rubble' which took root in October 2010 as the prospect of a central city of vacant lots and car parks worried a number of volunteers into action to temporarily cheer up empty public and private sites with pocket parks, native plant displays and cultural interventions. The second initiative is a different kind of 'gap filler' insofar as local communities are now drafting their own emergency response plans which seek to complement official civil defence planning arrangements. The 'Mt Pleasant Resilience and Response Plan 2012' is the first community-based plan to have been drafted to date. Both emergent responses are discussed in detail in the context of constantly changing and evolving hazardscapes and socio-economic and political conditions. It is argued that while conventional social capital theories apply these responses work also reflect a distinctly New Zealand improvisational 'can do' attitude.

### **Disaster Risk Reduction in Tourism – Insights from Northland, New Zealand**

*Susanne Becken (Lincoln University and Griffith University), Ken Hughey (Lincoln University)*

Despite increased global interest in disaster risk reduction for tourism little research has occurred into how tourism can become an active participant in disaster management. The tourism sector is potentially highly vulnerable to disasters (e.g. extreme weather events), but at the same time constitutes an important resource for civil defence activities. Northland in New Zealand



provides an excellent case study of destinations that are highly dependent on tourism and at the same time exposed to natural hazards. The action research presented in this paper includes a broad stakeholder consultation process, an operator survey and a tourism workshop and culminates in the development of a bottom-up Visitor Incident Plan (VIP) for tourism in Northland. The key finding is that an integration of tourism into existing disaster risk reduction is essential for effective and efficient risk management. Further, previous experience with natural disasters, an existing network of tourism stakeholders, and strong leadership were identified as key factors in the one-year process. Details of the VIP will be presented in the paper.

## RC 13-01 - Natural resources and risk management in developing countries - Networking for sustainability 1

*Chair: Udo Nehren, Junun Sartohadi*

### Study of the 2006 Bantul, Indonesia Earthquake Damage Pattern Based on Geomorphological Characteristics

*Dwi Wahyuni Nurwihastuti (Gadjah Mada University), Junun Sartohadi (Cologne University of Applied Sciences), Djati Mardiatno (Gadjah Mada University), Udo Nehren (Cologne University of Applied Sciences)*

The 2006 Bantul Earthquake had created a certain damage pattern which needs to be scientifically explained. This paper is giving some scientific explanation from a geomorphological point of view. This explanation is mainly based on the current and the past landform distribution. The methods applied in the research are covering some techniques of detection of current and past landform distribution in the Bantul lowland. Remote sensing and Geographical Information Systems techniques were used for spatial analysis of both landform and earthquake damage distribution. Geophysical techniques were applied to simulate the characteristics of the unconsolidated geological subsurface of the current landforms. Moreover, some subsurface characteristics such as shallow groundwater table and soil properties were also recorded to measure their spatial correlation with the damage pattern. The current results show that the earthquake damage pattern tends to spatially follow the current landform distribution. However, in some areas the pattern is also affected by the past landforms. Of utmost importance for the interpretation of the damage pattern is the distribution and thickness of unconsolidated materials. The distribution of the relatively thin layer of unconsolidated materials can be detected through spatial arrangement of the current landform distribution. Keywords: earthquake damage pattern, geomorphology, unconsolidated materials

### Post-Eruptive Lahars and Sediment-Related Disasters Following the 2010 Eruption of Merapi Volcano, Central Java

*Danang Sri Hadmoko (Universitas Gadjah Mada), Muh Aris Marfai (Univ. Gadjah Mada Indonesia), Junun Sartohadi (Fachhochschule Koeln), Suratman Suratman (Universitas Gadjah Mada), Franck Lavigne (University of Paris), Rosalina Kumalawati (Lambung Mangkurat University), Gilang Arya Dipayana (MPPDAS), Afrinia Lisditya Permatasari (Universitas Gadjah Mada)*

Merapi stratovolcano, Central Java (2965 m), Indonesia has erupted in 2010 and ejected about 140 million m<sup>3</sup> of mixed nuée ardente and pyroclastic materials. The pyroclastic flows reached the distance up to 20 km from the Crater. Due to the presence of high intensity of rainfall downpouring the pyroclastic deposits at Volcanic Flanks, lahar become the major threat for the people living surrounding the volcano. Kali Putih, situated at southwestern flank of Merapi is one of the most threatened valleys in Merapi. Since 2010, more than 25 lahar flows occur at this valley. Our on-going research aims at (1) developing a comprehensive database of lahar occurrence and related disasters following the Eruption of 2010, (2) studying the lahar dynamics through multi-temporal database, (3) identifying the most important sediment sources zones, sediment transportation zones and sediment depositional zones and (4) determining the geomorphologic impacts of the lahar flows. A combination among remote sensing approach, geographic information system (GIS) techniques and field measurement has been applied in order to achieve the results of the research. Lahar database inventory showed that there were 116 lahar occurrences during the period of 13 months. Spatial distribution of lahar occurrences show that the highest frequency of lahar flow occurred in the Putih River, followed by the Pabelan River, the Gendol River, and the Boyong-Code River. The occurrence of the flows concentrates in the period from November to April with the peak events occur in January due to the highest amount of rainfall. The affected area of lahar has been mapped at the downstream area of Kali Putih. This zone is the most affected area due to the following reasons: (1) weak control of topography (flat zone and low gradient of riverbed), (2) low level of riverbanks, (3) the presence of the barrier in the valley (previous sediment and point bars), (4) low river capacity. A total of 582 houses have been affected by lahars with the damage levels vary from slight damage to total destroyed. Keywords: lahars, spatio-temporal characteristics, Merapi Volcano, Java, Indonesia

### Ecological risk assessment of geo-disasters in Longnan mountainous area – a case study of Wudu of Southern Gansu

*Jie Gong (Lanzhou University), Caixia Zhao, Heling Wang, Peng Sun, Yuchu Xie, Xingmin Meng*

Mountainous areas are essential for sustaining the local human population and ecosystem function, but irrational human activities and geo-disasters can directly ruin the natural environment and disrupt ecosystem functioning. Ecological risk assessment (ERA) aims to estimate possible adverse effects of accidents or disasters with Uncertainty on ecosystems and their parts. Current ERA

practices, mostly focus on the likelihood of adverse effects on ecosystems of human-induced disturbance or pollution in the watershed, lake area and wetland. However, very little attention had been paid to landscape ecology and the risk estimates of geo-disaster in the mountainous area. The paper took Wudu as a case, a mountainous area with fragile ecological environment, frequent geo-disaster due to its particular terrain and rock conditions, to study the ERA caused by geo-disaster. This practice studied the effect of geological disasters in terms of landscape patterns on the environment in the mountain areas. Typical geological disasters (debris flow, earthquake, landslide) in Wudu and 6 land use types (forestland, farmland, grassland, water area, constructed and residential land, unused land) were selected as risk sources and receptors separately. Landscape index and vulnerability index were optimized as the evaluation indicator to calculate the landscape loss index, the distribution maps of main geological disasters was overlayed by GIS, then the integrated ecological loss index of every risk area was calculated. Finally, we got the spatial distribution map of risk condition of Wudu. The analysis results showed as below: firstly, the spatial difference of risk assessment was notable, the area of the first grade risk area was very small, the second, the third, the fourth, the fifth and the sixth grade risk area covered 12%, 21%, 12%, 17%, 38% of the study area respectively; secondly, the value of the ecological risk of the central and south area was greater than that in east and south part of Wudu, the high risk areas distributed mainly on the banks of Bailong river and partly in the north, the low risk areas distributed mainly in the south and east part of Wudu; Thirdly, human activities, land use types, terrain and vegetation cover on regional scale severely affected the ecological risk degree in Wudu.

### **Climate Change and Conflicts in Northwestern Kenya: Factors, Actors and the Way Out**

*Jürgen Scheffran (University Hamburg), Janpeter Schilling (University Hamburg)*

Northwestern Kenya is shaped by pastoralism which is well adapted to the harsh climatic conditions. Yet, more frequent and prolonged droughts in combination with socio-economic developments and the availability of small arms have increasingly overwhelmed existing coping capabilities. Violent livestock raiding has become more deadly and destructive, particularly between the Turkana and the Pokot. I present preliminary findings from my PhD field research conducted in March and from September to December 2011 in Kenya. I interviewed all relevant conflict parties, including community members (raiders, pastoralists, elders, chiefs, and women) as well as governmental and non-

governmental representatives. Further I analyzed conflict records in conjunction with climate data to find that the conflict between the Turkana and the Pokot is driven by a complex interplay of different actors and factors. The major conflict causes are asymmetric. On the Turkana side the triple challenge of (a) reduced pasture and water availability caused by consecutive periods of droughts, (b) reduced livestock numbers caused by animal diseases and raiding, and (c) lack of adaptive capacities, has made raiding the only survival alternative other than relying on food aid. On the Pokot side where pasture and water is available, the accumulation of wealth, payment of dowry and the expansion of territory are found to be the strongest drivers for raiding. In the last part of the presentation I discuss potential approaches of conflict mitigation.



## RC 13-02 - Natural resources and risk management in developing countries - Networking for sustainability 2

*Chair: Udo Nehren, Junun Sartohadi*

### Coastal flood risk management in Jakarta, Indonesia

*Muh Aris Marfai (Univ. Gadjah Mada Indonesia), Sukamdi Sukamdi (Univ. Gadjah Mada Indonesia), Danang Sri Hadmoko (Universitas Gadjah Mada)*

As an archipelago country, coastal areas in Indonesia are considering as the most important area for regional and national development. Coastal areas provide many natural resources and very often as a meeting point of the economic activities such as logistic distribution, trade and industrial development. Many big cities are located on the coastal area such as Jakarta, Semarang, Surabaya, Makasar and Bali. Jakarta, one of the fast growing port cities in Indonesia, is currently inhabited by more than 9 million inhabitants. Proximately 40% of the area is low lying area and located below the sea level. Jakarta is subjected to regular flooding and coastal inundation, which was triggered due to various colliding human activities in the coastal area. This study aims at identification of the flood adaptation strategy and risk reduction program due to coastal flooding. Method of the research program is involving literature study, interview, and fieldwork observation. As an early stage of coastal flood research, this research used descriptive analysis to explore and describe the physical condition of the study area, the mitigation strategy as well as the action plan taken by government. The result revealed that the adaptation and mitigation strategy is unequally distributed among the structural and non structural. The formal institution relied heavily on the structural method, while most of the non structural methods were carried out by various NGOs and other stakeholder involved. Simple adaptation and mitigation strategy conducted by the community seems to be insufficient which leads to more impact on the environmental perspective. The current effort proposed by the national government including the structural measures and coastal defense yet being realized into practice and various obstacles should be addressed as future planning agenda, in order to reduce more losses due to the unavoidable event, entitled as flooding hazards. Keywords: adaptation strategy, coastal flooding, risk reduction, Jakarta, Indonesia

### Potential impacts of surface water salt intrusion on urban water supply and irrigation in the Vu Gia Thu Bon River Basin, Vietnam

*Viet Trinh Quoc (Environmental Engineering + Ecology), Lars Ribbe (Fachhochschule Köln), Harro Stolpe (Institute of Environmental Engineering and Ecology)*

Salt water intrusion is a growing problem for coastal zones of Vietnam as for many other coastal areas worldwide. Climate change related sea level rise will probably pose an increasing pressure on ground and surface water salinity. This paper is assessing causes and potential impacts of salt water intrusion to surface water in the Vu Gia Thu Bon River basin in Central Vietnam. In the lower part of the basin surface freshwater resources play an important role as they supply over 1 Mio. inhabitants with drinking water and irrigate almost 30,000 ha of agricultural land. Factors determining salt water intrusion like river discharge patterns and sea level rise are analysed for current and future scenarios and time series of salinity measurements are discussed for the selected case study. Based on a comprehensive salinity hazard map developed for the lower VGTB basin, the potential impacts on drinking and agricultural water supply is analysed by applying GIS tools and analysis of intensity and frequency of salt water intrusion. The results show that the main water supply work of Da Nang city, the Cau Do Water Supply Plant, is not severely impacted by current levels of salt water intrusion. This may, however, change under future sea level scenarios. Irrigation schemes in the region are carefully investigated in order to determine water use mechanism and the potential impacts of salt water on agricultural production. Results show that around 1/3 of the total agricultural area in the region may be impacted by salt intrusion. The paper closes with discussing the limitations of the research and future research demand. Solutions regarding adequate strategies to cope with existing or future problems stemming from salt water intrusion are briefly described. Key words: salt intrusion; salt intrusion factors; irrigation, water supply quality, agricultural landuse; GIS; Vu Gia Thu Bon River Basin

### Methodology of ecological risks and restrains assessment for resource-intensive industries (on example of Russian pulp and paper industry)

*Maria Gunko (Institute of geography, RAS)*

There are many approaches to risk and restrain assessment but few meet the objective of ensuring territories' security because of anthropogenic and natural

processes' complexity and uncertainty of emergencies. First we estimate restrains - can natural environment provide needed resources, then risk assessment - is the enterprise compatible with the healthy functioning of environment and population. Only with a satisfactory result in both cases the territory may be considered as a potential area for construction. Assessment of restrains. At the beginning one should calculate the amount of resources needed for enterprise's functioning, and then conducted an assessment of available resources of territory based on statistical data or by interpreting remote sensing data combined with cartographic modeling. However, both methods are best used together in order to verify information. Based on resulting data we may make predictions on the time period when the enterprise will be able to develop within the biological capacity of local environment. Risk assessment. From a mathematical point of view, risk is the expectation of damage for a time period:  $M(D) = Q * D$ ,  $D$  - damage caused by disaster;  $Q$  - probability of emergency. To determine the probability of emergency situations mathematical models are used (such as representation of emergencies' flow as a Poisson stream of random events). Damage in financial terms, is assessed according to the formula for each component of geosystem:  $D = V * N * K * K_s$ ,  $V$  - volume of pollutants emitted into the environment  $N$  - state fee for the discharge of 1 ton of pollutant  $K$  - coefficient describing the ratio of pollutant's concentration and standard maximum permissible concentration  $K_s$  - coefficient of geosystem's sustainability. The degree of sustainability to pollution was determined by the indexes that characterize: the rate of chemical reactions to convert organic and mineral substances in the atmosphere, hydrosphere, pedosphere; the intensity of material removal from geosystem with air and water currents. Based on the data compiled in series of maps, it's possible to trace the spatial differences in sustainability coefficient. The formula has been worked out during internship in Russian Research Institute of Emergency Situations and Civil Defense for the new methodic of financial assessment of environmental damage caused by emergencies at hydrotechnical structures. The above methodic allows to analyze risks and restrains, avoiding the factors that are impossible for long term prediction, as well as outdated amendments to ecological state of environment used in existing governmental methodologies. An important feature of this methodic is that it allows to estimate risks and restrains at the phase of a new industrial facility planning, so one is able to select the best site from an ecological point of view for enterprise's localization.

### GIS-mapping for assessment of risks of groundwater use in Ukraine

*Viktor Putrenko (Institute of Geography of NAS of Ukraine)*

The main risks of groundwater use are associated with of anthropogenic pollution and natural content of toxic elements in water sources. Account of the special nature of water can prevent a negative impact on the health of local people. Therefore, mapping of geochemical anomalies of toxic elements content in water and risk assessment is an important task of complex research of territory. The main criterion for the risk of use natural waters is the maximum allowable concentration, the maximum concentration of a pollutant that does not cause adverse effects in the daily long-term effects on the environment and living organisms. The criteria for maximum permissible concentrations of the elements used by Ukrainian state standards and regulations. The basis for the study results were used for sampling of groundwater for the entire territory of Ukraine, which contain information about the content of uranium, arsenic and fluorides. The database contains an analysis of 6550 points uniformly distributed over the territory. According to the results of interpolation of data on the distribution of chemical elements were obtained by raster model, the statistical distribution of substances that have been classified according to the scales developed of legends. To map the risks have been developed rating scales based on a formal approach - comparing the data with the standards and subsequent allocation of categories of risk. The main categories are much lower than normal values, the average (about normal), elevated (above normal to 100 percent), high (multiple excess limits). Interpolation was realized by inverse distance weighting is inversely proportional to the size of the cell edge of 1 km. Further stage of research was the analysis of raster models. As a result of the analysis was to identify the main trends in the content of elements in the groundwater. The main reasons are geological factors related to the occurrence of rocks and climatic factors that determine the characteristics of migration of chemical elements. In Ukraine, were detected geochemical anomalies with elevated and high-risk groundwater use. The distribution of uranium in water due to deposits in the Ukrainian crystalline shield. Arsenic content increases from west to east of Ukraine. Individual values may exceed the standards in 3 - 4 times. Distribution of fluoride shows that they lack the west and the significant excess in the east. A combined risk assessment was to create a complex map of the methods of overlay anomalous zones of exceedance content elements. This was done in two stages. Selection based on raster models of polygons of values exceeding the standards and overlay them on a common map. Comparing this map with a map of settlements in Ukraine revealed the main territories and a population that



is in high-risk zones that are particularly increased in the zones of intersection of several geochemical anomalies.

## RC 14-01 - New cartographies of risk and conflicts

*Chair: Boris Michel, Georg Glasze*

### The emergence of counter-mapping practices in the Great East Japan Earthquake 2011

*Yuichiro Nishimura (Nara Women's University), Toshikazu Seto (Ritsumeikan University)*

The word of 'counter-mapping' is firstly introduced by Peluso (1995), which include the use of the modern mapping technologies including GIS for the indigenous community empowerment, and it designed to increase the power of people living in a mapped area to control the representations of themselves and to increase their control of resources (Peluso, 1995; Johnson, Louis and Pramono 2006). Though the word is mainly used for the practices in the rural community of developing countries, we would like to apply it to the critical mapping practices occurred in the huge disaster in Japan. The Great East Japan Earthquake on March 11th, 2011 has brought catastrophic damage in the huge area of Japan. In addition, the nuclear damages by Fukushima Plant of Tokyo Electric have diffused the radioactive materials on the wide range of the Tohoku and Kanto region. On this situation leads the various types of the radiation mapping activities by national government, local governments and the communities. The residents in the radioactive material diffusion area have started the counter-mapping practices. Such practices have begun because of the doubts of the radiation information by national/local government and have aimed to visualize the radiation levels of their living space. Such neogeographers made the detailed scale maps (like 1/500, 1/200, 1/100) against the small-scale map by the governments. On the other hand, these practices have faced some problems. Such mapping practices need to connect the measured radiation data to the location data and their geographical knowledge. They have to know how to use the Geiger counter; they have to know the use of GPS or location technics simultaneously. They also need the mapping and visualization methods by hand-drawn or GIS. Sometimes these methods are not fit to their geographical knowledge or imagination of the area. They also faced the problem of reliability of the information because measurement method is different and not standardized. They faced the issue of sharing and the comparing/estimation of the information. We discuss the possibility of user-made radiation maps for the daily living safety and the limitation of the sharing of the geographical knowledge in these disaster area.

### 'Ground truths' and 'digital echoes' – reporting into cartographies of crisis

*Cate Turk (University of Erlangen-Nürnberg), Christian Bittner*

Maps have long played a role as strategic instruments in times of crisis - both during armed conflict and in the management of catastrophic events. The technological innovations of the geoweb have introduced new cartographers and new types of maps to humanitarian organizations, emergency responders and political movements. In particular the possibilities of citizen sensors reporting in 'real time' from catastrophe areas and the ability to use maps to curate and broadcast information from multiple sources, both to affected areas and to interested parties around the world bring new dimensions to the social and political interactions that constitute a crisis. As part of a larger project investigating the political dimensions of these cartographies, here we call into question the nature of the information being contributed to these maps. While these new forms of mapping are lauded as successes of 'crowdsourcing' we look further into the mapped data, contrasting 'volunteered geographic information' with 'ambient' geographical information (Stephanidis et al, 2011). How much of the information in the maps are new 'ground truths'; and to what degree are these maps aggregating and re-presenting information available through other sources - resounding 'digital echoes'? Are they, by and large, mapping the views of an affected local 'crowd'? And are they being read as such? Taking a subset of maps of conflicts and natural disasters from 2011, we go on to consider how the data included (or not included) in each map works to create an imaginary of each crisis. Indeed what is and what is not mapped in these projects, shapes too our broader understanding of what constitutes a 'crisis'.

### Risk mapping – the risk of mapping?

*Nils Zurawski (University of Hamburg)*

Security having become one of the major discourses lately, does also affect the use of cartography as well as its appearances. Such discourses open or covertly address issues of risk and conflicts. Mapping such risks, conflicts or general situations of insecurities is used to highlight the immediacy and poignancy of these - while discussing its possible political, social or legal solutions. Using cartography to these ends it should be asked whether such maps are merely illustrative or whether they produce the risks in the first place? Analysing the relation between the use of cartography and the portrayal of risk, I want to

reflect on the nature of the security discourses and how they are transported via maps, seemingly neutral, but in effect as a product of the very cartographies. I will show that the security discourses as well as the cartographies follow similar patterns of exclusion, division, threat in using such archetypical figures such as the (possibly threatening) alien/outsider/unknown or a terra incognita. Using and generating cartographies of risk and conflict has consequences on how spatial and social relations are imagined and hence spatial order is constructed. Far from being a simple tool of innocent illustration, the strategy of mapping remains highly political and hegemonic. Drawing from empirical research and theoretical work on mapping, surveillance, security and spatial perception I will highlight the interdependencies of cartographic strategies, risk and security discourses and try to develop possible counter strategies.

### **New approaches for mapping of natural, technological and social risks and the dangers of emergency in Ukraine**

*Viktor Putrenko (Institute of Geography of NASU), Leonid Rudenko (Institute of Geography of NASU)*

In Ukraine, where 45.8 million people who survived the catastrophe at the Chernobyl Nuclear Power Plant (1986), the prevailing irrational economic structure and outdated technology in production, industrial and social infrastructure, the availability of chemical production with hazardous waste each year occur emergency different geographical coverage. Assessing the risks of their occurrence in different regions of the country is using different methods statistical and mathematical modelling and spatial analysis, including GIS-mapping. Modern GIS-mapping is based on the formation of map databases that are the basis for spatially distributed information presented on separate maps, atlases and geographic information systems. Combining traditional for cartography geographic modeling with database structures leads to the creation of a special type of models to identify the causes of the risks of emergencies. The main approaches, which are used in the Institute of Geography of NAS of Ukraine in the design of map databases, that are common standardization of information, the use of common classifiers, the use of uniform requirements for visualization of cartographic information. The main stages in the development of a cartographic database are: - Collection of factual information, using classifiers emergencies; - Geocoding and transformation of information for use in a spatial database; - The creation of the maps of the possible risks of emergencies; - Modeling capabilities of emergencies and their consequences by means of interactive mapping. The main advantages of map databases is multi scale and

ability to provide client spatial and attribute information. Using a single mapping object indexing system allows automated generalization of information and receive it at the national, regional or local level in the same coordinate system. This facilitates evaluation of the situation in the main managerial levels and allows the use of additional materials: satellite images, photographs and other referencing data. The database allows to realize the target selection of totality of objects in a given spatial or attribute-parameters. It is easily updated and integrated with the network resources. In this database can store the basic sets of thematic maps. The data can be promptly published in the Internet-based Web servers and free services such as Google. New approaches for mapping and modeling of various types of risks of emergency in Ukraine approved by the example of the model area of Vinnytsia region. Using the object information for each settlement of the region about various dangers (chemical, fire, radiation and other hazards) we have created a GIS model of the region, allowing to assess the risk of an emergency. Thematic layers were published on the based service Google Maps that allows any user to select data sets, get detailed information about objects and add your own information and comments.

## RC 15-01 - Placemaking and guerilla strategies in contested public spaces

*Chair: Martin Klamt, Martin Sondermann*

### The Negotiated City – An Approach to Deal with Public Protests and Resistance?

*Frank Othengrafen (TU Dortmund)*

The growing appropriation of public spaces by private developers and the increasingly authoritarian style of many local governments have provoked public protest and resistance among deprived groups and communities. As a result, conflicts around urban development, plans and projects arise in terms of social mobilization as recent developments, such as *Recht auf Stadt* (right to the city) in Hamburg, show. *Recht auf Stadt* is a networking initiative consisting of several smaller citizens' groups that exists since 2009. It criticizes the practices of local government in Hamburg with regard to (1) the sell-out of valuable inner-city urban real estate to the highest bidder, (2) the radical reduction of public housing, and (3) the dramatic increase of housing rents, particularly in former working-class city areas. Against this background, *Recht auf Stadt* claims that the city (a) should not be regarded as an enterprise follow exclusively an economic rationale but as a public body guaranteeing welfare services, and (b) should belong to all inhabitants, including different groups and neighborhoods, borders and spaces. Conceiving the city as a mosaic of socio-spatial configurations (Marcuse 2006), it is not only the financial powers, the real estate owners, the politicians or the media who are developing visions for the future of the city. In contrary and following Lefebvre's idea of 'the right to the city' (1967), every socio-spatial group obviously should have and, as *Recht auf Stadt* shows, wants its say on the future of the city. The idea of 'the right to the city' therefore raises the complexity of urban development and its related 'uncertainties' in form of public protests and resistance. The concept of the 'negotiated city' (Kesteloot 2002, 2005) could address these challenges, using the socio-spatial order of the city in order to unveil conflicts and institutionalize them into negotiations that potentially fulfill the right to the city. Cohesion, in this context, should be more understood as capacity to acknowledge the existence of different social and territorial groups present in the city, their diverse and sometimes contradictory interests as well as the capacity of these groups to organize themselves and for the city to create institutions in which these groups can confront each other and discuss about the city's future. It is the aim of this paper to (1) present selected

ongoing public protests in Hamburg and to summarize the consequences for (public) urban development in Hamburg, before (2) discussing the potential of the concept of the 'negotiated city' as a new approach to urban development: Is the negotiated city appropriate for Hamburg and other cities do deal with or to avoid conflicts? Which (planning) rationales and (political) institutions are necessary? Which consequences does this have for urban development in general?

### From informal to formalized uses of public spaces – the integration of grass-root activities into the planning and development process of the former Tempelhof airport, Berlin

*Ulrike Mackrodt (Humboldt-Universität Berlin)*

In recent years, public spaces in (Western) cities have been characterized by an intensified citizens' use. These newly awakened claims for the freely accessible spaces in a city have led to a rising number of conflicts between the different urban stakeholders on how to use and design public spaces. As one consequence of this, the suitability of established participatory urban planning instruments has been challenged. The urban dwellers' wish for active participation in the placemaking process increasingly goes beyond formal opportunities of participation. It can be argued that the participatory interest of urban dwellers is more clearly implemented through their materialized and localized informal practices on-site than through taking part in public hearings or displays of planning blueprints. This mismatch between the planning authority's offers and the urban dwellers' demands for placemaking opportunities calls for the reconsideration of established planning concepts. In planning theory, though, this societal change and its theoretical implications have yet rarely been received. This paper therefore suggests a modified planning perspective on the relation between development and use of urban open spaces. Instead of imagining the citizens' use to be the end of a development process it can rather be regarded as a central element of this process itself. By including grass-root activities in the early stages of a planning process an assumably more accepted and just outcome of the placemaking process may be achieved. In a small number of cases, the need for innovative planning strategies has already been acknowledged by municipal authorities. In these cases, experimental planning approaches comprise - what until then had been - informal placemaking strategies by local citizens. In doing so, these grass-root activities are getting formalized and institutionally integrated into the planning process. The development of 'Tempelhof Park' in Berlin represents a prominent example of

this new type of planning. On the symbolic site of the former inner-city airport a park is being developed with the participation of so-called 'pioneer users': grass-root activities such as urban gardening and educational activities are carried out on designated lots inside the park. Drawing on performance theory, the paper seeks to investigate the potential of the pioneer users for obtaining a more publicly requested and accepted design for the new park than through other (predominantly discursive) participatory means. The author ultimately aims at conceptualizing a modified theoretical view on participatory planning that takes into account the new demands by urban dwellers for their public urban living environment. For this purpose, empirical data consisting of qualitative interviews with pioneer users, municipal planners and park visitors are being used as well as insights from participant observation.

### **Re-programming the city: alternative complex programs for public space**

*Christopher Rawlinson (Queensland University of Technology), Mirko Guaralda (Queensland University of Technology)*

Cities have always been a vibrant nexus of people's desires, memories and activities. The coexistence of multiple functions in the public environment has been a constant in the preindustrial city. This characteristic has also been the driving element in shaping the design of public open space. Societies celebrate themselves on the public stage translating values and aspirations into the design of places as well as shaping the identity of communities through activation of space. Conflict has also been a constant in the urban life; dwellings, production, commerce and celebration have been competing for centuries in the use of space. Activities recognised as unhealthy have been relocated from the centre to the city outskirts, and with the increase in managerial concern for liability and the risk of social conflict between different social Actors; this process of expurgation has widened to include recreational activities. As a result of this segregation and isolation of key cultural generators, cities have become more controlled and sanitised environments. More recently, since 1980's, there has been a steady growth in insurgent tactics used by the public to express themselves in these sanitised environments. Guerilla Spatial Tactics and methods of Urban Hacking have dovetailed with both established counter cultures and more conservative representatives of the population, achieving their common desire for cultural generation (away from gentrified commercial culture) through alternative grass roots methods mirroring 'evolutionary' urban theories whereby small hidden changes and interventions in the socio-spatial genetic

code cause long term macro change, and eventual change in typology. Urban Hacking and Guerilla activities such as Parkour, Urbex and Guerilla Gardening demonstrate the public desire to generate culture within public space that is often non-conformist with the expurgating instruments of popular governance. In response to these instruments, urban hackers move through space identifying conflicts, circumventing adversarial exchanges, and presenting (even if only ephemerally) new realities in which culture is generated and expressed. The paper proposes, via a comparative study of guerrilla style activisms and other more structured urban social activators, alternative complex and integrated programming of public spaces allowing cultural generation instead of the expurgating policies of popular governance. The solutions proposed may not solve all pre-existing fears of spatial management, however they do reduce fear of conflict between members of the public and authorities, giving permission to urban activists, and simultaneously providing some limitations. Additionally, the proposals demonstrably create spatial activation and cultural production with resulting increases in public safety, education and health; as well as commercial, environmental and cultural sustainability.

### **Urban Square as a Contested Space: The Spatial Tactics of a Local Community in St. Petersburg**

*Elena Tykanova (St. Petersburg State University), Anisya Khokhlova (St. Petersburg State University)*

In recent years St. Petersburg has rapidly developed into the arena where the competing social, economic and political interests collide. Uneven access of social groups to spatial resources and different potential of power and control over them make a reason for social tension. The dominant discourse of the elites on city development and planning often ignores the interests and values of the population. Alternative views on how contested urban spaces should be organized make the representatives of local communities consolidate and buck against the decisions of authorities. In the absence of effective legitimate means of struggle, citizens involve in protest activities, employ various tactics to contest the spatial domination of administrations and business elites and develop different modes of legitimization of their choices and actions. These spatial and discursive tactics are aimed both at the self-organization of local communities and at the presentation of their position to the authorities and the public at large. In our research designed as a set of case-studies we inquire how local communities in St. Petersburg struggle against the legal and symbolic privatization and commodification of public spaces. In this paper we focus on



the history of protection of one of the city squares - square of Courage - against the construction of a bistro and a shopping center. To analyze the modality of the community's actions, we follow A.Hirschman and distinguish between exit (attempts to change the delegate subject of decision-making); voice (declaration of discontent addressed to authorities, mass-media, NGO-s); and loyalty (passive acceptance of any top-down initiatives). Under the threat of spot construction of a commercial area just in front of the residential houses, the majority of locals chose loyalty option seeing the public space of the square as lying beyond their responsibility or opting for stowaway strategy. The exit mode was unavailable for the small action group who had no property rights to the square other than symbolic claims. Instead, activists used a wide range of actions within the protest mode: talk-ins, planting flowers in the place of future construction and even laying the foundation of a monument to the defenders of Leningrad in the WW2 after whom the square had been named. The representatives of the local community also applied numerous legitimizations of their activities that we describe through the perspective of sociology of critical capacity. Moreover, they persistently referred to history and memory of the area (events of the WW2, heroic defense of Leningrad, tragedy of the Blockade) that don't directly fall under 7 orders of worth as distinguished by L.Thévenot and L.Boltanski. They turned history and memory into effective resources of solidarity and protest and managed to symbolically re-appropriate the public space of the square and defend it from commercial build-up.



## RC 15-02 Joint session „Placemaking and guerilla strategies in contested public spaces“ & „The fight against disenfranchisement: Emerging cultures of protest in the city

*Chair: Martin Klamt, Samuel Mössner*

### Place-making processes and new forms of urban belonging in a central neighborhood of Madrid

*Eva Youkhana (Interdisziplinäres Lateinamerikazentrum), Christian Sebalý (University of Bonn)*

Madrid is undergoing an urban transformation process. Economic growth primarily backed by the real estate and service sectors has introduced the city as an international hub for business and commerce. To demonstrate the new centrality neoliberal urban governance strategies such as revaluation and progressive tertiarisation transform the historic city center to an arena for consumption, urban spectacle and tourism. At the same time demographic pressure and segregation reconfigure the dynamics of the socio-spatial urban fabric. The socially marginal working class neighborhood Lavapiés is one case in point. The construction of cultural institutions, rehabilitation projects, redesign of the public space and control of communal places foster the image of Lavapiés as a cultural destination and provoke changes in social tenancy, as well as gentrification and displacement of low endowed people. As a consequence the replacement of traditional structures and conventions provoke resistant spatial practices and make Lavapiés a highly contested space. To counteract rehabilitation programs to commercialize and control the city and thus repel heterogenous urban livelihoods street and action art is increasingly used to symbolically re-appropriate the urban space. As such, street and action art is part of a creative guerilla strategy and has become an important resource for those who are widely excluded from hegemonic social, political, cultural and economic participation. Alternative cultural expressions are nowadays synonyms for the countervailing power of the subalterns. This was nicely documented at the example of the symbolic re-appropriation of North American cities since the late 1960s through Graffiti. While Graffiti has been used mainly by young artists to allow for the articulation of political and other forms of self-manifestations, there are nowadays different forms of street and action art used by activists and migrant groups to escape from voicelessness, to articulate exclusion and the

lack of rights and access to resources. By that means new forms of urban belonging beyond normative categorisations of social difference are produced, and citizenship is enacted by those who are not wanted to be seen by the polity. Giving the example of different initiatives and events jointly organized by activists, migrant and neighborhood groups in Lavapiés it will be shown in how public spaces are produced and places are made notwithstanding the municipal clearing and displacement strategies. It will furthermore be shown that people in search for justice produce place based belongings that are situated and dynamic rather than essentialistic.

### Material and symbolic spaces of conflicts: caring for Cova do Vapor, Portugal

*Margarida Queirós (University of Lisbon), Mario Vale (University of Lisbon)*

With neoliberal restructuring in the 1980s and throughout the early 2000s the conditions of transforming urban places changed dramatically, strengthening urban competitiveness and weakening social support, thus making visible socio-spatial conflicts. The arena of disagreements happens in the physical level as actors claim to improve conditions of living, guarantee quality of public space, the right to the city and increase development and also, in the subjective level, as it changes urban narratives which takes neoliberal projects as given (Kohler and Wissen, 2003). The aim of this paper is to highlight the role of different actors conflicting for a specific place, in this case Cova do Vapor - a small beach neighbourhood situated at a borderland that was built simultaneously by the river Tagus and the Atlantic Ocean, located in the south bank of the Lisbon Metropolitan Area (LMA) - which has an enormous potential for urban and tourism highly profitable projects, which is until now occupied by families without significant financial resources some of them descendants from the original settlers. We emphasize the influence of local actors and power relations with other stakeholders who see that place as strategic and profitable for other land uses whereas others see it as a special reference of the Portuguese culture and organic architecture. In this paper we study the urban conflicts at Cova do Vapor, a former summer neighbourhood with a fishing community living in mobile wood houses that is today part of the LMA and became a permanent housing and a summer and weekend residence area, with about 350 popular, small, and cosy houses. This place has an allegedly illegal origin as the land ownership is private and was occupied by the residents and expanded during the 1974 Portuguese Revolution. The mounting conflict between landowner and residents association has been mediated by public authorities and ONG,

although with different strategies and approaches. Recently two architects with their students installed the 'TISA pilot project', i.e. The Informal School of Architecture in Cova do Vapor. This innovative project, which adopts the concept of organic architecture, created by the people according to their daily needs, has found its strong expression here and Cova do Vapor gained a new legitimacy through academia and research. In an unconventional way, TISA's intervention came to play and perhaps, amplify the adaptive and creative solutions of the population and offered a real opportunity to legitimate the neighbourhood, the meaning of the place and the value for Portuguese culture. In the paper we conclude that Cova do Vapor, a popular and precarious neighbourhood, a place of everyday life, shows why neoliberal urban planning is 'intrusive and blind' to the local communities and how different power relations and alliances shape everyday life of a small but proud community.

### Strategies for revival toopkhaneh square in tehran as a public space

*Leila Shahbazi (Bauhaus university)*

In addition to rare aesthetic values, historical contexts have a value of maintaining collective memories and identifying our cities. One of the values in social topics is the discussion of maintaining a cultural memory in a historical context. A memorable urban context is indicative of the identity of that context. In fact, the identity is nothing except a collective memory of individuals, and a city without memory lacks identity. Considering that hidden values in old contexts are the main factors identifying these contexts, their recreation requires full knowledge of values and a way they identify the context. Urban space as a place of occurring social phenomena is an integral part of collective memories. While we see the space as an open and abstract range, the place is part of the space occupied by a person or thing and has a semantic and valuable load. Memories that have shaped in the past and are flowing in the collective memory of a city, give a historical identity to the urban space. An old urban space loses its efficiency gradually as a context of social interactions and collective representations and this leads to stopping a person's communication with the urban space and fading the collective memories away. Each historical district where a successful revival operation is conducted socially in is an attractive and appropriate place for staying and going: streets are full of people and wrongdoing and crime rate has also been reduced in them. By the presence and use of people, spaces are converted to a place. Urban spaces should be revived by people's presence, and for this revival, it should also be planned. As a result, an improvement in historical context requires its social revival next to physical

one. In this article, Toopkhaneh (Cannon House) Square of Tehran is taken into consideration as a case study and a live urban space since its formation until today. The square had a special credit in ancient times, and now it is also regarded as one of the busy and valid squares in Tehran. The square was established in 1281 of the lunar year; it was the place to fire cannon balls in official ceremonies and also dawns of Ramadan; hence, it was called Toopkhaneh (Cannon House), but Toopkhaneh square during its life period until today has witnessed many scenes that the most important was Sheikh Fazlollah's execution in constitutional period. The purpose of this article is to provide an appropriate solution for maintaining urban memories in this square and to utilize the space optimally with regard to its plentiful capabilities in the process of active urban life of today and also changes made in it; the solution that neither removes a memory nor eliminates its historical identity.

## RC 16-01 - Power struggles – energy systems governance and conflict

*Chair: Johannes Hamhaber, Günther Weiss*

### Leaving NIMBYs behind – Uncertainty within space-related conflicts over offshore wind farms in Scotland and Germany

*David Rudolph (University of Edinburgh)*

Offshore wind farms are widely considered to become a cornerstone of energy transition for securing the energy supply and tackling climate change simultaneously. But recent developments have demonstrated that offshore wind farms are far from being conflict-free, evoking confrontations with other stakeholder interests. Drawing on comparative case studies in Scotland and Germany, this paper addresses and explores various conflict lines emerging from the installation of offshore wind farms and contesting local community interests and concerns. Local resistance against wind farms opens up a vast debate about the constitutive origins of the opposition which have previously been framed by NIMBY portrayals that are now rather denounced as being too simplistic, uneducated and parochial. Such considerations may point towards the appearance of locally rooted oppositions but do not provide profound explanations due to obscuring underlying rationales. By going beyond the stigmatisation of NIMBYism, the notion of space-related conflicts is intended to turn the attention towards conflicting interests and values that are aimed at space. This does not imply that such interests can be simply located at a certain 'space', but that these interests rather involve a spatial dimension in terms of representations and appropriations of spatiality. Conflicts over the development of renewable energy facilities manifest through practices stressing socio-economic and environmental impacts that are supposed to be disruptive to people and to what is regarded as 'nature'. However, it is argued that these refer to uncertainties and claimed truths that are under negotiation during the planning and licensing processes. Hence, this notion rather points to discursive representations and assumptions of potential impacts which are supposed to be particularly informed by strategic spatial constructions in the sense of 'geography-making'. While mostly reproducing discourses that are likewise applicable to and may coincide with those stemming from controversies over onshore wind farms, local opponents to offshore wind farms draw on specific narratives in order to justify and legitimate their stances. This paper explores the story lines local actors (re-)produce to cope with and overcome various conflict

situations. In doing so, a framework reflecting on structural, subjective and spatial components of conflicts is suggested to illuminate the rationales hiding behind an alleged NIMBYism. It will be shown that oppositional story lines are, to a certain extent, related to uncertainties, risks and insecurities evolving from planning and participation structures and societal negotiation processes of spatial and economic impacts.

### The tensions in sustainable energy discourses: Civil society, regionalisation and uneven development in Southeast Asia

*Mattijs Smits (University of Sydney)*

This paper analyses how tensions in discourses of sustainability play out in the context of the ongoing energy transitions in Southeast Asia. While discourses on climate change, renewable energy and sustainability transitions are increasingly thought of as global and homogeneous in global media and academia, their meaning and traction in different countries, scales and contexts are often quite different. There is a need to understand the tensions and complexities of these discourses to influence thinking about more equitable and sustainable energy futures. This paper analyses two tensions that exist in discourses on sustainability with reference to Thailand and Laos, two neighbouring countries in Southeast Asia. The first tension relates to the different levels of civil society involvement in shaping energy debates. In Thailand, civil society opposition to some large power projects has led to the cancellation of some controversial projects and resulted in some of these projects moving across the border into neighbouring countries such as Laos. Laos, on the other hand, has limited space for civil society expression and discourses of opposition and sustainability have mainly been institutionalised through development projects and have limited traction in government organisations and everyday life. As such, uneven development of civil society shifts the problems of sustainable energy development to different geographical locations, thereby exacerbating domestic and regional inequalities and increasing potential for conflicts. A second tension can be found between sustainability and increased regional integration. The key motivations for regional integration initiatives of regional actors such as ASEAN and the ADB are linked to infrastructural connectivity and power trading in the region. This regional dimension further complicates development of sustainable energy futures in Laos and Thailand, as these initiatives are usually geared towards facilitating private investment and often only pay lip service to the discourse of sustainable energy and potential social and environmental impacts. This paper provides a geographical insight into the tensions in the discourse of

sustainability brought about by transitions in the electricity sector, drawing on multi-site and multi-scale fieldwork on energy projects in Thailand and Laos. It challenges the implicit assumptions that global discourses, such as on climate change and sustainability, have a similar meaning at different scales or can 'trickle down' through global structures and initiatives. Instead, this paper proposes an alternative framework in which assemblages of actors engage with the challenges of energy, development and sustainability on different scales in non-linear and conflictual ways.

### Local energy transition framed by international climate regimes and national energy regulation

*Sybille Bauriedl (Universität Kassel)*

Transition from a fossil to a renewable energy system seems to be a great solution for many problems of multiple crises. It is the solution for the peak oil crisis (by substitution of fossil resources), climate crisis (by low carbon economy), global economy crisis (by new fields for accumulation), crisis of distribution justice (by decentralized access to energy), crisis of local finances (by regional value creation) and it is the alternative of the majority after a changed risk perception for nuclear power after the Fukushima disaster. Energy transition linked with a green economy discourse might be a good strategy to stabilize the industrial-capitalist complex, but the implicit paradigm of growth seems not to be the best solution for global climate mitigation or global social justice. As long as the idea of decoupling growth and resource consumption is not reality, a sustainable energy transition must be connected with a socio-ecological transformation. The paper presents case studies on actor networks and governance formations of German renewable energy municipalities and their multiple interests to realize an energy transition by decentralized renewable energy production and supply. This transition creates a changed set of actors at the local level. New promoters of local energy policy are real estate owners, wood land owners, citizens, farmers, and regional financial service providers. Do these local actors create governance innovations within a multi level energy policy? And does more participation in political and economic processes result in a higher acceptance of energy transition? Or is the economic instrument of the national government by gratification for feed in of renewable energy the powerful framing of local governance? I will discuss these questions with the perspective of a critical political ecology, which analyses socio-economic and ecological conflicts, mechanisms of power relations and politics of scale. The framing of energy transition by energy security discourse, green economy

discourse and mitigation discourse is linked by a rescaling of the responsibility for mitigation by a low carbon energy economy to a regional level. This regionalization of energy transition is connected with many local land use conflicts like the extension of covered area for renewable energy (photovoltaic and biomass) in conflict with food production, renewable energy plants (wind power) in conflict with environmental protection (e.g. birds), health protection (e.g. noise and shadow), and electricity grid expansion in conflict with landscape protection (for tourism and recreation). These local conflicts of energy transition can be analysed as results of a politicized ecology and of socially constructed scales of mitigation strategies.

### Postfordistic energy policies? Desertec and the reregulation of energy supply between Europe and North Africa

*Thomas Schmitt (Max-Planck-Institute for the Study of Religious and Ethnic Diversity)*

In 2009 the Desertec Industrial Initiative (DII) was founded by several, predominant German enterprises including the NGO Desertec Foundation, a kind of spin-off of the Club of Rome. The objective of DII is to organize the conditions for the realisation of the Desertec idea, which aims to supply, in a large scale manner, Europe with electricity produced in solar power plants in North Africa and the Arabic peninsula. The Desertec concept is playing with and combining different myths as the desert, the large-scale/"megatechnic" vision and the reconciliation of the North and the South. Critics of Desertec argue that the project has the intention to impede an energy transition towards decentralized energy structures in Europe and that Desertec has a neo-colonial attitude. Both the Arab spring and the disaster of Fukushima have changed the discursive landscape and the institutional conditions around the realisation of Desertec. The paper presents the ideas and current realisation of the Desertec project, and analyses central arguments of its protagonists and antagonists. It raises and responds to the question, if Desertec can be seen as a fordistic or a postfordistic project according to the categories of the French regulation school.

## RC 17-01 - Resettlement and relocation as a hazard prevention strategy

*Chair: Jürgen Pohl, Swen Zehetmair*

### Resettlement after disasters: Reducing hazard exposure – increasing susceptibility?

*Jörn Birkmann (United Nations University)*

The international Displacement Monitoring Centre (IDMC) and the Norwegian Refugee Council (NRC) underscore in a recent study published in 2011 that in 2010 the number of people displaced due to disasters caused by natural events, were over 42 million people with highest numbers in Asia (see IDMC and NRC 2011). The paper focuses on vulnerability dynamics due to resettlement, but with a specific focus on resettlement after disasters due to environmental change and natural hazards. In this regard resettlement is often conducted by country governments with the intention to reduce disaster risk. Resettlement in the framework of Disaster Risk Reduction (DRR) involves a complex planning process similar, but not identical to development induced displacement and resettlement (Correa 2011; Oliver-Smith 2009). While a large number of past research projects focuses on the effects of resettlement due to development projects, less research and vulnerability assessments have dealt with the various consequences of resettlement due to natural hazards. The question of dynamic changes of vulnerability of those who resettle and those who are staying in areas highly exposed to natural hazards is also less examined. Against this background the paper examines consequences and dynamic changes of vulnerability due to resettlement in disaster hit areas in Sri Lanka after the Indian Ocean Tsunami in 2004 and on flood exposed rural households in Vietnam. The comparison of resettlement strategies and processes provides insights on how different social groups are coping and adapting to the new circumstances introduced by the disaster event and the relocation processed thereafter. Conclusions on how to improve resettlement processes in the future which are likely to become an even more important topic in the light of climate change are formulated.

### Community Relocation as a Flood Mitigation Measure in Germany

*Thomas Kox (Freie Universität Berlin)*

In times of severe flood events much needed support is often provided by authorities and private organizations. However, the aid contributes to future flood related problems, as pre-disaster situations are recreated. Relocation is seen as a measure to break this so called 'Disaster-Damage-Repair-Disaster-Cycle' (Tobin&Montz 1997). It lies within the context of preventive strategies of risk reduction and can be seen as a form of land use planning, since the final aim is to reduce the communities' exposure to flood risk. Affected communities and their residents should thus be protected against the recurrence of flood events by relocating their houses to non flood prone sites. Hence it is the most radical flood mitigation measure, and by eliminating the exposure by 100% the most effective as well. Although resettlement is well known in Germany in terms of open-pit mining (e.g. Rhineland), it is not widely used as flood mitigation measure. By following the paradigm of natural hazards research (White, Kates, Burton) and the concept of natural risk management (Hollenstein, PLANAT), the study focused on the two major relocations in Germany so far: Röderau-Süd, a town situated on the Elbe, and Moos, a village situated on the Danube. Both had been struck by serious flood events in the past. While the latter was relocated shortly thereafter, the relocation of Moos is still in progress. Even though relocations are seen as case-by-case decisions, some general requirements to the implementation and the success of a relocation effort can be set out, if specific local characteristics are taken into account: Most important requirement is the acceptance by the affected population. Without this a prevention measure on voluntary basis cannot be implemented, especially since legal foundations are lacking and no suitable precedents are available. The temporal constellation in the aftermath of an extreme event (window of opportunity), even not exclusively relevant to the implementation, favors to a large extent the feasibility of the measure since political support and financial resources are easier to acquire. The significance of a possible risk image is ambivalent. On one hand, the gained attention can lead to more of the mentioned support and money. On the other hand, the resulting fears of adverse economic consequences can lead to a negative attitude of local authorities and stakeholders towards the settlement. In addition the results pointed out, that in terms of a risk assessment the factor efficiency outweighs the mentioned extreme high effectiveness as the prior criteria. This is particularly true for small relocation areas. Here a resettlement can be more cost-efficient than, for example, the construction of a dyke, whereas the development of larger areas

are not meant to be restricted. Thus a general shift from the still existing supremacy of structural flood protection measures is not yet seen.

### **Vulnerability and Disaster Devastation of American Communities: Long-term Demographic Consequences**

*John Cross (University of Wisconsin Oshkosh)*

Vulnerability of populations to disasters is a topic of growing interest among many hazards scholars and disaster planners. Cutter and colleagues (2003) developed a social vulnerability index that predicts how various geographic areas, initially counties, would respond to disaster losses. Their index has been refined and more widely recognized, and recently Esnard, Sapat, and Mitsova (2011) developed an "index of displacement vulnerability", considering long-term displacements caused by hurricanes. While the focus of these endeavors has been upon how well residents can respond to losses and how long they might be displaced, recent catastrophic destruction of several American communities by tornadoes and flooding raises questions about whether the places can recover. This paper looks at demographic changes that have resulted from devastating disasters in communities, many of which are in rural settings, throughout the United States. Communities that suffer catastrophic destruction frequently experience long-term losses of population, as their residents select relocation rather than reconstruction. Many communities suffer sharp drops in their populations immediately following major disasters, as shown by Gulf Coast settlements devastated by hurricanes and in Great Plains communities struck by tornadoes or floods. Some communities quickly rebound, while others continue losing residents. Seeking explanations of what types of communities suffer the largest proportional long-term losses of their populations, this paper looks at a sample of over seventy American communities that suffered destruction of, or major damage to, the majority of their dwellings between 1991 and 2008. Factors considered were the type of hazard event, the socio-economic and demographic characteristics of the devastated community, the pre-event size of the community, the long-term population trends before the event, and the proximity of the community to other similar sized or larger cities. Communities with younger populations typically suffered the greatest population losses, while those communities that grew in population during the decade of their destruction had pre-event median ages that exceeded the national average. Communities that were already losing populations, or were in counties losing population, before the disaster suffered far greater population declines than those that were growing. Losses also tended to be higher in communities

that lacked schools. Communities located in counties or parishes with higher social vulnerability indices were most likely to have moderate drops in population in contrast with those with the lowest social vulnerability indices.

### **People's perception of relocation due to natural hazards on the German North Sea coast**

*Daniela Siedschlag (Helmholtz-Zentrum Geesthacht)*

It is a worldwide phenomenon that people settle in regions vulnerable to natural hazards. In regions of the Global South scenarios of relocation due to (natural) hazards are conceivable and often necessary. In Europe relocations in consequence of floods, avalanches, storm surges or other natural hazards are not a prevention strategy that is openly discussed by the responsible authorities and/or in civil society. Nevertheless, there are hazard prone regions in Europe and people live there. For this reason the discussion about relocation as a strategy to cope with hazards is relevant. It is not a technical or solely financial question if relocation is considered an option but also a question of perception, awareness and place identity which bind people to their homescape. Therefore, an analytical discussion of appropriate mitigation strategies to hazards has to include perceptual studies of the people affected. In other words: Are relocation strategies on the mitigation agenda of the people affected? In Germany, the North Sea coast, the North Sea islands and Halligen are such hazard prone regions. Heavy storm surges can cause dyke breaks and flooding of settlements, agricultural and industrial areas. Especially the consequences of climate change will lead to sea level rise and intensified storm activities in the North Sea region. The paper deals with the research question: - Do people - living on the North Sea coast - perceive relocation as a proper strategy to cope with sea level rise and storm surges? Furthermore, following aspects will be considered: - How do people - living on the North Sea coast - perceive the risk of sea level rise and storm surges? - Are they afraid of losing their 'Heimat'/homeland due to sea level rise and storm surges? The empirical case study is a quantitative household-based survey on the island Pellworm (500 households) and the North Friesland mainland (200 households) (Germany) and additional qualitative in-depth interviews. First results of the ongoing research will be presented and framed into the context of relocation as a voluntary hazard mitigation instrument. The results show that the people living on the North Sea coast feel connected to the sea in their everyday lives and are bound to this region. On the other hand the risk of storm surges is - particularly on the North Sea islands - omnipresent and people are aware of this risk. Insights into the



connection between people and place can lead to relevant information for the adequate management of potential relocation. One important aspect in the discussion about relocation as a strategy of risk prevention is to know about the perception of the people who would be potentially affected.



## RC 18-01 - Risk governance in Southeast Asian cities

*Chair: Javier Revilla Diez, Frauke Kraas*

### **Nested response capacities to multiple risks in Vietnamese cities – Empirical lessons for advancing conceptual guidance on risk governance**

*Matthias Garschagen (United Nations University)*

Risk landscapes in Vietnamese cities are not only highly complex due to the interaction of different types of risks but also very dynamic given the multiple socio-economic and political transformation processes as well as environmental changes. The importance of acknowledging overlapping exposures to multiple risks and their feedback relations has been emphasized in the literature (notably O'Brien et al. 2004; Leichenko and O'Brien 2008). However, it seems that this call for integrative perspectives is only insufficiently taken up by a large part of the current research on risk assessment. This is particularly true for the rapidly growing body of work on climate change impacts and the respective responses which often tends to treat climate change risk as if it emerged in isolation from other risks. In addition, when assessing the capacity of urban actors or institutions to respond to these risks, the differences but also interactions of coping vs. adaptation processes debated in the conceptual literature are often not considered as a backdrop for empirical analysis. Yet, it is argued here that considering these conceptual stimuli might provide valuable insight for enhancing knowledge on risk response capacities and eventually for improving risk governance. Against this background, the paper reflects on the usefulness of the above mentioned impulses for understanding risk complexes in Vietnamese cities and draws in particular on empirical research in Can Tho City, Vietnam, for a detailed case study analysis. Can Tho's population is heavily at risk from intensifying natural hazards but - often neglected - is also exposed to multiple other risks such as institutional insecurity with respect to land development and land titling, environmental risks related to pollution or heavy price fluctuations. Profiles and comparisons of risk cascades are therefore developed for selected socio-economic groups. This is argued to be beneficial not only for analytical but also policy communication purposes. The analysis further suggest to frame socially differentiated risk response capacity as a nested concept that combines elements previously ascribed in the conceptual literature to either coping or adaptation, i.e. combining for example short- vs. long-term response measures, spontaneous vs. planned measures, exploitive

vs. constructive measures, or measures targeting systemic conservation vs. systemic change. The empirical data allows in particular for discussing how these nested response capacities are influenced by other socio-economic conditions, and are hence socially differentiated. The paper concludes by discussing the implications of the empirical findings for improving risk governance in Vietnam's cities and beyond. In this context the need for a stronger integration of governmental and non-governmental risk response measures as well as for socially differentiated policy options are discussed. Future research needs are formulated.

### **Bangkok's Flood Problem: Local Vulnerabilities and the Role of Governance**

*Frederick Massmann (University of Kiel)*

The severe flooding in Thailand during October/November 2011 impacted many northern provinces including the capital Bangkok and highlighted their vulnerabilities to external shocks. With more than 700 casualties, seriously disturbed livelihoods of millions of people and an estimated damage of US\$ 20 billion, this flood was the worst in terms of economic losses, the amount of water and people affected. In Bangkok, where the economic and population density is highest, the flood revealed political and social conditions which contributed significantly to the vulnerability of the megacity and thus to the dimension of the impacts. An understanding of the causal factors of vulnerability is crucial not only for the implementation of recovery plans, but also for building future resilience. Therefore this study analyzes the vulnerability through a holistic framework. A special emphasis is on the influence of governance, not least to contribute to a theoretical enhancement. Different governance modes are taken into account and are analyzed and classified accordingly. This paper examines two selected case-study areas in Bangkok. One area is an inner-city slum bordering the Chao Phraya River and the other area is a stream island in the northern suburbs. The underlying factors contributing to the vulnerability of the inhabitants of those areas are investigated, focusing particularly on the influence of governance processes and structures. Based on qualitative interviews the socio-economic and political conditions in the communities as well as the coping mechanisms and adaptation strategies are analyzed. Preliminary results show that the vulnerabilities are shaped by various interlinked factors which can be arranged in the above named three dimensions. The existence and effectiveness of community organizations, for instance, is closely bound to social networks within the community. Conversely a strong community organization



strengthens the social cohesion within the community by organizing common events and regular meetings. Furthermore it implements flood-adaptation measures on a local level like uplifting walkways and placing sandbags but it also negotiates for external help with the government and others. Accordingly a strong community organization is fostering resilience. The distribution of external help is criticized heavily by the local population as being unfair. Often aid packages and financial compensation are given to those in favour of the distributor. Another factor revealed during the data collection relates to serious conflicts regarding land tenure within the study areas. Many people exposed to flooding are living on governmental land without a legal status. This unsafe condition makes the occupants hesitate in applying adaptation measures to their houses or to the community respectively and hence increases their vulnerability.

### Climate Risk Assessment of Urban Kathmandu

*Ina Yanakieva, Udo Nehren (Cologne University of Applied Sciences), Simone Sandholz (University of Innsbruck), Jishnu Kumar Subedi (Department of Civil Engineering Pulchowk Campus, Institute of Engineering)*

The presented study analyzes existing key environmental problems and regional climate trends in urban Kathmandu as a basis for assessing vulnerabilities and risks associated with CC. Over the last decades, Kathmandu, the administrative, economic and cultural center of Nepal, has been facing rapid population growth and urbanization. This development has led to severe environmental problems and inefficient urban infrastructure. Climate Change (CC) is expected to worsen existing environmental and sanitation problems in Kathmandu Valley (KV) and to increase the vulnerability of urban population to climate induced hazards. Research methods include the collection and interpretation of existing climate, hydrological and health data, survey in squatter settlements, expert interviews, field observations, and literature review. Analyzed temperature and precipitation data for a period of four decades revealed consistent and continuous increase in maximum and minimum temperatures in KV and a trend of increase in erratic and high intensity rainfall episodes. Furthermore, later onset of the monsoon and a trend of drier winters have been indicated. Potential risks associated with the observed changing climate have been identified, such as more frequent and severe flood and inundation events, frequent and extended droughts, and the introduction and outbreak of water and vector-borne diseases. Hydrological analyses have shown strong dependence of Bagmati River discharge dynamics on precipitation in KV and a correlation has been found between extreme rainfall and flood events. Chronic water shortage in urban Kathmandu is expected to

worsen with CC, posing the risk of growing water demand, decreasing groundwater recharge and groundwater depletion. Observed prevalence patterns of water-borne diseases, such as Infectious Gastroenteritis, Typhoid fever and Cholera in KV have shown clear seasonal disease dynamics with highest percentage of infections during the monsoon season. CC is expected to put extra stress on urban water quality in KV and to increase the risks of water-borne-disease outbreaks. Furthermore, it is expected to widen the range of disease vectors. Although vector-borne diseases are not yet considered a serious problem in urban Kathmandu, in the recent years the presence of Malaria, Dengue and Japanese Encephalitis in KV has been reported. A survey in squatter settlements of Bagmati and Manohara rivers in KV has revealed the high vulnerability of squatter population to present and future threats posed by CC. Living in poor housing in a hazard prone and highly polluted environment, depending on limited fresh water sources and having deficient hygiene practices, urban squatter dwellers are expected to be hardest hit by the negative impacts of CC. The study underlines the urgent need for improvements in the management of urban Kathmandu, which are essential for its resilience and adaptation to CC.

### Spatio-Temporal Patterns of Crime in Association with Predominant Functional characteristic of areas - A Case Study on Urban Risks in Greater Mumbai, India

*Chandrakala Joshi (K.P.B.Hinduja College of Commerce), Vinayak Phadke*

The vulnerability of metro cities to crime is largely due to concentration of wealth, heavy unemployment, disparity in lifestyles, competition for sustenance, heavy population pressure on infrastructure and temptations perceived through mass media. This in turn leads to greater incidence of crime in urban metros. Crime related urban risks depend upon various socio-economic attributes including the functional characteristics of the area. The present paper offers a geographical perspective on crime by focussing upon the spatio-temporal patterns of crime in Greater Mumbai between 1996 and 2006. This exercise suggests that different functional areas are associated with specific types of crime. Upper class residential, Low class residential (with a mix of small scale industrial units), Commercial and Industrial areas were studied to find the relationship between the nature of crime and the predominant function existing in that area. Selection of study areas has remained purposive. Accordingly, four areas were selected as representatives of the types mentioned above. The secondary data was obtained from Crime Branch, Greater Mumbai. Number of cases registered



under IPC during the period 1996 - 2006 were investigated for each of the study areas. Since this information focuses primarily on the temporal pattern, intra-areal pattern was analysed by collecting data from the concerned police stations. Detailed information about the place, date and time of offence as well as information about the source area of the accused for the year 2006 was obtained by studying the crime records maintained by the respective police stations. The area wise and crime wise tabulation of data has brought together the crime of specific categories such as violence, property related, thefts, riots etc. This study has helped to appreciate the temporal pattern of crime, to locate the crime prone segments in the selected areas and examine the crime specialization in each of them. It is not surprising to find that with globalization and liberalization, the character of the city has changed and so also the ambition of criminals.

## RC 19-01 - Spatial landslide analysis and its implementation in spatial planning 1

*Chair: Rainer Bell, Alexander Brenning*

### State-of-the-art and challenges of landslide susceptibility modelling at regional to continental scales

*Miet Van Den Eeckhaut (Joint Research Centre, European Commission), Jean Poesen (KU Leuven, Department of Earth and Environmental Sciences), Andreas Günther (Federal Institute for Geosciences and Natural Resources), Jean-Philippe Malet (Institut de Physique du Globe de Strasbourg), Paola Reichenbach (Research Institute for Hydrogeological Protection, National Research Council), Fausto Guzzetti (Research Institute for Hydrogeological Protection, National Research Council), Javier Hervás (Joint Research Centre, European Commission)*

Growing awareness of regional, national and international organizations has resulted in several initiatives fostering to identify, assess and mitigate the risks posed by landslides using scientific knowledge and innovation. Here, we present an overview of landslide susceptibility modelling at scales ranging from regions to continents, based on case-studies from Belgium and Europe. We mainly focus on the type of models, their validation and their use for regional and European policy making. Regional-scale landslide susceptibility assessments nowadays mainly comprise statistical modelling. Hilly areas of Flanders (northern Belgium) are affected by more than 330 landslides of various types. In these areas, we evaluated different statistical models among which stepwise logistic regression and discriminant analysis. Susceptibility maps produced from the logistic regression models, which can be freely consulted on the internet and which are currently used by the Flemish Government as an additional input map for land use planning and management purposes, have already proven their value. After presenting a short overview of national-scale landslide susceptibility assessments in Europe, we move to the continental scale, and present the ongoing activities of the JRC Landslide Expert Group in the context of EU's Soil Thematic Strategy for Soil Protection. This Strategy considers landslides as one of the eight main soil threats in Europe for which it is necessary to identify risk areas, i.e. areas where landslides are likely to occur in the future and where risk reduction measures have to be taken. Because of the wide variety of climate and physiographic regions in Europe, the continent was divided in seven climato-physiographic regions, and for each region a specific model was

produced. Both semi-quantitative (Spatial Multicriteria Evaluation) and quantitative (logistic regression) methods are evaluated using available Pan-European thematic maps of slope gradient, lithology and land cover as independent variables. Model calibration and evaluation are possible, because more than 110,000 landslide locations were made available by national and regional authorities from 18 European countries. Combination of the susceptibility maps obtained for each climato-physiographic region results in a European-wide landslide susceptibility map that performs significantly better than previous attempts of continental-scale landslide zoning. Finally, we conclude with some major challenges for future landslide susceptibility modelling at various spatial scales.

### Landslide susceptibility maps and their importance for spatial planning strategies

*Gilbert Pomaroli (Amt der NÖ Landesregierung)*

Landslides are a major threat in the Provincial State of Lower Austria. They damage infrastructure, forests, agricultural land and settlements. Therefore, landslides besides floods have been of crucial importance within the spatial planning strategies of the provincial state. This is also manifested within the Spatial Planning Law of Lower Austria (1976). However, since no detailed information on spatial landslide threats were available, spatial planning could not work as effective as it should and as it does e.g. for flood hazards due to the availability of flood hazard maps. It will be shown how landslide hazards were and still are treated. However, in comparison with the flood hazard maps it became obvious that similar maps are needed for landslides. Thus, the project 'MoNOE' (Method development for landslide susceptibility modelling in Lower Austria) was initiated by the provincial government. The main aim is to prepare landslide susceptibility maps for slides and rock falls. For implementation into the spatial planning strategies, these must fulfil special requirements which encompass the optimal number of landslide susceptibility classes, the definition of meaningful thresholds for each class, the definition of recommendations for actions for each class and finally, the best colours for each class. These aspects were not only intensively discussed with the project partners carrying out the study, but also with representatives of communities and of the Austrian Service for Torrent and Avalanche Control. The project 'MoNOE' will be finished in early 2013, so that at the conference almost final results can be presented and discussed.

### **Landslide mapping, susceptibility modelling and infrastructure planning at regional and national scales within the UK**

*Hannah Evans (British Geological Survey), Claire Foster (British Geological Survey), Colm Jordan (British Geological Survey)*

The combination of an increasing population density, abundance of relict landslides and a high proportion of failure-susceptible lithologies means that landslide research within the UK is paramount. New technologies are being used alongside traditional mapping techniques in a novel, multi-stage methodology for landslide mapping developed by the British Geological Survey (BGS). Variable-perspective 3-D topographic visualisation, 3-D aerial photograph interpretation and field mapping with digital data capture are all being utilised to accurately map the UK's landslides. These strategic surveys allow the BGS to better characterise and understand the country's landslides: an essential requirement for landslide susceptibility mapping, hazard assessment and infrastructure planning. Repeat monitoring of selected landslides using terrestrial LIDAR and dGPS and the formation of a proactive Landslide Response Team also help to maintain a nationally uniform, up-to-date National Landslide Database. Information derived from the BGS's strategic, repeat and responsive landslide surveys is used to inform a series of National Geohazard Assessments. These GIS-based assessments provide information on the susceptibility of the UK landmass to landslide activity, alongside a suite of 5 other geohazards. The information is used by government planners, insurance companies and utility operators as well as being made available to home buyers. This established susceptibility assessment technique has recently been further developed in order to allow asset managers to assess the susceptibility of infrastructure to landslides. In Great Britain the land owner has primary responsibility for ground instability and a duty to take measures to remove or reduce the hazards they may be aware of. With increased landsliding due to climate change forecast, management of assets with regard to landslides could become an even greater issue. The BGS landslide mapping and susceptibility modelling methodology is also suited to application in an international context and aspects of the processes have already been trialled in Madagascar and applied to Martian landslides.

### **Landslide Hazard Zonation Mapping of Umshing Micro Watershed using RS, GIS and GPS**

*Bijay Mipun (North-Eastern Hill University), Devesh Walia (North-Eastern Hill University)*

Landslides constitute one of the major hazards that cause losses in lives and property. Landslides are one of the complex analyses, involving multitude of factors and need to be studied systematically in order to evaluate the hazard. Some factors are very much effective in landslide occurrence these are: slope, aspect, altitude, rainfall, landuse, geology, distance from fault, distance from roads and distance from main drainages etc. The present study is to investigate and analyze the different causative factors, which are responsible for generating landslide. The methodology used for the study of landslide zone is based on satellite data and GIS-GPS technique for Umshing micro watershed of Shillong. The location of landslide study is considered based on, lithological structure, vegetation cover, type of land use, slope angle, construction activities, river & waterways, altitude, slope aspect etc. The average annual rainfall of the state is 2599.84mm. Though the incident of cloudburst is not a common phenomena in North East India yet the areas which have higher altitude (1500m) are more prone to landslides. Especially, narrow valley, gorge, and lithology are some of the prime causes for landslide occurrence. Areas, which have low compact lithological structure are more prone to landslide. The study area is predominant of Granite, Gneiss and Ferruginous sandstone with Phyllite and Schist, therefore possibility of landslide occurrence is high. Due to the active seismotectonic phenomena in the region and creep in area of study, the Umshing micro watershed is prone to landslide. The earthquakes of moderate intensity which is a common phenomena creates new spots and gets generated that making the area more vulnerable.

## RC 19-02 - Spatial landslide analysis and its implementation in spatial planning 2

*Chair: Rainer Bell, Alexander Brenning*

### Landslide damage in hilly regions: A spatial and economic analysis from the Flemish Ardennes, Belgium

*Liesbet Vranken (University of Leuven), Pieter Van Turnhout (University of Leuven), Miet Van Den Eeckhaut (Joint Research Centre, European Commission), Liesbeth Vandekerckhove (Flemish Government, Environment, Nature and Energy Department), Goele Vantilt (University of Leuven), Jean Poesen (KU Leuven)*

Several regions around the globe are at risk to incur damage from landslides. These landslides cause significant structural and functional damage to public and private buildings and infrastructure. Many studies investigated how natural factors and human activities control the (re-)activation of landslides. However, few studies have concentrated on a quantitative estimate of the overall damage caused by landslides at a regional scale. Landslides lead to economic losses and both direct and indirect costs have to be considered. Societies are becoming reluctant to invest in structural measures that can reduce natural risks because of the high costs associated with these engineering and technical works. Instead, they tend towards the development of non-structural mitigation measures, such as land-use planning, regulation and building codes. If governments want to design proper policy measures to minimize societal damage due to landslides' occurrence, they need to assess the costs and benefits of different mitigation scenarios. As a first step, one needs to get a picture of the overall economic damage caused by landslides. This study therefore starts with a quantitative economic assessment of the damage caused by landslides in the Flemish Ardennes (Belgium), a low-relief region (area=700 km<sup>2</sup>) susceptible to landslides. Based on focus interviews and semi-structured interviews with homeowners, civil servants (e.g. from the technical services from the various towns), or with the owners and providers of lifelines (e.g. electricity and sewage), we have quantitatively estimated the direct and indirect damage induced by landsliding and this for a 10 to 30 year period (depending on the type of infrastructure or buildings). For example, in the last 10 year, costs of road repair augmented to 814.560 '. Costs to repair current road damage were estimated at 669.318 '. In the past 30 years, costs of measures to prevent road damage augmented to at least 14.872.380 '. To repair and prevent damage to

waterworks and sewage systems, expenditures amounted to 551.044 ' and this for the last 30 years. In the past 10 years, the cost to prevent damage to railroads augmented to at least 4.567.822 '. The value of real estate located in regions affected by landslides decreased with 15% to 35%. All these damage costs were then used to made potential damage maps. Based on the inventory of landslides frequency of landslides' re-activation and past land uses, we categorized regions that were affected by landslides in the past according to their temporal probability of landslide re-activation. This allowed us to produce a risk map for regions that were affected by landslides in the past. This paper shows that, though generally not spectacular, landsliding in low-relief regions susceptible to landslides is a slow but continuously operating process with considerable damage allowing one to identify several medium to high landslide risk zones.

### Landslides hazard zonation in Jajrod river basin

*Ezatollah Ghanavati*

Jajrod river basin consist about 69683 hectares and located between 350 45/ N and 360 50/ N Latitude and 510 22/ and 510 51/ E Longitude. One of the most important reservoir that provide the water resources for Tehran (capital of Iran) with over 8 million population as Latian dam is situated in this basin about 10 km far from Tehran. It is more susceptible to landslide, mud flow, and other forms of mass movement. Landslide is one of the most natural hazard that causes damage to city and rural inhabit, cultural lands, roads, forest and so on. Therefore it is obvious that the landslide susceptibility mapping is very important for environmental management in this region. The objects of this study are: To study and assess the role of factors that affect landslides in Jajrod river basin. To present a quantities model to predicting potential landslides risk in Jajrod river basin. Provide the map of landslide risk mapping in Jajrod river basin. In this research 150 landslides by field study and air photographs was recognized and mapped. These landslides also pointed on 1:50000 topography map of the Jajrod river basin. Determining the effective factors on landslide in the Jajrod basin is the second stage of this research. Lithology, Slope, Slope direction, Land use, Distance to fault, Digital Elevation Model (DEM) and precipitation were the seven factors that studied and analyzed by using AHP model in GIS environment. The methodology of this research contains theses stages: 1. Reading data in Geomatic software. 2. Geometric and radiometric of images. 3. Extract NDVI of basin by ETM image. 4. Make Digital Elevation Model (DEM) by using ArcGIS. 5. Extract the slope, aspect, elevation, drainage map of basin by

using DEM. 6. Extract lithology and fault map by geology map of the basin. 7. Determination of weights of the factors by using analytical hierarchy process (AHP) methods. The result of this research represent that the AHP model is the suitable method for predicting the landslide hazard risk in this area. At the final the landslide hazard risk map of the Jajrod basin is classified in five class containing; very low, low, medium, high and very high hazard risk. In this classification about (62%) identified as high hazard risk in the Jajrod river basin. Keywords: Jajrod: Landslide susceptibility mapping: Analytical Hierarchy Process

### **Effects of preprocessing techniques on landslide detection based on high-resolution (HR) remote sensing data**

*Vincent Balthazar (Université catholique de Louvain), François Clapuyt (Université catholique de Louvain), veerle vanacker (University of Louvain)*

Landsliding and accelerated erosion are common hazards in tropical mountainous regions around the world. Not only considerable financial costs are suffered, but also major ecological and environmental problems often arise in a larger geographical area. Land cover modification and conversion have clear impacts on natural disaster risks. Assessing the rate and spatial patterns of landslides is challenging given the ruggedness and the inaccessibility of mountain areas. Satellite data offer an inexpensive means of deriving complete spatial coverage of land attributes in a consistent manner that may be updated regularly. The aim of this study is to evaluate the efficiency of high spatial resolution (HR) satellite sensors to create regional landslide inventories. Detecting and mapping landslides over extensive areas is of great importance and cannot be accomplished by time consuming methods like point-based field measurements or aerial photographs analysis. HR satellite sensors with relatively high spectral and temporal resolutions might be considered for regional scale landslide inventories. However, the use of such data in steep terrain is highly constrained by topographical and shadowing effects that require appropriate and advanced pre-processing techniques. Preprocessing of remote sensing data commonly addresses atmospheric and geometric corrections, but rarely incorporates topographic corrections even though they are recognized as a major problem for quantitative analysis. To account for the effects of shadowing in steep terrain, we applied 3 levels of pre-processing techniques. The Ecuadorian Andes and Northern Vietnamese Mountains were selected as preliminary test sites, as these regions are facing rapid land use changes that are associated with an important number of mass movements. Multi-spectral

images have proven to be particularly effective for mass movement mapping, improving the 2D shape recognition of features particularly with processing techniques such as color composites, vegetation indexes, pan-sharpening, band arithmetic or principal component analysis (PCA). Landslide inventories are here created based on semi-automated detection procedures applied on 3 different levels of pre-processed satellite data. The performance of these techniques is evaluated quantitatively by comparing the semi-automated landslide inventories from high-resolution satellite data with ground-truthing data from very-high resolution (VHR) imagery and field observations. Our results indicate that the application of topographic correction techniques significantly enhances the performance of the semi-automated landslide detection in steep terrain.

### **Mass movement risk analysis and mapping in Pahuatlán, municipality of Puebla, México**

*Franny Murillo García, Irasema Alcántara Ayala (Institute of Geography, National Autonomous University of Mexico (UNAM))*

Mass movement risk disaster analysis and mapping in Pahuatlán, municipality of Puebla, México. Very frequently, mass movement processes take place in the Sierra Norte de Puebla, Mexico. Different disaster events associated to such processes have occurred in 1957, 1999, 2005, 2007, 2009 and 2010 as a result of heavy rainfall or the presence of tropical storms and hurricanes. Therefore, recognition, analysis and mapping of the risk elements that determine the occurrence of mass movement disasters in this region, and particularly in Pahuatlán municipality, Puebla, Mexico, has been established as the aim of this work. Disaster research approaches have changed over nearly a century. First of all, a positive perspective was used for understanding their occurrence. Afterwards, in the seventies, the structuralism framework stressed the significance of vulnerability. As a consequence, current disaster approaches include tree basic concepts: hazard, vulnerability and risk. The estimation, assessment and treatment of risk have been identified as the most essential aspects of every single disaster. Under such framework, and following the scheme proposed by Varnes (1976), a landslide inventory, hazard and risk mapping of Pahuatlán have been carried out based on the analysis of high resolution and stereoscopic image satellite GeoEye (0.5 m resolution panchromatic) dated from December of 2009. Additionally, vulnerability was quantitatively estimated for the population exposed. The combination of these



elements was utilized to propose a landslide risk assessment for the area of interest. Results are presented here.

## RC 20-01 - The fight against disenfranchisement: Emerging cultures of protest in the city

*Chair: Luis Del Romero Renau, Samuel Mössner*

### Urban conflicts in Santiago de Chile and Buenos Aires. An international comparison of strategies and outcome of citizen participation in urban development.

*Corinna Hölzl (Humboldt Universität zu Berlin)*

Over a long period, civil society played a minor role in urban politics of Santiago and Buenos Aires. Due to profound processes of de-regulation, liberalization and privatization, urban development has been heavily influenced by private actors. At the same time, clientelism on the local level and, particularly in Chile, the weakening of civil society organizations forced during the military dictatorship continue to have an effect on urban democracy. In recent years, however, conflicts of interest in urban development have been on the increase. Citizens are increasingly fighting against uncontrolled development measures such as large-scale real-estate or infrastructure projects. In that context, the contribution examines the extent to which these strategies of participation in urban development contribute to a change in local governance processes and opportunities of participation. For this purpose, four urban development conflicts in the Metropolitan Area of Santiago and in the City of Buenos Aires were selected to be studied in-depth. While one conflict of each metropolis is located in an upper middle to high income neighborhood, a second pair of conflicts was selected from poor to socially heterogeneous parts of the cities. In all four cases processes of densification, displacement and increasing housing shortage are provoking strong protests. By means of different strategies, existing and newly emerging social movements and citizens' organizations are fighting against these urban transformations. The international comparative study is based on a broad range of empirical methods. Between 30 and 40 problem-centered interviews, particularly with stakeholders of urban social movements and citizen initiatives involved in the four conflicts, have been carried out. Furthermore participant observations in meetings and demonstrations as well as documents pertaining to the conflicts (plans, press materials and websites of selected initiatives) are included in the analysis. First results show that negotiation processes are varying strongly depending on factors such as resources of the urban social movements, practices and interests of the respective community as well as the governance structures of both cities. The international comparison

reveals strong differences regarding protest cultures and practices of the involved actor groups. Although the local governments partly react to the growing number of protests by incorporating additional participation instruments, rethinking of planning practices seems to be low and political will for real citizen participation is still missing.

### Urban conflicts of Montreal and Valencia, 1995-2010. A comparative analysis.

*Catherine Trudelle (UQAM)*

Catherine Trudelle Geography Department, Université du Québec à Montréal, Quebec Luis del Romero Renau Geography Department, Université de Valencia, Spain Metropolization processes at work in contemporary societies produce social and spatial change which raise strong opposition from a variety of urban actors, leading to acts of dissent. While such urban conflict has been examined in the past, geographical analysis of urban conflicts as sociospatial processes is more recent. Systematic quantitative research on urban conflict is virtually nonexistent in terms of comparative analysis conducted with an international perspective. Systematic comparative analysis sheds light on the existing relationship between urban conflicts and socio-territorial contexts in which conflicts emerge and evolve. This article presents a comparative analysis of urban conflict that occurred in a selection of boroughs in two cities characterized by different geographical realities, Valencia (Spain) and Montreal (Canada), between 1995 and 2010. Spatial autocorrelation techniques applied on a conflict database show a significant relationship between the emergence of urban conflict and the spatial distribution of some contextual variables. Indeed, for Montreal as for Valencia, the concentration of urban conflict is the greatest in the most deprived neighbourhoods. Also, regarding management and regulation of urban conflict, results shed light on important differences between Montreal and Valencia. These differences include the outcome of urban conflicts, repertoire of action of actors involved in conflict activity, and the type of contestation faced by actors who promote the challenged urban projects. Keywords: Urban conflicts, spatial autocorrelation, local governance, urban actors, Montreal, Valencia.



## Protest cultures in France and Germany about housing and “right to the city”

*Elodie Vittu (Bauhaus-Universität Weimar)*

The terms “right to the city” or “right of housing” are used as an action-programme by many contemporary urban social movements acting worldwide to define their actions. Henri Lefebvre’s utopian ideas and production (*Droit à la ville*, 1968) are connected to these movements. While Lefebvre criticized the post-industrial city, the contemporary organizations use the “right to the city” to face problems of the neo-liberal city. These movements protest against the gentrification of city centres, want more civil participation and public facilities or defend housing policies. All these activists use different ways to make their voices heard. I would like to compare the protest cultures in Germany and France, based on case studies. Germany has an important tradition of the protection of the tenants and supportive tenancy law. This has created powerful tenant organizations with a strong political lobby. Privatization of social housing is a central issue that they are fighting against. Also, big cities like Berlin have a tradition of squat and other alternatives movements. As a initiator of a big network of about 50 initiatives, the “Recht auf Stadt”-Network in Hamburg is a representative example of German activism. By presenting this and further networks from Berlin and Freiburg consisting of different social groups (students, tenants) claiming the “right to the city” and acting with regards to the question of housing, I will discuss characteristic projects from Germany and typical protest forms like exhibitions, art projects, walks or street parties, etc. In France, a new form of activism has recently developed. It comes from young people, connected to the media culture and does not especially follow traditional means of activism, like demonstrations or petitions. Instead, they use the social networks to catch the public’s attention. Their names are “The kids of Don Quixote” because they want to help the homeless people through camps in public space, or “Jeudi Noir” (black Thursdays) in reference to the day on which a newspaper with flat advertisements is published. I would report on their actions and also present the activities of a French association named AITEC. This group of urban experts, founded in 1983, organizes debates and produces reports to support social movements and aims at “overcoming the divide between the professionals and the activists” (full description in English <http://aitec.reseau-ipam.org/spip.php?article130>). This is a more formal way of protest but an interesting example of linking two worlds: the research and the practice. There are many French-German links about urban issues, like the fight for quality and affordable housing for all people or the production of space. But

there are also different cultures. With this comparison, I would like to highlight particular practices of urban protest.

## Migrant Women and 'The Right to the City'

*Gwyneth Lonergan (The University of Manchester)*

In recent years, Lefebvre's (1968) concept of the 'right to the city' has been adopted by various theorists and activists as a basis for challenging the impact of neo-liberal economic restructuring on urban areas, and the exclusion of marginalised groups from economic and political decision-making in the city. However, as Atttoh (2011) points out, the concept is defined vaguely at best, and there is no consensus around who has the 'right to the city', and what this 'right' involves, or what happens if the 'rights to the city' of different individuals or groups come into conflict. To the extent that a common definition of the 'right to the city' exists among theorists, it involves the right of city inhabitants to participate in the production and use of public city space. However, as Massey (2005) points out, public space is intertwined with power relations, and is thus gendered and racialised; racial and gender power dynamics will also be present in the processes used by inhabitants to make collective decisions around the production and use of public space. As members of various marginalised groups - as women, migrants and often ethnic minorities - migrant women are in danger of being excluded by definitions of the 'right to the city' that do not incorporate critical perspectives on racial and gender oppression. Additionally, the processes that marginalise migrant women extend far beyond the city-scale to the realm of the nation-state, including, for example, increasingly restrictive immigration laws, and exclusionary discourses of national identity that are frequently both gendered and racialised. Consequently, for the concept of the 'right to the city' to be useful to migrant women, it must address the exclusion of migrant women at the nation-state scale, the scalar relationship between the nation-state and city, and the influence of this relationship on the experience of migrant women in the city. This paper will explore how the concept of the 'right to the city' can be defined in a way that is useful to migrant women activists and the wider implications of such a definition for urban protest movements. Precisely because of their location at the intersection of multiple axes of oppression, a definition of the 'right to the city' that is useful for migrant women must necessarily challenge racism, sexism and xenophobia as well as neo-liberalism, and consequently may offer greater emancipatory possibilities for all inhabitants of the city. Atttoh, Kafui A (2011) 'What kind of right is the right to the city'? *Progress In Human Geography* 35: 669- 685 Lefebvre, Henri (1968) *Le*



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## RC 21-01 - Urban dynamics and environmental conflicts

1

*Chair: Ellen Banzhaf, Alexis Vásquez*

### Income inequality and its effects on access to ecological services in a western US city

*Madhusudan Katti (California State University), Andrew Rhys Jones (California State University), Kaberi Kar Gupta (California State University)*

Cities now represent the primary habitat for human beings on earth, and are best studied as dynamic coupled socio-ecological systems. Modern urban development provides an excellent laboratory to examine the interplay among socio-ecological relationships. With increasing demand on limited resources, urban development often sharpens conflicts driven by socioeconomic inequalities which often result in unequal access to critical natural resources and biodiversity. Urban poverty is characterized not only by low socioeconomic status, but also by low ecological status resulting in increased vulnerability to risk factors such as food and water security. Urban land and water management decisions result from dynamic interactions between institutional, individual and ecological factors. Landscaping and irrigation at any particular residence, for example, is a product of geography, hydrology, soil, and other local environmental conditions, the homeowners' cultural preferences, socioeconomic status, neighborhood dynamics, as well as zoning laws, market conditions, city policies, and county/state/federal government regulations. Since land and water management are key determinants of habitat for other species, urban biodiversity is strongly driven by the outcome of interactions between these variables. This study addresses the significance of water as a key variable in the Fresno-Clovis Metropolitan Area (FCMA), shaping current patterns of landscape and water use, at a time when the city of Fresno is installing meters as a regulatory tool to conserve water. A recent study from the Fresno Bird Count found that bird species richness and functional group diversity are both strongly correlated with residential irrigation and neighborhood poverty. Tree species diversity shows a similar pattern. Water usage in the FCMA is also directly linked to socioeconomic status, but what exactly are the social behaviors entailed by socioeconomic status? How will water use behaviors change across the socioeconomic spectrum with changes in the cost of water due to metering? In particular, what are the implications of raising the cost of water on access to ecological services for poor residents? We examine various theoretical models

explaining outdoor water use behaviors, with the aim of assessing the resilience of such behaviors with the introduction of water metering in Fresno. We argue that socioeconomic status results from a complex interplay of cultural, economic, structural, and social-psychological factors, influencing institutional policies regarding the governance of water resources, and in turn impact biodiversity within the urban landscape through spatial and temporal variations in water usage. This study is part of a long-term research project that examines the impacts of human water usage and water use policies on biodiversity within an urban environment.

### Urban Sprawl and Natural Disasters in Chilean Cities: A Geographical Overlapping of Exposure to Natural Hazards and Socioecological Vulnerabilities

*Hugo Romero (Universidad de Chile)*

Northern Chile cities located in and around Atacama Desert- one of the driest in the world-are increasingly growing in population, functions and size, competing for scarce and irregular water supply against mining companies, agricultural communities, indigenous people and conservation areas, and also strongly exposed to natural hazards. Cities like Arica, Iquique, Antofagasta and Copiapó, are depending much more from uncertain fossil groundwater sources, given the effects of desertification caused by climate change and extreme interannual variability of rainfall and snowfall over mountains that act like unique water towels. Growing concentration of regional population in coastal cities is not only leaching resources from inland and mountainous landscapes, forcing an almost complete outmigration of local communities, but also exposing them to severe natural hazards, like floods, landslides, droughts, earthquakes and tsunamis. Economic transformations are in turn, increasing socioecological vulnerabilities, due to socially segregated exposure and reduction of Disasters Resilience of Places (DROP; Cutter et al., 2008). Complex socioecological vulnerabilities of Chilean cities as a result of long-term 'disasters incubation' (Mulvihill and Ali, 2007), are also well exemplified by devastation caused by February 27th 2010, 8.8 earthquake and tsunami that affected mainly to the Concepcion-Talcahuano Metropolitan Area. Geographical information about floods, landslides and even areas that has been historically damaged by earthquakes and tsunamis were freely available in public organizations webpages since year 2000. However, public urban planning and housing policies did not pay any attention to these maps and reports because urban sprawl in Chile is strongly controlled by private urban development companies business and land speculation, on one side, and

social urgencies, on the other. A clear lack of environmental justice could be observed everywhere, since well-known hazardous areas have been allocated by public authorities and by the market, like the built environment of the city poorest people, who have lived for many decades, over frequently devastated areas. References Cutter, S.; Barnes, L.; Berry, M.; Burton, C. ; Tate, E.; Webb, S. 2008. A place-based model for understanding community resilience to natural disasters. *Global Environmental Change* 18 (2008): 598-606. Mulvihill, P. , Ali, H. 2007. Disasters incubation, cumulative impacts and the urban/ex-urban/rural dynamic. *Environmental Impact Assessment Review* 27 (2007):343-358.

### Urbanization-environmental differences at the NUTS 4 level in Poland: A case study

*Barbara Konecka - Szydłowska (Adam Mickiewicz University), Jan Hauke (Adam Mickiewicz University)*

The aim of the paper was to characterize urbanization-environmental differences among the 379 units of the NUTS 4 system in Poland, i.e. poviats-ranking towns and non-urban poviats. The research consisted of the following three stages: 1) An analysis of the internal diversity of the NUTS 4 units in terms of urbanization. As a result of their classification, three classes were obtained. The first class embraces units showing a high level of urbanisation, the second - an average level, and the third ' a low level. 2) An analysis of the internal diversity of the NUTS 4 units in environmental terms. As in the first stage, the units were divided into three classes according to a decreasing intensity of environmental care. In both stages the classification was carried out on the basis of selected indicators describing, directly or indirectly, the level of urbanization and environmental care of poviats using mathematical-statistical methods. The results are supported by graphics showing the spatial distribution of the individual classes. 3) In the final stage of the research, a two-dimensional classification of poviats was obtained: in urban and environmental terms. It allowed distinguishing poviats well-matched in both dimensions, i.e., those ranking high on both urban and environmental scores (growth areas), or ranking low (stagnation areas), as well as those with a mismatch between their levels of urbanization and environmental care (transitional areas). All results are supported by graphics illustrating the spatial distribution of the individual classes. The research sought to answer the following questions: (1) Are areas with a high level of urbanization more prone to environmental conflicts than those with a low level' and (2) Is it possible to unambiguously determine the presence of such dependencies? The paper is a substantial part of the first stage in a research procedure of the project financed

by the National Science Centre (N N306 791940) entitled 'Socio-economic development and the pattern of growth and stagnation areas', implemented by the Regional Analysis Department in the Institute of Socio-Economic Geography and Spatial Management of the Adam Mickiewicz University in Poznań.

### Urban subsidence hazard: Site of experimentation in Ha Noi (Vietnam)

*Christiane Weber (cnrs), Khac Dang Vu (LIVE), Frederic Masson (EOST), Cecile Doubre (EOST)*

Urban subsidence hazard: Site of experimentation in Ha Noi (Vietnam) Dang Vu Khac<sup>1</sup>, C Doubre<sup>2</sup>, F Masson<sup>2</sup> and C Weber<sup>1</sup> <sup>1</sup> LIVE ERL7230 CNRS/Uni. De Strasbourg <sup>2</sup> EOST CNRS/Uni. De Strasbourg Context Subsidence is an unusual urban hazard which can lead to severe economic, social and structural damages. Due to geological and hydrological conditions this characteristics can be increased due to human activities like deep structures constructions (metro), water pumping (well) or hydrologic derivations. Such situations might occur more and more frequently due to urban growth and land consumption. Urban spatial extension enters in competition with other human activities like agriculture or natural preservation sites. This competition leads often to choose rather poor building sites, less productive fields, liable to flooding areas etc. In countries where urban growth is very important and intensive, several hazards might converge, flood and landslide or inversely dryness and soils contraction. Case study The case study of Ha Noi (Vietnam) is an interesting experimentation site while it combines rapid spatial extension, quick population growth, agricultural production (rice) and a particular hydrogeologic situation due to rivers, ponds, soft substratum. The rapid urban growth has induced the creation of districts on agricultural areas, the growth of population the multiplication of individual wells, the soft geologic substratum leads to lower the level of the ground in several districts. Aim The aim of this study is to map planning security plans and to alert the local authorities about the phenomenon. Mapping subsidence degree will be included in a risk management product to be introduced in the master plan of the city. Methods and data Various type of data have been collected: imagery interferometric, ERS, InSAR, ENVISAT data and also GPS points. Ground field campaigns have been set up in 2011 and 2012 to assess the methodological plan and to prepare data analyses and crosschecking. The presentation will be the occasion to precise the context and provide the first results of data processing.



## RC 21-02 - Urban dynamics and environmental conflicts 2

*Chair: Ellen Banzhaf, Alexis Vásquez*

### **Environmental services of 'El Panul' forest and urban conflict in Santiago of Chile**

*Cristian Henriquez (Pontificia Universidad Catolica de Chile), Marion Cereño (Pontificia Universidad Catolica de Chile), Jorge Quense (Pontificia Universidad Catolica de Chile)*

Environmental services of 'El Panul' forest and urban conflict in Santiago of Chile  
(1) Just as most worldwide metropolis, Santiago, Chile, has expanded quickly onto rural and natural areas. During the last few years the Andean foothills have been strongly pressured by urban sprawl. One particular case real-estate project 'Fundo El Panul' located in La Florida proposes cutting down 61 hectares of sclerophilic forest and bushes for high density housing, buildings and road infrastructure. This native Mediterranean vegetation is considered a biodiversity hot spot worldwide. To evaluate the environmental services that 'El Panul' forest gives to the city, researches have been developed on the contribution it has in decreasing atmospheric contamination using the UFORE model and on local climate by registering air temperature during the 2010-2011 periods. According to the analysis, it was established that the 'El Panul' forest captures 1,063.68 tons/year of carbon, and removes 0.5 tons/year of PM10, 10.8636 tons/year of ozone, 43.2058 tons/year of nitrogen dioxide and 0.64162 annual tons of sulfur dioxide; on the other hand, the forest air temperature is 2°C lower than the air temperature of the nearby residential area, thus attenuating the urban heat island phenomenon. In 2008 the project was submitted to the Environmental Evaluation Service (SEA in Spanish) through an Environmental Impact Declaration (DIA in Spanish), nevertheless it was desisted due to questioning made by competent organisms regarding the ecological value of the forest and due to civil pressure who wants to maintain its biogeographical, geomorphological, hydrological, scenery and history particularities. At present, the project was once again submitted to the SEA through an Environmental Impact Study (EIA in Spanish), raising an urban conflict scenario between two opposed visions: conservation versus real-estate development. 'The forest 'El Panul' supplies important environmental functions for both wildlife and the community. While the percentage of carbon sequestration and air pollution control services are not as significant on a metropolitan scale, the overall effects

are positive for the environment especially in regard to reducing air temperatures. The cutting down forest and subsequent development of the sector would not only lose these attributes but also missed an opportunity for local and metropolitan government to preserve, through a partner funding mechanism, a forest remaining within the city. Beside, it will not need large maintenance for water use, would deliver significant benefits to the community and environmental education. (1) Fondecyt Project N° 1100657

### **Urban locational conflict resolutions: a case study of patna urban area**

*Priya Priyadarshini (Patna University)*

Urban locational conflict can be simplified as the existing and ever-changing geography of the city and its region. It is the end-product of innumerable conflict in urban areas, and is mainly a frequent-by-product of efforts to amenities, building highways/ over bridges, alterations of traffic patterns, parks/open spaces, providing shelters for homeless. Locational conflict arises when individuals or groups express opposition to a locational or siting decisions made by others. 'Not in My Backyard' (NMBY), is a colloquial expression of locational conflict. Urban locational conflict can be seen in spatial- time context. In this context urban locational conflict remains changing even within the boundary of a city. In the developing countries like India, urban locational conflicts, mainly is a byproduct of government planning policies, expansion and rebuilding cities. The study area of this paper is Patna West (BIHAR).India has experienced a lot of changes during its urbanization processes in the last few decades from the rising vertical growth to horizontally expanding urban land-use patterns and urban amenities, besides infrastructural development which have given rise to many locational conflicts. The study area is recently in the phase of rapid population growth, which, in turn, is giving rise to numerous locational conflicts. The study is aimed at finding out genesis, level and nature of conflict, focusing on the main factors working behind the locational conflicts and examining the locational conflicts which have occurred in the last few years. The entire work is based on the primary survey through random sampling. However, a reconnaissance survey of the study area has been done before the final primary survey. The schedules were prepared on the basis of the reconnaissance survey. The data set so prepared has been statistically and cartographically treated for the explanation with regard to the findings of the problem. Patna is in that stage of urban development which has the potential to develop into locational conflicts of varied nature in the near future. Locational conflict arises

mainly due to allocation of services delivering systems. Locational conflict pits communities against corporations, local municipalities against state and other agencies and interest groups against interest groups. Most of the urban locational conflicts in the study area have risen because of the reluctance on the part of the local residents to government-sponsored development plan of infrastructure. It can be said at the outset that acquisition, demolition and construction in different localities by the government for the betterment of the quality of life of the residents of the study area have resulted in locational conflict.

### Land use conflict identification in vulnerable open spaces using participatory GIS techniques

*Helene Draux (London Metropolitan University)*

Sea level rise due to climate change is threatening low-lying coastlines around the world. This threat is forcing those living by the sea to upgrade sea defences, therefore spending a considerable amount of money on defending cities. In the UK, residential, commercial and industrial areas are traditionally given high value; however it is more difficult to assign a value to land uses such as open spaces and areas of natural beauty. It is therefore important to understand the value of coastal open spaces. In the UK, Shoreline Management Plans (SMPs) are giving recommendations for the future of sea defences. Portsmouth, a low-lying highly densely populated city of the South of Britain has most of its coast protected by hard defences. Policies of the last SMP for the region recommended to 'hold the line', but asked for more time to consider the Farlington Marshes, the biggest open space of the city. This two hundred year old coastal marshland is a man made natural reserve defended by a sea wall, and its non-replacement would mean the end of the Marshes. Consequences on the wildlife are currently investigated, putting aside the consequences of recreational loss. This research is using three Participatory Geographic Information Systems (PGIS) techniques to explore the current uses of the Farlington Marshes, public use of open spaces in Portsmouth, perception of flood risk in Portsmouth as a whole and reactions to the proposed change in the alignment of coastal defences. The methods used consisted of a face-to-face map-based survey, activities during the Portsmouth Summer Fair and an interactive online survey based on Google Maps. Maps are used either as a way to collect information (by asking participants to indicate on the map where they walk and what they like), or to present visual information in a more quickly and easily-understandable way (when showing flood risk in Portsmouth). So far 142 participants took part in the face-to-face survey in the Farlington Marshes and Milton Common (another low-

lying open space). Between 60 and 75 people took part in each of the four activities organised during the Summer Fair. The data collected is currently being input into a GIS system to create a visual map of the value that participants give to the open space. The online survey has attracted little participation among the general public. New strategies are being implemented in order to increase the traffic on the website. So far, the preliminary results show that PGIS techniques of engagement with users of the Farlington Marshes can generate interesting data that may not be possible to collect using traditional surveys that do not involve the use of maps. It is too early to say with certainty whether the PGIS techniques used in this study may be of use in resolving conflicts. Stakeholders' interviews are currently taking place to discuss the conflicts in Portsmouth around flooding, open spaces and the Farlington Marshes.

### Delhi's changing riverfront – land use conflicts surrounding the reclamation of Yamuna's floodplain for a world-class city in the making

*Alexander Follmann (Universität zu Köln)*

Delhi's rapid population and economic growth have resulted in high pressure on land. Additionally, the Delhi Development Authority, the city's planning authority, has an ambitious vision of transforming Delhi into a "world-class city" by the year 2021. With a total area of 97 km<sup>2</sup> the floodplain of the river Yamuna is the largest remaining natural feature within the mega-city. Degraded to a foul-smelling drain by the city's untreated sewage, the wide riverbed has been a neglected backyard of India's capital. However, being seen as underutilized or wasted land the river's floodplain has become promising for the city's make-over to become 'world-class'. Therefore, the urban poor have been evicted from the riverbed based on controversial court orders, which have held them responsible for polluting the river. Conversely, urban mega-projects like a religious theme park, the Commonwealth Games Village, an information technology office park and two metro depots (parking and maintenance facilities for Delhi's new metro rail system) have been developed on the floodplain regardless their negative environmental impacts. Though claiming to protect the floodplain, the courts have dismissed Public Interest Litigations filed by environmental NGOs in opposition to the mega-projects, which have been given the green light to be built on environmentally sensitive land despite pollution, obstruction of groundwater recharge and loss of food water retention area. The controversial developments have led to the declaration of a no-development zone along the banks in 2008; the recent plan aims to create a biodiversity zone along the river,



focusing on environmental restoration and recreational spaces. However, major challenges exist to implement the biodiversity zone: different government agencies have already violated the no-development declaration, pollution control efforts have failed due to a multiplicity of involved agencies, and corruption has stalled the implementation. Additionally, the majority of the land is not under possession of the city's planning authority and land acquisition will prove to be costly and difficult. Lastly, the essential awareness to protect and restore the river's sensitive ecosystem is missing across the public at large. Based on multi-temporal mappings and extensive interviews with relevant stakeholders among the multiplicity of government agencies, the presentation will highlight land-use conflicts with respect to river restoration and preservation of environmentally sensitive spaces within fast-growing mega-cities. The conceptual focus lies on the manifold challenges for policy making and its implementation at the interface of urban and environmental governance. Therefore, the case study analyses the interactions between different levels of government, political parties, courts, special interest groups (e.g. peasant movements), and environmental NGOs.



## UDC 01-01 - (Mega)urban health in South Asia

*Chair: Carsten Butsch, Mareike Kroll*

### Trends and challenges of non-communicable diseases in urban India

*Surinder Aggarwal (Kurukshetra University)*

India is experiencing demographic and epidemiological transitions concurrently. Close to one-third population now lives in urban areas with major concentration and growth happening in big cities. Massive rural migrations have contributed largely to this emerging urban trend. Fast urbanization coupled with rising incomes, sedentary life styles, faulty food habits, lack of exercise and exposure to hazardous substances is causing shift in disease pattern from communicable to non-communicable diseases (NCDs). Among the top ten causes of deaths, NCDs occupy first five positions with cardio vascular disease (CVD) at the top followed by respiratory diseases and cancers. Injuries, accidental deaths are on the rise and now considered among the top ten causes of death. Mortality patterns exhibit strong gradients with social determinants like gender, location, age, wealth, and ethnicity. Likewise emerging risk factors of smoking, obesity, alcohol consumption and hypertension are found to be strongly associated with emerging NCDs. The poor living in informal settlements are observed to suffer from double burden of communicable and NCDs. NCDs among the poor is a new phenomenon as the risk factors like smoking, drinking, lack of exercise and exposure to carcinogenic and other chemical substances is higher than middle and higher income groups. At the city level key findings reveal mega cities exhibit higher prevalence and mortality rate for CVDs and cancers, whereas for medium size cities ARIs and accidents predominate. The greatest challenge now lies for the urban healthcare systems to accommodate the higher healthcare costs (diagnostic, treatment, and medicines) associated with NCDs. Annual per capita health expenditure in India at \$ 109 is among the lowest in the world and higher allocation for urban health is a low priority for the governments at the moment. The urban health mission of the government of India is still in the formative stage. Apparently, the urban poor and other vulnerable groups are to suffer more under the current healthcare scenario. This paper examines such trends in greater depth to analyze the emerging mortality trends, especially for NCDs, with social determinants approach. Policy dimensions of interventions will be probed and suggestions made to face the new urban health challenges in India. Various mortality data sources including SRS, CRS, MCCDI, NFHS, 1 million death

study, disease registries and serial studies will be used to examine the mortality trends and inequity aspects associated with social determinants approach.

### 'Entitlements to health care' as perceived by stakeholders and urban poor: Why is there a preference for private facilities in the city of Chennai, South India?

*Patrick Sakdapolrak (University of Bonn), Christina R. Ergler (The University of Auckland)*

India - one of the focal points of the global megapolisation process - is confronted with growing urban poverty, and the urban poor bear an increasing disease burden. Results of the National Family Health Survey (2005-06) reveal that the health status of poor urban populations is not only worse in comparison to that of the urban population in general, but, to a certain extent, also to the health status of people from rural areas. One of the key determinants of the health status of the population is the performance of the health care system. In the urban context of India - especially in large agglomeration - a wide variety of health care providers are available, but not all sections of the society are benefiting from all options equally. This paper focuses on access to health care by urban poor residents in Chennai, India. It aims to reveal constraining and enabling conditions for impoverished users seeking treatment. We explore patterns of health-seeking behaviour through the reasoning of the poor residents themselves as well as stakeholders involved in providing care for these users. Particular attention will be given to the needy residents' preference for private health care providers despite the fact that costs are involved and free public facilities are available. We address this issue by combining Sen's entitlement approach with Penchansky's and Thomas' work on access to health care. Based on empirical data gathered in a qualitative research design, we argue that the mere availability of health care facilities within walking distance is a necessary but not sufficient precondition for satisfactory access to health care by urban poor. Rather, we demonstrate that access to health care facilities is shaped by 'entitlements to health care', which allow poor households that are endowed with certain resources such as income, knowledge and social networks to realise access. As the results of the interviews with users and stakeholders reveal, not only experiences of health care, but also feelings about its utilisation, are crucial in determining choice and use of health care facilities. This finding suggests that analyses of affordability and physical access to health care in less developed countries should be complemented by a focus on emotional dimensions of utilisation. We conclude that there is a greater need to consider

not only effective access to health care, but also affective dimensions of treatment for poorer citizens.

### **Perspectives change lives: Managing human health in Chennai slums from the inside out**

*Divya Rajeswari Swaminathan, Vasanthakumaran Thangavelu, Nandhini Jj, Jayanthi Swaminathan*

This paper recognizes that people's perspectives change their lives, especially when management decisions are made. The study reported in the paper demonstrates how in managing human health the slum people of the megacity Chennai, India show up characteristics and perspectives necessary from the inside out. Purpose: This paper has the purpose of relating some of the urban health constructs of the people of select Chennai slums and the discussion is on discourses concerning health perceptions, including epistemologies, influences of socio-cultural norms, gendered perceptions and relations to health and exposures and vulnerabilities. For this purpose, the authors recognize the slum communities of Chennai as narrative machines, which are capable of elucidating their urban health constructs as they see them. Research Questions: How do people conceptualize health? What do the vulnerable do to continuously cope with water-related risks, to manage, maintain and protect their health? What are the constraints and the enabling factors for coping and adaptation among the vulnerable? Data and Method: Narrative analysis is a new strategy for medical geography. It works with cognitive methods, focusing on the cultural behaviour of the vulnerable in the two slums. Discourse analysis represents the voices of the vulnerable in the slums. The constructs discussed are those that have emerged from the narrative and discourse analyses and also the perspectives and insights of the slum people. Constructs and Narratives: Vulnerability and capacity to cope are the two sides of the same coin. The more one is vulnerable, the less one has the capacity to cope, and the more one tends to adopt coping mechanisms. Some of the crucial constructs of the slum communities are: For women, 'absence of disease' is a sign of good health; For men and women, 'being active and able to do regular work is a symptom of good health'; Women think of 'body resistance or stamina as good health'. In their discourses, the constructs have taken several different forms. Some of them as narratives are: We have food but disturbance of mind makes us restless, unable to eat; If we are of free mind, then we can avoid sickness and have a long life; An unclean slum man may be healthy, while a woman with clean clothes and living in more spacious house, with hygienic surroundings, could be afflicted with

major illnesses; Disease is not a result of cleanliness and hygiene, for 'having been here for more than 30 years, nobody in my family has ever been sick'. Outcomes: The paper examines and analyses the meanings and implications of the constructs and narratives for coping and adaptation and then generates strategies for overcoming vulnerabilities, real and perceived. Besides, it demonstrates how community perspectives change lives of the slum people, especially when they self-organize themselves and develop strategies for managing human health from the inside out.

### **What determines the level of housing satisfaction in urban slums of Dhaka? Results from the baseline survey of a cohort study in Bangladesh.**

*Md. Mobarak Hossain Khan (Bielefeld University), Arina Zanuzdana (Bielefeld University), Alexander Krämer (Bielefeld University)*

Background Housing belongs to the main domains of life and can be defined through interrelated dimensions, such as socioeconomic, neighbourhood and cultural attributes. Quality of housing plays one of the key roles in public health, since inadequate housing may have direct or indirect negative impact on social, physical and mental health. Higher satisfaction with housing was shown to be associated with income, higher age, a smaller family, higher education, being female as well as being an owner of a dwelling. The aim of our study is to investigate the associations of individual, family and neighbourhood factors with individual housing satisfaction in Dhaka, Bangladesh. Methods The data was generated through baseline surveys (designed for one-year cohort study) conducted in 2008 and 2009. A total of 3,207 adult respondents were systematically selected. We have used a combined variable 'housing satisfaction', containing nine items related to satisfaction with different types of housing facilities (water, electricity, surrounding noise etc.). An ordinal logistic regression model was applied to predict housing satisfaction. Statistical analysis was performed using SPSS 17.0. Results Income (wealth index) had a direct effect on the level of housing satisfaction in urban slum and rural areas. Rural residents were much more satisfied with their housing than urban slum dwellers (parameter estimate 1.923,  $p < 0.0001$ ). A strong and highly statistically significant association was detected for the 'Living area is located well to reach a doctor'. Those respondents who perceived their area as 'Very bad or bad' or 'Moderate' to reach a doctor reported much lower levels of housing satisfaction. Respondents who perceived their neighbourhood environment as not harmful for their health were much more frequently satisfied with their housing



(parameter estimate 0.953,  $p < 0.0001$ ). Satisfaction with housing in relation to the water source displayed as well significant associations. Conclusions The major findings of our study showed complex relationship between housing satisfaction and other domains of life and confirmed the importance of including several sets of explanatory variables into analysis. The existing link between health and housing satisfaction was made obvious and is the focus of our further research. Understanding the factors which lead to satisfaction or dissatisfaction with housing and residential environment is crucial for planning successful and effective housing policies. The study brings evidence for urban planners and municipal governors about what priorities should be addressed to provide urban residents with satisfactory and safe housing, taking into account growing urbanisation and migration in the megacities like Dhaka.



# Urbanisation & Demographic Change

## UDC 02-01 - Conviviality and/ or confrontation? Ethnic, cultural and political diversity in public space 1

*Chair: Thomas Schmitt, Lars Wieseemann*

### **Narratives of encounter: Implications for the contact hypothesis**

*Gill Valentine (University of Leeds), Joanna Sadgrove (University of Leeds), Nichola Wood (University of Leeds)*

This paper focuses on adults' narratives of their encounters with 'difference' to explore the processes through which attitudes (positive or negative) towards 'others' are transmitted and/or interrupted. It draws on in-depth life- history interviews structured around the construction of time-lines in which the informants identified key factors in their autobiographies from childhood to the present day when/where their attitudes developed. This data was collected as part of a larger European Research Council funded study of 'Living with Difference'. The paper examines the interviewees' narratives of encounters in terms of the evolution of attitudes over time, as well as narratives of 'fateful moments' where a sudden one-off encounter interrupts previously held perceptions of sameness or difference. In doing so, the paper identifies the importance of space and time in relation to the outcome of the informants' encounters with 'difference' and also considers how individuals resolve or reconcile contrasting positive and negative encounters to define their own understanding of their relationship to 'others'. The conclusion reflects on the implications of this research for the contact hypothesis and the geographies of encounters literature.

### **Encounters with a new category of the “visible poor”. On the emancipatory potential of street newspapers.**

*Rainer Kazig (University of Munich)*

With the appearance of street newspapers in the 1990s, a new category of the 'visible poor' has arisen in many large cities: the street newspaper vendors. This development can be viewed as a subtle expression of the commercialisation of public spaces, as a consequence of which the 'visible poor' are tolerated only in the role of disciplined vendors. Many street newspapers have however emphasised the socio-political act that exists in the contact between passers-by and the vendors of street newspapers. It is presented - in contrast to the encounters with beggars who are reduced to charity - as an opportunity in

which passers-by can encounter the poor as fellow citizens ('turning beggars into salesmen'). Supplemented by biographical reports in the street newspapers, the contacts are intended to contribute towards breaking down the widespread negative image of the poor and homeless. Whether the market-like interaction with the street newspaper vendors can fulfil its emancipatory function must however be regarded as an open question. On the basis of an empirical study of mine on street newspaper projects, in my paper I would therefore like to pursue the question of the significance(s) of this new form of encounter with street newspaper vendors. As a first step, I shall focus on the visible course of the encounter. Compared with encounters with beggars, in which passers-by conduct the handing over of a donation with the greatest possible distance, the purchase of a street newspaper proceeds largely according to the pattern of buying a standard newspaper, but can also be characterised by brief conversations. To this extent, with the street newspapers, a new possibility for public interaction with visibly poor people really has come into being. They can however have different significances, to which I shall return in a second step. Besides the classic act of purchase, four different forms of purchase exist here, which are accompanied by decidedly contradictory moral motives (rewarding the deserving poor, supporting efforts towards normalisation, recognising tiring work). In fact, the encounters with street newspaper vendors also enable the image of the 'visible poor' as morally inadequate to be undermined, and to this extent they fulfil the emancipatory claim of the projects. However, in view of the ambivalent meanings of the purchase relationships, it must be clearly relativised.

### **Urban public parks and social sustainability**

*Elisabeth Buehler (University of Zurich), Heidi Kaspar (University of Zurich), Frank Ostermann (Joint Research Center, European Commission)*

Urban public parks are distinguished elements of urban public spaces. As nature-oriented green and free spaces they contribute to social sustainability and to the quality of life in cities in many ways. As public spaces parks are accessible to everyone in today's democratic societies. Urban public parks possess therefore a high potential for conviviality. However, the normative logics of equal access do not mean that de facto no processes of confrontation and possible social exclusion are taking place in urban public parks. This paper discusses in which ways public parks may support social sustainability in urban settlements. Based on theories of public space it offers a transformation of the powerful, however abstract normative concept of social sustainability into concepts that are adaptable for empirical research and political debates. These

concepts focus on comfort and belonging, negotiation between equals, and social diversity. Drawing on case studies in three different neighbourhood parks in the city of Zurich in Switzerland the paper discusses people's appropriation of urban green spaces with a special focus on gender, age and activities performed. The paper also identifies elements of landscape design as well as strategies of planning and regulation that foster social sustainability in urban public green spaces. Both quantitative and qualitative methods were employed in this research project funded by the Swiss National Science Foundation. Systematic collections of representative observation data of park usage by different user groups, and its subsequent statistical analysis and visualization in a GIS mainly used quantitative methods. Qualitative methods were used in semi-structured interviews with park visitors to capture their feelings and perceptions of the park spaces, and in expert interviews. This triangulation of methods allowed combining the strengths of different approaches, analyzing the research object from different perspectives. The results of these investigations brought processes of confrontation as well as processes of conviviality to light. It also became evident that planning, design and regulation are powerful and vital instruments shaping social sustainability in urban public parks. A final report of this research project is published in German: Bühler Elisabeth, Kaspar Heidi, Ostermann Frank (2010): Sozial nachhaltige Parkanlagen. Vdf, Zürich.

### **Please don't cross the line: Marginal urbanity in public spaces**

*Felicitas Hillmann (FU Berlin)*

In my paper I will concentrate on the relevance of migrant action for urban development. Starting from the concept of 'marginal urbanity', I will show that the figure of the 'stranger' has fulfilled from the outset a fundamental role for the conceptualization of urbanity, as documented in Simmels and Parks work. But this position of the stranger as the one at the margins existed mainly on a theoretical level. In reality, after world war two, with the flourishing of the welfare-states and the guestworker regimes in actu in European cities, the perception of the 'stranger' in the urban setting had been substituted by a sectoral approach that perceived migrants in the position of a consumer and receiver of help and transfer. Migrants were just not expected to contribute to urban development. In this logic especially the expression of religious identity in the public sphere, as given through the construction of mosques, was strongly debated. This deficit-oriented view on migrants has reversed only recently due to the anticipated demographic changes. Many cities became aware of their ageing populations and realized that, often, the majority of children in school age are of migrant

origin. Further, a substantial share of small businesses is set up by migrants and many contributions in cultures and sports stem from the migrant population. In multicultural cities such as Frankfurt am Main, migrant entrepreneurship makes up 54 % of all business registrations. Some cities such as London and Amsterdam succeeded in making their public places that are characterized by a strong presence of migrants, tourist attractions. Superdiversity and the involvement of highly differentiated migrant milieus are now expected to contribute to urban development. In Germany the abolition of the most important program for the social development of the cities strikes especially migrant neighborhoods, eventual difficulties are downplayed. Nevertheless migrants are expected to shape public spaces and to actively promote their migrant identity - as long as functional to the locally wanted narrative of urbanity and as long not leaving their assigned public spaces.

## UDC 02-02 - Conviviality and/ or confrontation? Ethnic, cultural and political diversity in public space 2

*Chair: Thomas Schmitt, Lars Wiesemann*

### Social Interaction in the Iranian Residential Public Open Space

*S. Neda Ghazizadeh (TU Berlin), Alireza Monam (TU Berlin)*

Yard was one of the most important parts of the Iranian traditional house. Lots of activities depending on the climatic situation were accrued there. According to the limitations of modern life in the big cities of Iran opposed of the past, privet yard for every house is impossible. So the meaning of the yard has transferred to the public open space for a group of neighborhoods. Small apartments request more using of open space, even though the function of the yard has declined to necessary activities. Public space in the contemporary cities, in all its tidiness, is thought of as a secondary space, owned neither by the city nor by the individual, although it should cover a huge part of everyday activities. So designers should pay deep attention to the open space as a new yard and adapting it to the modern life. Appropriate design of public open space, will change residence's perceptions of the total space of the complex. The purpose of this research is to explore the relationship between residential public open space design and social interaction. In particular, it focuses on the role of public open space in Tehran residential complexes to fostering sense of community. The aim of this research is improving the residential building quality within the contemporary urban context by focusing on the physical properties at the residential public open spaces. The selected complexes were chosen from the medium scale and high rise blocks in the north part of Tehran. The path model analysis had architectural, socio-relational, and functional features of public open space as the exogenous variables predicting residents' evaluation of open space and the level of social interaction. The result shows people attached to the places with more social activities, and open spaces encourage the social interaction. The result implies that the meaning of neighborhood, and the quantity and quality of interaction has changed in the new life, and people expectation of social contract has reformed.

### Ethnic diversity in Public Space: Syndrome Self and Other, Otherness and Spatial Exclusion, Case Study of Liberec, the Czech Republic

*Jaroslav Vávra (Technical University of Liberec), Barbora Krejcová (Masaryk University of Brno)*

The official figures of the Czech Statistical Office (CzSO) say the foreigners represents four per cent of the Czech population at the end of 2010. The foreigners of Liberec district, northern part of the Czech Republic, represent five per cent of the population of the district. At the end of 2011 the CzSO announced the population of the Czech Republic raised slightly thanks to the international immigration. How is it possible to read the figures? How can we interpret them? We realized the first inquiry in 2008 and 2009. The inquiry was focused on a specific group of foreigners. They taught their mother language as a foreign language of the Czechs. We inquire reasons and ways how they make a decision on host country, and key factors of their making a decision on the destination. We are interested in length of their stay in the destination and changes in their behaviour/acting during their staying in the destination, the Liberec city. Their adaptation and integration into the Czech majority was important for us too. We published the result in proceedings of IGU, Istanbul 2010. The second inquiry in Liberec was realized in 2011. We asked ourselves: How is perceived members of minority by members of majority? How do ethnic members perceive a place where they live? Is the minority spatially excluded? Is the minority becoming a part of majority? What a way? The students, would-be geography teachers, decided for small areas of the Liberec city and each student team focused on minorities in their area. They observed, enquired, talked to people and asked people to draw their mental maps. As minorities, the students have found international immigrants (the Ukrainian, the Vietnamese) as well as Roma people. We used a concept of social/spatial exclusion - in housing, labour market, education. The relevance of the results is measured by statements of members of majority as well as of students who made the inquiry in the field. One of the results of the inquiry is the members of majority in the areas do not both realize and adopt neutral attitude to minorities. The majority people evaluated minorities according to their contribution to majority (Vietnamese, Ukrainian) or danger (Ukrainian) in a local community. Be interesting the respondent of majority miss out international immigrants from developed countries (e.g. Western Europe, North America). It can be the members of Czech majority judges the members of minorities on the basis of

common adopted prejudices rather than their own experience or knowledge of Czech curriculum (schools).

### **Contesting Alun-alun: Power Relations, Meaning and the Production of Public Space in Yogyakarta, Indonesia**

*Dyah Widiyastuti (TU. Dortmund)*

Yogyakarta as an old city has traditional main square, called alun-alun, which takes form as a void in front of its palace. This place has becoming a witness of changing power and political system in this old monarch as well as in the country. The initial functions of this space which were strongly related to royal purposes and display of king power upon his subjects such as processions were not intended to public purposes. Through history, alun-alun has been changing its function and becoming merely to be a public space. Going through shifting in political system along with decreasing supremacy of the king as the owner has causing dilemma in managing this space. It has been experiencing various tensions over its reproduction which is ranging from issues of privatization and commercialization, the absence of institution to the lack of its planning and regulation. Waiting for the ideal form of alun-alun through various debates among stakeholders in formulating the concept of revitalization has been creating negative impact and left this space abandoned. Taking all of these different aspects into consideration, it becomes an evident that alun-alun is part of controversy and renegotiation where various interest, meanings and values clash. My paper will show changing role and function of this public space from the initial creation in 1755 to its present where three phases of historical layer: the early, the colonial and the modern periods are distinguished. The aforementioned of historical accounts help to visualize how alun-alun has catalyzed the formation of collective urban images, which are transmitted from generation to generation. This allows the square to maintain its role as a place for the collective expression of urban life. Understanding its physical and social transformation processes will help to unveil the elements of the urban memory related to this place and the condition that have been crucial in constructing its social meaning. The values behind its transformation are considered important for formulating strategic planning in revitalizing this public space.

### **The Appropriation of Public Spaces by Youths**

*Raimund Kemper (IRAP Institute for Spatial Development)*

In social geography the appropriation of public spaces by the youth is gaining growing attention since conflicts caused by bottelones, facebook parties or occupation events, as well as day to day activities like hanging out, skating or strolling, are increasingly discussed in the media. This paper reflects the findings of a nationally funded research project conducted in six cities in Switzerland (2009-2011). Within the context of a changing significance of public spaces in the adolescence, the project explains the meaning and relevance of the appropriation of 'social' public spaces for the youth and analyses the social, cultural and regulative restrictions which often lead to conflicts. The research project was designed in the context of a flagrant research deficit in the sociology of adolescence, in which space has been disregarded; as well as in urban sociology, in which adolescents generally haven't yet played a relevant role. It is theoretically rooted in the assertion that traditional object-oriented socio-ecological concepts fail to explain the meaning of public spaces for the youth; their appropriation and the conflicts enacted in them. Therefore these processes themselves remain invisible, contrary to the manifest results like vandalism or violence that are visible and perceivable in public spaces. Complementary to the object-oriented view of space and spatial processes, a subject-orientated approach has been developed that encompasses the social-spatial interaction manifested in processes of appropriation, from the perspective of adolescents. This is understood not only in a territorial sense but also as an interpretation of symbolic meanings in spaces and containing its own symbolic markings (spacing). Being in spaces is an important part of the socialization and identity building of adolescents. In a dualistic understanding of action and space (Loew, 2001) processes of appropriation and conflict do not only take place in public space. They occur through space as it becomes a category of social differentiation in the sense of Bourdieu (symbolic capital) and an expression of uneven distributed power. The adult geographies of owners, politicians or representatives of the public administration overlay those of the youth and are symbolically manifested in the built environment compliant to social regulation systems and legal regulatory measures in public spaces. This spatial marginalization and social exclusion represent a manifold disappropriation (symbolic, legal, regulatory) of the youth in public spaces, in its original sense accessible to all. Vandalism, provocations and violence as signs of disappointment, resignation and protest can be regarded as results of negative forms of appropriation. From a subject-oriented perspective new strategies for





processes for youth-oriented planning and designing public spaces are necessary and corresponding qualities must be developed.

## UDC 03-01 - Do borders make regions learn?

*Chair: H. Peter Dörrenbächer, Tobias Chilla*

### **Vers l'émergence d'une région apprenante transfrontalière en Europe de l'Ouest : une nouvelle étape d'une histoire de la coopération transfrontalière dans le Rhin supérieur.**

Bernard Reitel (Université d'Artois)

On peut considérer qu'un espace transfrontalier devient une région apprenante lorsque les institutions transfrontalières créées dans les domaines politiques, économiques et éducatifs deviennent des lieux où s'inventent et s'expérimentent des cadres et des dispositifs qui peuvent servir de modèles à d'autres territoires ou ensembles spatiaux. Nous chercherons à montrer que l'idée de région apprenante peut constituer une nouvelle étape de la coopération transfrontalière en nous basant sur l'exemple du Rhin supérieur. Cette dernière est souvent considérée comme un modèle de coopération du fait de son ancienneté (depuis les années 60) et parce qu'elle associe deux Etats voisins qui ont réussi à dépasser leur antagonisme, la France et l'Allemagne, auxquels s'ajoute la Suisse qui n'est pas membre de l'UE. Nous examinerons plus précisément les orientations de 3 organisations représentatives des 2 domaines évoqués : l'Euro-Institut, un centre spécialisé de formation et de conseil aux élus, Eucor, un réseau de coopération entre les Universités. Trois hypothèses sont examinées. D'une part, le caractère transfrontalier de ces organisations leur permet d'être des ressources favorisant la médiation entre territoires voisins. D'autre part, ces organisations sont des lieux d'expérimentation de l'interculturalité et d'invention de nouveaux modes d'action culturels et politiques. Enfin, ces organisations permettent aux acteurs de se confronter à différentes échelles géographiques. Si ces conditions sont remplies, on peut estimer que le Rhin supérieur peut être qualifié de région apprenante.

### **North Korea's Special Economic Zones at the Demilitarized Zone: In between Potemkin Villages and failed Laboratories of Inner-Korean Cooperation?**

*Bernhard Köppen (Univ. Koblenz-Landau)*

The demilitarized zone (DMZ) between the Republic of Korea (ROK) and the Democratic People's Republic of Korea (DPRK) is judged to be the last border of the "Cold War". Even after Kim Jong Il's death, the DPRK's regime announced

that no significant changes shall be expected. The current chilled down and sometimes hostile inner-Korean diplomatic relations let sink major success' of the last decade, initiated by South Korean 'sunshine policy', into oblivion: As a tangible result, two Special Economic Zones, based on cross-border-interaction have been established nearby the DMZ. One of them dedicated to tourism and one to industrial production, the latter still operating, despite most serious diplomatic and military frictions between both nations. A close examination of that what is known about the Korean SEZ-projects reveals a relative importance of 'knowledge' and 'adaption' in the official discourse/propaganda. Nevertheless, it seems that real cross-border-cooperation can't be a real option for the DPRK's current leadership; neither before nor after South-Korea's approach of Sunshine Policy. On the other hand, as a matter of fact, the Kaesong SEZ is still working although official relations between the two Koreas reached the rock bottom. If operations were really stopped, not only a major source of urgently needed hard currency would vanish but also an estimated 40,000 North Koreans might share their knowledge about the Kaesong Industrial Complex, when being transferred to other workplaces. A scenario obviously feared by the regime. Whilst the DPRK is perceived as a totally enigmatic state by the international community and especially the 'West', the South Korean government as well as private companies haven't gained fundamental knowledge and experiences in cooperation with the North. This might become an asset for future negotiations concerning the Korean peninsula.

### **Civil Society Co-operation in the Russian-Finnish Borderlands: Processes of Social Learning**

*James Scott (University of Eastern Finland)*

This paper presents results from research projects that have investigated networks of civil society organizations (CSOs) between EU member states and neighbouring countries. The focus here is on Finnish-Russian civil society co-operation in the areas of social welfare provision as well as regional and economic development. One major objective in this conjunction is to assess the contribution of this cross-border co-operation to the development of Russia's social economy as well as to discuss the various obstacles that civil society actors face in developing co-operative projects. As such, organizational, social and technical issues are important areas to be addressed. However, civil society co-operation is not a mere technical issue; understandings of the social embeddedness of civil society are also necessary in order to promote social welfare agendas. In concluding, the paper will reflect on experiences of CSO co-



operation with regard to capacity-building processes of social learning and future prospects for social enterprise.

### **Development factors and functional structures of border towns**

*Agnieszka Kwiatek-So'tys (University of Cracow), Krzysztof Wiedermann (Pedagogical University of Cracow)*

Dr Agnieszka Kwiatek-So'tys Dr Krzysztof Wiedermann Institute of Geography Pedagogical University of Cracow Development factors and functional structures of border towns The changing role of a border as the result of transition in the post-socialist countries gave the new opportunities of the development of cross-border regions. On one hand these were associated with UE integration processes and on the other hand strongly influenced by the local need for changes. The transformation process in post socialist countries changed the economics conditions from central planed system to the market economy. The new role of local and regional government which gain control over the local and regional development processes is stress in the paper. The authors make an attempt to answer the question to what extend the regions and towns take advantages of cross-border location in terms of social, economic and cultural international cooperation. Results of the authors researches on cross-border regions carried out in Poland, Czech Republic and Germany proved that the best conditions for development are associated with the towns located close to the main border crossings. Communication accessibility factors are the clue elements in terms of region competitiveness in time with open borders. The lack of communication infrastructure is the significant barrier for both endogenic and egzogenic growth. It is caused by a local society isolation and results in lower social capital value. In the paper different aspects of development such as population changes, labor market, cross-border commuting, social, economic and cultural linkages are considered. Those problems are illustrated by examples of different towns (for instance Mi'dzylesie, amberk, Lubawka, aclé?, - at the Polish-Czech border and Zgorzelec, Goerlitz - the Polish-German one). The realization of these tasks was possible thanks to the detailed statistical analyze as well as field work including questionnaires conducted in mentioned towns. Authors believe that the empirical date allow for drawing universal conclusions.

## UDC 04-01 - Global winners and local losers? Comparing regeneration policies in shrinking cities in America and Europe 1

*Chair: Thorsten Wiechmann, Sylvie Fol*

### Comparing American and European Shrinking City Turnarounds: Searching for Pivotal Revival Strategies that Allow Cities to Take Charge of Their Own Destinies?

*Alan Mallach (The Brookings Institution), Işıl Brachman*

Shrinkage is a pervasive phenomenon among 'old industrial' European and American cities that have experienced significant economic restructuring in a post-industrial age. While significant research and writing has been done on hypothetical strategies for turning these cities around and on local innovative practices being implemented, very little is known about what elements in the aggregate ultimately create 'winners' and 'losers' among these places. Until recently, there were few, if any, success stories to draw upon; however, signs of life are emerging in several American and European cities from which it may be possible to draw preliminary conclusions. Using a comparative approach between three European and three American cities that have shown signs of recovery, this paper will begin by offering a conceptual framework for what constitutes an urban 'turnaround,' from an economic or social perspective, and then focus on characterizing and identifying 'turning points' for city revival, how these are being implemented and whether they can be replicated. Since European cities appear to have demonstrated greater progress earlier, this paper proposes to examine three European cities -- Leipzig, Manchester and Barcelona - as the touchstone for comparison with three American cities - Milwaukee, Pittsburgh and one smaller city to be selected - to identify the centrality of critical pivotal elements. The paper will also contrast these three American cities with two cities that have not yet experienced revival - Cleveland and Detroit - to differentiate their experiences and identify factors that are holding them back. No silver bullets exist for reviving older industrial cities. However, building on recent work by the German Marshall Fund and on previous research identifying 'turning point' factors (Ploger, 2012), this paper posits the existence of certain common factors that are critical for recovery - leadership; a mix of economic restructuring strategies and urban or place-based revitalization techniques; new partnerships -- whether city & regional, inter-

governmental, and/or public-private; and finally exogenous factors, such as larger political or economic shifts. This paper proposes to delve into these four pivotal elements as experienced in the six cities and to test the hypothesis that, broadly speaking, these four elements make a critical difference between 'winners' and 'losers.' This paper addresses crucial questions about what local leaders have control over, how critical exogenous factors are, and the barriers to replication. Comparing and contrasting these European and American cities will illuminate the commonalities in their recoveries and help extract critical revival elements for application elsewhere.

### The comeback city and the incredibly shrinking city: Urban regeneration in Leipzig, Germany and Cleveland, USA

*Matthias Wendt (Universität Bayreuth)*

East German cities and US cities of the industrial mid-west have been affected by shrinkage due to deindustrialization, suburbanization and out migration. While the city of Leipzig managed to reverse this trend and shows modest growth in a contracting region the city of Cleveland continues to lose population in a persistently growing region. Considering the resurgence of Leipzig and the prolonged shrinkage of Cleveland, the paper charts perception of shrinkage, regeneration strategies as well as actors involved and asks for the conditions for innovative policies managing shrinkage to be implemented. Drawing on concepts of path dependency (Pierson 2000, Kuder 2009), urban governance (Le Galés 1998, Pierre 1999) and urban political economy (Logan/Molotch 1987) the research shows that approaches to shrinkage differ dramatically in both cities. In spite of six decades of continued population loss shrinkage is still perceived as a temporary phenomenon in Cleveland. Especially the local business community and local government do not acknowledge shrinkage and tend to perceive it as a process that can be overcome. By contrast, the depopulation of the 1990s led the local government in Leipzig to accept shrinkage as a long-term challenge. This triggered a paradigm shift in urban planning that can be conceptualized as double loop learning (Jachtenfuchs 1996) since it included both a realignment of instruments as well as general objectives. While strategies of managed decline aimed at turning the problems of shrinkage into opportunities the past 20 years also included policies to reverse the trend of out migration. In Cleveland, the persisting interpretation of out-migration as a temporary phenomenon has perpetuated optimistic re-growth policies focusing on downtown revitalization and the attraction of suburbanites and tourists. Only the foreclosure crisis enforced pragmatic decisions to deal

with the soaring vacancy rates. But as the general policies are still aimed at re-growing the city the Cleveland approach to shrinkage is framed as single loop learning. The pro-growth agenda is shaped by an elitist circle of corporate and city government personnel with weak public welfare interests. Besides the dominating growth machine a second coalition of neighborhood organizations and independent planners exhibits a high public welfare orientation and a strong commitment to the city's neighborhoods. A first conceptual approach to deal with vacant lots strategically has come out of this realm. The German reunification led to a decreasing importance of old path dependencies in Leipzig and an infusion of new personnel in city government. Grounded on a broad agreement to tackle shrinkage strategically Leipzig has embarked on new policies in urban regeneration. These approaches have been drafted and implemented in close cooperation by city government as single most important actor in urban regeneration, housing industry and a highly involved civil society.

#### **From long-term shrinkage to re-growth? A comparative study of urban development trajectories of Liverpool and Leipzig**

*Dieter Rink (Helmholtz Centre for Environmental Research - UFZ), Annegret Haase, Katrin Grossmann, Chris Couch (John Moores University), Matthew Cocks*

Whereas many cities in Europe experience a fairly continuous process of urban growth, a considerable number of others have experienced long periods of urban shrinkage over recent decades. Shrinkage has today become a normality in urban Europe, and is likely to continue into the future. However, in between these two poles of ongoing urban growth or shrinkage, there are cities with less pronounced trajectories. One type here is cities that underwent a phase of shrinkage but have more recently seen a recovery of population numbers. This 'turnaround' from shrinkage towards a stabilization, or even re-growth, has been increasingly reflected in the literature in recent years - a number of papers deal with the upswing of cities after a phase of decline calling it 'reurbanization', 'resurgence', 'revival of cities' or even 'urban renaissance'. Urban shrinkage and re-growth today form a part of complex changes within many European cities. Since the number of such cities has increased over recent years in a number of countries, for example in Germany and the UK, not only the question arises how re-growth can be understood, but also if and how the two processes of shrinkage and re-growth are interrelated and how the future of such cities might look like? Set against this background, the paper aims to understand and discuss the urban development trajectories of two European cities - Leipzig in

Germany and Liverpool in the UK - two cities of a similar size that underwent a phase of long-term shrinkage from the 1930s until the late 1990s (Leipzig), and even the 2000s (Liverpool). Recently, both cities have stabilized their population, and in recent years have seen a modest growth of some thousand people per year. Both shrinkage and re-growth of cities result from the interplay of macro processes (for example, economic globalization, social or demographic change) and local settings of a city (including the political and institutional settings, strategic decision-making and planning, economic performance and labour market, population characteristics and development). In our approach, we highlight the qualitative dimension of both processes, i.e. we are mainly interested in its causal relationships and underlying dynamics as well as the impact it has on different fields of urban development. The paper seeks to compare the experiences of these two cities in order to discuss how regeneration policies and planning strategies have influenced re-growth. \* Helmholtz Centre for Environmental Research - UFZ, Department Urban and Environmental Sociology \*\* Liverpool John Moores University, School of the Built Environment

#### **Policy responses to shrinking cities**

*Emmanuèle Cunningham-Sabot (University of Rennes), Sylvie Fol (Paris 1 - Panthéon-Sorbonne University)*

Cités Urban shrinkage is more and more defined as a 'global phenomenon' (Pallagst et al 2009). However, the national and local modes of regulation respond differently. Planning paradigms have long focused on urban growth, and national and urban governance have been primarily oriented to reinforcing the image of cities as growth machines. Therefore the recognition and perception of shrinking cities, nationally and locally is far from being evidence for some countries. The local and national policy responses to shrinking cities will be analysed in two countries: France and the UK. Three main questions will shape the comparison: What are the differences and similarities between the policies within the two countries? What are the influences of national and regional contexts? And are these policies still influenced by the growth paradigm? References: Pallagst, K., J. Aber, I. Audirac, E. Cunningham-Sabot, S. Fol, C. Martinez-Fernandez, S. Moraes, H. Mulligan, J. Vargas-Hernandez, T. Wiechmann, and T. Wu (Editors) (2009) *The Future of Shrinking Cities - Problems, Patterns and Strategies of Urban Transformation in a Global Context*, Berkeley, CA: Center for Global Metropolitan Studies, Institute of Urban and



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### UDC 04-02 - Global winners and local losers? Regeneration strategies in the absence of growth in Asia and Europe 2

*Chair: Thorsten Wiechmann, Sylvie Fol*

#### **New marginal areas in metropolises in Japan – issues and policy ideas**

*Tetsuji Uemura (Nomura Research Institute), Daisaku Honma (Ministry of Land, Infrastructure, Transport and Tourism), Toshiyuki Kigure (Ministry of Land, Infrastructure, Transport and Tourism), Shinichi Kusano (Ministry of Land, Infrastructure, Transport and Tourism), Miki Matsuoka (Nomura Research Institute), Masahiko Natori (Nomura Research Institute), Hiromi Otsuka (Ministry of Land, Infrastructure, Transport and Tourism)*

'Marginal areas' has been used in the context of rural decay. Marginal areas can be observed not only in rural areas, but also in the high street in small cities, and furthermore, recently can be potentially emerged in urban areas, even in the suburbs of metropolis in Japan. Provided the recent public finance constraints and population decline in Japan, appropriate policies should be developed before the potential problems are realized. This paper tries to develop a package of policies to cope with the problems in the marginal areas in metropolises by literature review, interviews to local governments, private railway companies, GIS data analysis and so on. Previous researches suggest that the residential complexes developed in 1960s and in the early 1970s located in the area from one-hour commutes by railway from the city centre, and in which one-person households over 85 years old are increasing are facing on their decay. These areas cannot expect the social capital as in the traditional settlements and the composition of ages is almost simple. It can be concerned that the potentiality of increase in the number of vacant houses and unused lands is, therefore, expected to be high in five or ten years. On the other hand, the areas with two of three conditions, 'more than one-hour far from city centre by public transportation', 'the 50 years history since the development', 'new towns' may survive from such a severe situation up to the policies. The Japanese ministry of land, infrastructure, transport and tourism promotes the corridor type compact cities along the railway lines. According to this policy, the private railway and government sector can make a good partnership each other in order to promote the residential shift from the elderly to the young, and the management of vacant

houses and unused lands. The history of residential complex development in Japan suggests that the marginal areas needing the management mentioned above will transition spatially by time passing. It needs the dynamic urban policy and plan to cope with the problems in metropolises in the future.

## UDC 04-03 - Global winners and local losers? Dealing with demographic shrinkage in Europe 3

*Chair: Thorsten Wiechmann, Sylvie Fol*

### Reurbanisation as regeneration strategy of small shrinking German cities?

*Sabine Beisswenger (ILS - Research Institute for Regional and Urban Development), Tim Dunkel (ILS - Research Institute for Regional and Urban Development)*

In Germany urban shrinkage is a challenge that especially small and medium sized cities outside of urban agglomerations face. These cities and their regeneration strategies are in focus here. Based on numerous interviews with local stakeholders and on data on population development the paper compares the three case study cities Osterode am Harz, Pirmasens and Völklingen. During the course of the research project which provides the basis for the findings presented here it became clear that all of the cities follow some kind of reurbanisation strategy to cope with declining population numbers caused by out-migration and demographic change. For this reason the paper will give special attention to the relationship between shrinkage and the employment of reurbanisation strategies by the local urban planning authorities. Reurbanisation is here understood as an actively pursued strategy of local urban stakeholders to strengthen central parts of the city with the aim of future-oriented sustainable development of the city against the background of ongoing population decline. In this paper, firstly the medium-term developments of the three cities are presented, depicting changes in the industrial structures over the last four decades and the turning points from growing to shrinking cities. Secondly, the specific reurbanisation strategies are characterized and connected to population changes on the spatial level of single city quarters. These results are, thirdly, related to specific local developments, to urban governance constellations and urban and industrial structure and contrasted with corresponding findings on larger cities as presented in the relevant literature. Drawing conclusions from this comparison this paper finally attempts to introduce in a more abstract manner a range of reurbanisation strategies that can be found in shrinking small and medium sized cities.

### Urban shrinkage in Poland in the context of the development pathways of "winners" and "losers" in the post-socialist transition

*Emilia Jaroszevska (Adam Mickiewicz University Poznan), Tadeusz Strykiewicz (Adam Mickiewicz University Poznan)*

The post-socialist transition that started in Poland at the beginning of the 1990s has diversified the country's level of development. The ever more readily visible polarisation that this process has produced manifests itself in the concentration of the population and economic development in metropolitan areas and depopulation and economic collapse in peripheral ones. Most metropolitan areas, which are the "winners", have been able to adjust their economies to the new market conditions fairly quickly. Even so, when analysing the biggest cities with developing metropolitan functions, from the very start of the systemic transformation one can observe a dynamic suburbanisation process there. The process of urban shrinkage - understood in terms of the appearance of problem areas suffering both, a long-term depopulation trend and a socio-economic crisis - largely affects cities and towns from the remaining group, that of "losers". They grapple with such problems as industrial decline, high unemployment rates, and an outflow of the population (especially young and educated). These are in particular old industrial towns with the predominance of the heavy, extractive and textile industries. The chief aim of the paper will be to present and compare two development paths of cities located in the same region of Poland (Lower Silesia). The first will be discussed using Wroc'aw as an example of a city belonging to the first group, of "winners". The other type of path will be illustrated by the former mining city of Wa'brzych, situated close to Wroc'aw, a mere 60 km away, but classified as a "loser". An attempt will be made to account for the differences in the development potentials of the two cities with the help of the concept of path dependence. On the basis of the identified critical junctures or windows of opportunities, factors and processes will be discussed that have crucially affected their historical growth trajectories, including the process of shrinkage. Finally, different types of regeneration strategies and their effect on the development of the two cities will be presented.

Key words:



### Facing a new enemy: Reactions for shrinking-based challenges in Hungarian small towns

*Gábor Pirisi (University of Pécs), Tamás Németh (University of Pécs), András Trócsányi (University of Pécs), Tímea Vercse (University of Pécs)*

Shrinking is not only a phenomenon of the urban decline: it also appears in rural places, where small towns suffer from the loss of population and functions. Present demographical processes and the future perspectives together with the structural problems of dominantly rural areas shows that without the dramatic change of social and economic paradigms the depopulation and shrinking will be the most typical process for the rural areas outside the urban agglomerations for the next decades. In Hungary, where about half of the population still live in rural environment (including villages and also small towns), and where the natural loss and even more the emigration decreases significantly and rapidly the population, shrinking appears much more in these, rural level, than being an urban issue. The depopulation of villages has even started between the 1950s and 1980s and against all political intentions and public disapproval still and even faster continues today. Strategies were developed for stopping this process but no coherent plans were created to handle the shrinking. Till the last years, small towns have not suffered from the shrinking: their population became stabile, or even has been grown; most of their traditional functions were connected to the local and micro-regional public services, and were guaranteed by the state. This stability was only available due to the supply of the demographic reserves of the surrounding rural areas, and these reserves were depleted. That resulted the start of a massive decline of quantity and quality of human resources. Beside the negative trends in population, the small towns suffer a relative decline in spatial functions too. Due to the economic globalization and its macro-regional consequences, including the political, social and economic transformation of the 1990s in Eastern-Europe, the former roles of small towns in employment, supply and services has been revaluated by the markets, investors and consumers. With the forced withdrawal of state due to the finance-crises, which lead us to the reduction of welfare state - an important pillar of the Hungarian small towns' development could fall again, because these settlements based their development partly on exogenous, even on public-financed resources. Our research goal is to investigate how the small town municipalities handle the problem of shrinking. With methods of analyzing the content of development strategies and action plans, we will reveal, how conscious settlements facing the phenomenon related with shrinking and what kind of strategies and goals are developed to handle this situation. With

comparing the empiric results the statistic-based analysis of shrinking trends among the small towns we will show the most problematic fields of small towns' adaptation.

### Spatial distribution of urban regeneration processes in Riga

*Guntis Solks (University of Latvia)*

Urban regeneration processes are considered as part of current urban development of Riga. These process are one of the key issues in order to achieve sustainable urban development in various ways and it should be important for Riga as a post-manufacturing city with significant proportion of brownfields. The purpose of this research is to characterize the spatial distribution of urban regeneration processes in Riga. The tasks of the research include: 1. Review of theoretical issues regarding urban regeneration processes; 2. Characterization of urban development trends in Riga; 3. Exploration of transformation processes of urban brownfields in Riga; 4. Determination of the spatial distribution of urban regeneration processes in Riga; 5. Evaluation of the urban regeneration processes in Riga. The research methods include review of literature, field studies, interviews with experts and GIS methods. The results are described focusing on social, economic and cultural issues, in order to evaluate their role and importance for successful urban regeneration in Riga. Various proposals and solutions for further urban development of Riga are recommended on the basis of the results of this research. Spatial distribution of urban regeneration processes in Riga is uneven what is determined by various factors - trends of the national economic growth, activities in the real estate sector, geographical location and built-up structure of particular urban areas as well as other factors. Most of the urban regeneration processes in Riga are concentrated in the central part of the city, because it is one of the most prestigious neighborhoods where historical buildings, what require redevelopment, are concentrated. Other neighborhoods, where urban regeneration activities are also common, have various different features and implications of urban regeneration processes, that determines the diverse character of urban transformation process in Riga. Urban regeneration processes in Riga are identified and evaluated based on the methodology elaborated by the author. The results are processed, appraised and interpreted in the context of local administrative subdivisions (neighborhoods) of Riga in order to represent spatial distribution of urban regeneration processes in Riga. Local urban planners and municipal authorities have declared urban brownfield redevelopment as an important tool to achieve sustainable urban development,

thus promoting formation of compact urban structure of Riga and minimizing the effects of urban sprawl. In this context urban regeneration processes have to be evaluated as an important approach for further urban development of Riga. Keywords: brownfields, Riga, urban regeneration.

### **Shrinking Regions in Japan: Community ownership of assets as a development potential?**

*Thomas Feldhoff (Goethe University Frankfurt)*

In the context of a decline in the overall national population, non-metropolitan areas in Japan are most severely affected by depopulation and demographic ageing. The fast-spreading 'marginal settlement' (genkai sh'raku') phenomenon refers to communities that have reached the limits of their manageability due to dramatic depopulation and where people aged 65 years or older make up more than half the total population. This challenge requires a fundamental shift in Japan's policy response to trends of regional abandonment and collapse. Former development strategies based on the Mountain Village Promotion Act (Sanson shink' h', 1965) or the Emergency Act for the Improvement of Depopulated Areas (Kaso chiiki taisaku kinky' sochi-h', 1970) obviously failed and the government has to take into account new challenges such as globalization, social and demographic change. The paper aims to analyse current and future economic and socio-demographic challenges facing shrinking regions in Japan, and to assess the development and institutional context of related government policies. It argues that local communities should abandon the expectation of externally induced revitalisation and concentrate on asset-based community development. Giving communities the opportunity to capture the gains from public goods (e.g. natural endowments like land, wind, water) as well as private assets could improve the prospects for local livelihoods and quality of life. Community ownership of assets can be an important means to facilitate local engagement, foster local place attachment and thereby strengthen rural community resilience. Based on case studies, the paper provides some empirical evidence for this policy approach, which is a major challenge to state-society relations traditionally shaped from the top down. It requires local communities to become more independent from central government influence and to integrat

### **Prestige Events and Shrinking Cities: Pathway to Regeneration? The Case of Vladivostok, Russky Island and the 2012 APEC Summit**

*Chung-Tong Wu (University of Western Sydney), Nicolas Buchoud (Renaissance Urbaine Consultants)*

Policy makers in charge of shrinking cities face many obstacles, notably a falling population and loss of economic vitality. The fear is that unless something dramatic is done these negative factors will in turn feed into each other leading the city into a downward spiral. Like their counterparts elsewhere, many policy makers look towards major events as a catalyst to catapult the city out of the vicious circle. Competing for major mass attendance events such as the Olympics, the World Cup and World Expos are notable examples. Other more political or economic oriented prestige events with restricted attendance such as the meeting of the World Bank, or the Asia Pacific Economic Cooperation (APEC) are also seen as worthy catalyst events. This paper utilizes the forthcoming APEC 2012 Summit in Vladivostok to explore the possibilities and implications of hosting a prestige event for a shrinking city. Vladivostok, a city with a population of about 578,000 is the largest Russian city in Russia's Far East region. As the capital of the Primorskiy Krai it has the distinction of being a major Russian port city located near the borders with China and North Korea. Over the last decade, Vladivostok lost 10% of its population due to a combination of factors including falling birth rate, lack of economic growth and the Eurocentric policies of the government as well as the population. In September 2012, Russia will host the APEC Heads of States Summit and several parallel meetings on Russky Island--a coastal area facing Vladivostok's main urban core. It is expected that this event of complex geogstrategic significance will kickstart the revitalizasion process of the city and its region and at the same time assert Russia's presence in Asia. The central government is investing several billion dollars to upgrade its airport, to build new infrastructure, expresways, bridges and new conference facilities to host the APEC meeting. The federal government has also invested in defining new flagship projects based on education, innovation and education as means to ensure a viable economic development strategy. This raises exceptional challenging and exciting conceptual and practical issues for a shrinking city in a globalized environment. APEC Summit planning has brought new investments and considerable attention to Vladivostok and Russky Island but whether these will have lasting effects will depend on a large number of factors. Experience elsewhere casts doubt on the efficacy of these strategies for a city still remote from the consciousness of its own population and the rest of the world. Utilizing

published and unpublished data, this paper compares the strategies of Vladivostok with the experience of other cities that have adopted similar strategies. It questions the conditions under which a shrinking city in a highly strategic and yet largely ignored region of Russia could be converted as the gateway for innovative urban regeneration.

### **Cities without Growth. Urban Development under the Conditions of Demographic and Climate Change**

*Babette Scurrell (Bauhaus Dessau Foundation), Heike Brückner (Bauhaus Dessau Foundation)*

Saxony-Anhalt as one of the new federal states of Germany has been experiencing three essential transformations within the recent 20 years: the social-political and socio-economic transformation from a socialist into a capitalist society, a rapid demographic change and early signs of the global climate change. In 2002 the state government set up the process of the International Building Exhibition (IBA) Urban Redevelopment Saxony-Anhalt 2010 with the Bauhaus Dessau as one partner to pay special attention to the problem of demographic change. The IBA Urban Redevelopment 2010 was a 'laboratory', where innovative urban redevelopment 'tools' were tested and applied. Its objective was to build up practical redevelopment expertise and to devise pilot schemes setting standards for urban design under the conditions of demographic, economic and social change. The year 2002 was at the same time the year of the 'hundred year flood' of the river Elbe. Man-made influences like soil sealing and river regulation or unusual extreme weather events as a consequence of climate change caused a catastrophe and aroused interest in urban planning in the river basin - adapting to climate change became suddenly a very up-to-date topic. While the losses in population have not come to an end and the climate change challenging urban planning is just beginning the cities of Saxony-Anhalt can draw on experiences in change management from the recent 20 years. The authors argue that changes in urban structures, especially in urban landscapes, as well as the strong tendency to citizens' participation in urban redevelopment processes pave the way to adapt to change. Furthermore the activities towards and the debate on sustainable urban development sensitized the population to the new challenges. The paper will explore what this means for future concepts. Can the procedures and instruments designed in one transformation help to prepare the cities for the next changes? Are there opportunities in shrinking when it comes to answer the challenges of climate change? Do experiences from urban development without growth contribute to

strategies for developing a resilient city? Can prosuming, like it emerges in the energy sector, become a strategic answer to the demands of demographic and climate change? Confirming the conclusions from the processes since 1990, one outcome of the IBA Urban Redevelopment 2010 is that in cities without growth we find new actors for urban development making other sorts of investment, which result in different returns. Their manifold interests and goals, their unusual contributions to urban development and most important their experience of negotiating aims and methods of urban development with each other offer a good starting point to meet the new challenges. It might turn out, that the presumed losers of demographic change are the future winners in climate change.

## UDC 05-01 - Health and sustainability in the cities of the future – the impacts of urban environments, urban green and urban blue elements

*Chair: Thomas Claßen, Richard Mitchell*

### Using NDVI for estimating the influence and mitigation effect of urban green on heat-related excess mortality in Lisbon, Portugal

*Katrin Burkart (Humboldt-Universität zu Berlin), Fred Meier (Technische Universität Berlin), Paulo Canário (Universidade Lisboa), Dieter Scherer (Technische Universität Berlin), Wilfried Endlicher (Humboldt-Universität zu Berlin)*

Climate and weather exert profound effects on human health and well-being. Non-linear relationships between temperature and mortality/morbidity have been observed at high and low values. The heat-mortality and -morbidity relationship varies across time periods, regions and populations. Time-series studies have shown that different cities and population groups exhibit different responses to heat. The underlying reasons for these differences are only partially understood. The demographic composition as well as the spatial structure, the degree of urbanisation, population density or the urban design and morphology might be crucial in shaping the atmospheric effect. Due to the projected consequences of climate change, the hazardous nature of heat effects and heat-related excess mortality has been given increased attention in science as well as politics. Moreover, the superimposed urban heat island (UHI) effect is likely to aggravate health threats in urban areas. The primary objective of this study was to assess the influence and mitigation effect of urban green on heat-related excess mortality in Lisbon, Portugal. One way to mitigate the UHI intensity is by increasing the amount of vegetation in cities. The spatial distribution of the amount of urban green in Lisbon is described in terms of a common remotely sensed vegetative index, the Normalized Difference Vegetation Index (NDVI). The Moderate Resolution Imaging Spectroradiometer (MODIS) sensor aboard the Terra (EOS-AM) satellite provides data for this investigation. The MODIS Level-3 product MOD13Q1 is used to quantify the mean spatial distribution of NDVI for the period 2000-2008. The spatial resolution of NDVI is approximately 250 m. Further, the intra- and inter-annual variability of NDVI for local administrative units in Lisbon and rural areas are computed in order to clarify if the vegetative conditions during distinct hot and dry periods are significantly different from the mean annual course. In order to assess the combined effect of different

meteorological parameters, i.e. temperature, humidity, wind-speed, radiation, on the human heat balance, we applied a thermo-physiological model and calculated the Universal Thermal Climate Index (UTCI). This modelled atmospheric index is combined with daily spatially stratified all-cause mortality data using a generalized additive model (GAM) adjusting for several confounder variables, such as trend, season, day of the month and day of the year, as well as air pollution and demographic characteristics. In order to quantify heat effects above a particular threshold value we use a breakpoint model (hockey-stick model). Understanding and accounting for the role and beneficial character of urban green is of major importance for public health.

### Green for All! Examples of children's therapeutic landscapes of activity from Germany and New Zealand

*Silvia D. Schäffer (University of Bonn), Christina R. Ergler (The University of Auckland)*

The positive impact of natural environments on adults' participation in active leisure and mental well-being is well discussed in the literature. Children's voices, however, are only a whisper in this context. With escalating indoor sedentary activities and associated limitations such as decreasing rates of physical activity and increasing prevalence of obesity, children's perspectives warrant being brought into view. Safe environments in which children can play and explore their surroundings as in past generations are limited. It is important to include children's voices more loudly in debates on nature benefits in urban areas and to foster participation in outdoor activities. We propose a theoretical framework under the umbrella of therapeutic landscapes of activity attuned to children's perspectives and needs. We embrace in this framework aspects of green environments affording children's resilience, health promotion and general well-being. In addition, we include how institutional and social settings can contribute positively to children's participation in safe outdoor activities. To embed the theoretical aspects empirically, we draw on two case studies. The German study is set within the institutionalized context of forest kindergartens, which offer children in this densely populated country regular relation to and activities in nature. Drawing on semi-structured interviews with head teachers in these settings, we present their perception on the impact of regular nature exposure on children's healthy development and well-being. In contrast, the New Zealand study draws on findings from a comparative study of apartment living and suburban housing. While New Zealand projects a "green and (c)lean" image internationally and its citizens regard themselves as outdoor people, child-led

neighbourhood walks and semi-structured interviews with parents and children revealed that apartment dwellers are divorced from knowledge of, and movement in, natural settings. Reflecting on both case studies, we conclude with a call to rethink children's present linkage with natural settings in urban environments. While restorative aspects of green environments have priority for adults, children evaluate the same environment differently; physical, mental and social benefits often arise in relation to activities carried out in natural settings. To enable children as grown ups to enjoy the restorative aspects of nature, we need to combat their recent alienation from nature and turn urban green environments into accessible places for the youngest.

### **Environmental and Socioeconomic Benefits of Urban and Periurban Greening: The Case of Aksu in NW-China**

*Martin Welp (Eberswalde University), Abdulla Abliz (Eberswalde University for Sustainable Development), Jörg Eberts (Eberswalde University), Siegmund Missall (Eberswalde University)*

Urban and periurban forests in arid regions provide many ecosystem services (ESS) such as protection against dust and heat stress. China has in past decades taken great efforts to increase the forest cover in and around cities. The national afforestation program (tuigen huanlin) has been to a great extent motivated by the serious and frequent dust storms which have impacted China's megacities. But also in smaller cities major greening efforts have taken place. The Kökyar project at the fringe of the city of Aksu, Northwest China is one such prominent example, and it is frequently cited as a model for other cities in China and elsewhere. The case study is part of a project, which is focusing on river basin management in the oases around the Tarim River. Surveys and interviews in the City of Aksu revealed, that besides the concentrated and early efforts by the local government, crucial for the success have been the socioeconomic benefits which the local farmers gain from managing forests and agricultural land. In future climate change and increasing competition about scarce water resources due to agricultural expansion is likely to be a challenge for water management, and eventually for urban greening. New management ideas, such as the use of locally adapted, drought-resistant species, the use of biochar to enhance water retention of soils, as well as shift towards an ecological greening paradigm within cities are currently being discussed among scientists and stakeholders. Furthermore new economic incentives, such as payments for environmental services (PES) and improved communication and cooperation between key agencies can improve the provision of ESS of urban and periurban

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### **Blue or Green? Healthy environments in the inner city**

*Sebastian Völker (University of Bonn), Thomas Kistemann (University of Bonn)*

Cities challenge various health problems nowadays. There is a consensus in research that urban green space contributes to human health and well-being. But having a closer look on urban green one can recognise that many spaces are in fact blue. Water has a central significance in settlement areas in history and today, i.e. as an important aesthetic landscape element or for integrated development and coordinated design. Although there is an increasing need for healthy places in cities like urban blue, those spaces are mostly disregarded as a beneficial health factor by planners. The concept of therapeutic landscapes dedicated to analyses at blue space (Völker and Kistemann, 2011) is used to analyse salutogenetic health processes at the promenades at the river Rhine in the city centres of two German cities (Cologne and Düsseldorf). The research area is analysed thoroughly using a complex of qualitative and quantitative methods from diverse disciplines to obtain a multi-dimensional image: qualitative interviews, qualitative questionnaires, participant observation, and spatial analysis. At the promenades health enhancing and health limiting aspects were recognised in each dimension of appropriation and substantiality within the basic concept. Visitors of the promenades admire the view of water and the beautiful environment. They show a clear relation to the promenade with a strong sense of place, expressed by the striking feeling of home. People experience relative social equality and conduct social relations and contacts at the promenades. They are favourite places to spend leisure time and to do recreational activities, restoring from everyday stress. Urban blue can be interpreted as a therapeutic landscape element and contributes to human health and well-being in urban contexts. The health enhancing aspects distinctly prevail health limiting aspects. The regard of urban blue as a health factor in planning issues is a large potential for enhancing health in cities.

## UDC 06-01 - How European towns deal with peripheralization – different action strategies and comparable structural baselines

*Chair: Sabine Beißwenger, Hanna Sommer*

### Peripheralisation and uneven development. Approaching spatial inequalities.

*Matthias Naumann (Leibniz Institute for Regional Development and Structural Planning)*

While there is a growing body of literature - initiated mostly outside Human Geography - on the 'peripheralisation' of cities and regions especially within the context of shrinkage in East Germany (Beetz et al. 2008, Bernt et al. 2010, Keim 2006), a theoretical understanding of 'peripheralisation' is still missing and there exist only few connections to other conceptual approaches to explain spatial inequalities. Especially the Anglophone Critical Geography provides an elaborated debate on 'uneven development' as the production of spatial differences within capitalist societies. Theories of 'uneven development' include more general concepts on the spatial dimension of capital accumulation (Harvey 1982, Smith 1984, Soja 2011) but also work that is embedded in certain regional or economic contexts (Hadjimichalis 1987, Massey 1995). All approaches of 'uneven development' have in common the understanding that spatial inequalities are inherent to capitalism. Despite its rich theoretical foundation, there are very few attempts to apply 'uneven development' to the analysis of regional or urban decline. Furthermore, 'uneven development' is a concept that has been neglected in research on newly emerged peripheralised regions. The paper looks on similarities and differences between the approach of 'peripheralisation' and the theoretical concepts of 'uneven development'. What are the potentials and limitations of each concept? Is it possible to combine macro theories such as 'uneven development' with micro-range concepts of 'peripheralisation'? Is 'peripheralisation' just another name for 'uneven development'? Is 'peripheralisation' applicable to cities and regions outside East Germany and what can concepts of 'uneven development' contribute to contemporary cases of urban and regional decline? The discussion of these questions addresses the fundamental problem of understanding local specifics without neglecting general and global developments as well as possibilities for theorizing research on peripheralised cities and regions.

### Peripheralization and development strategies in French shrinking cities

*Helene Roth (Université Blaise Pascal)*

The paper will propose an analysis of development policies and strategies in cities dealing with peripheralisation in French shrinking 'regions' (départements). These cities have to cope with contradictory processes. On the one hand, the structural context (demographic, economic and infrastructural weakness), the macro-economic developments and the spatial planning strategies at national level increase the dependency of shrinking cities and strongly limit their capacity of action. On the other hand, the development of intermunicipal cooperation, the changes in multilevel governance (especially since the 1990's and 2000's laws on decentralisation, planning governance and intermunicipal cooperation) and the emergence of alternative development models contribute to open new development opportunities for local actors. How do these two processes interact in shrinking cities? Are local development theories relevant in a regional context of increasing peripheralization? Is peripheralization and increasing dependency compatible with the emergence of coherent, integrated and sustainable development strategies at urban level? In the French context, two patterns of dependency will be particularly questioned: -The role of incomes dependency as a resource for local development (Davezies, 2004) -The role of State level in urban governance, in a national context which is still shaped by a tradition of centralisation. These questions will be explored through the analysis of development strategies and actions in small and medium-sized towns situated in shrinking regions of the northern fringe of Central Massif. These studied cases present a similar structural context: emigration and demographic change; desindustrialisation and lack of innovation; internal and external stigmatisation. Nevertheless, although the structural 'background' is similar, the case studies will stress possible differentiation in strategies, actions and governance. The case studies are based on qualitative interviews of experts, completed by statistical data analysis.

### Town Centre Management: The Portuguese Experience

*Pedro Porfirio Guimaraes ("IGOT; CEG")*

In recent decades we have witnessed a process of expansion and dispersion of the city that is unparalleled in urban history (Fernandes, 2007). Because new centralities have appeared within, or in the surroundings, of the largest cities, the once predominant centre of the city has become only the traditional centre

(Fernandes, 1994), experiencing a loss of functions to other areas. Being something that is similar across several cities and not a phenomenon unique to urban centres in Portugal, we are seeing a migration of the functions of city centres to new peripheral areas (the new centralities). This causes problems in employment and residential function (Barata-Salgueiro, 2006). The old city centre failed, in most cases, to keep pace with changes, making it more susceptible to the weakening of its position in the urban hierarchy. The old centre tends, however, to maintain a position in the city (Dear and Flusty, 1998), although one may admit as merely mentally relevant area of "the city. This superiority seems to be sometimes very faintly supported for historical reasons, assigning an importance that these spaces in concrete may not have. Some interventions in Portugal seem to be based upon these trends. Several programmes have been introduced to support the retail sector with the aim of promoting the revitalization of city centres. They have showed a certain preference for interventions located in the old central areas of cities. These programmes highlight the value that the retail sector possesses. Incorporating this sector in the revitalization of those areas highlight its importance to the city. Relations between the city and retail are dynamic and fundamental, in both directions (Barata-Salgueiro and Cachinho, 2009). Within those programmes, in 2006, 47 new mechanisms of intervention were supported in inner cities, based on public-private partnerships, formed in order to tackle the problems that have plagued these areas for decades. These new structures are based on the model of Town Centre Management schemes (TCMs). As in many other countries where this sort of measure is introduced, this intervention model admits the success of existing shopping centres in that it attempts to acquire or reproduce some of the features that they implement successfully. Adapting approaches used in private places to public space was the main focus of these schemes. The management of city centres includes topics like: promoting the city centre; putting forward common services to the retailers that individually they wouldn't be able to have; promoting an ongoing dialogue between the various stakeholders involved in the respective areas. The presentation aims to shed some light to the process of implantation of TCMs in Portugal discussing: the context in which the schemes appear; the work developed; and conclusions about the strengths and weakness of the process.

## The Resilience of City Centres: The Role of Retailers

*Pedro Porfirio Guimaraes (IGOT; CEG)*

Cities are not static places, changes have been always a part of them. How cities respond to these changes is not the same in all of them, and the reaction is not equal in the various centres that make up a city. In fact, the various centres within cities also evolve, experiencing constant changes in their role in the urban setting. The place they occupy in the hierarchy of the city may change over time. However, there are centres that respond better to changes than others, that is, while some centres cannot adapt to change and decline, others can adapt and maintain their function in the city. This adaptation while maintaining the essential functions can be designated as resilience. Although it's a concept that arises from other sciences, the application in the context of human geography, in general, and in urban and retail studies is of high importance. In the present context, resilience, can be defined as The ability of different types of retailing at different scales, to adapt to changes, shocks or crisis, challenging the system's equilibrium, without failing to perform its functions in a sustainable way (Replacis, 2010). This presentation departs from the project REPLACIS - Retail Planning for Sustainability Cities, held in partnership with researchers from various national contexts, such as Portugal, France, Sweden and Turkey. This project recognizes that retail is a crucial element of contemporary city life and connects the sustainability of the city with the preservation of diverse retail systems, which must have the capacity to respond effectively to the needs and desires of different types of consumers (Cachinho and Barata-Salgueiro, 2010). It is intended to discuss the role of retailers in the resilience of retail areas and how their profile can influence the viability and vitality of an area. It is admitted that, generally, there are three different types of retailers, according to their attitude towards business: (1) Passive, retailers who were unable to take steps to keep the pace of change and adopt a posture of resistance to change, which can lead to decline, (2) Reactive, retailers who recognize the changes that happen and take measures in order to track changes, (3) Pro-active, retailers that realize and anticipate the changes and are at the forefront of the changes that happen in the consumption habits of the various consumers. With this presentation, we aim to understand the relationship between the type of retailers present in a particular area and the ability of that same area to be resilient and adapt to change. The analysis will be anchored empirically in several interviews that were done with retailers of distinct areas of Lisbon.





## UDC 07-01 - International migration and 'glocal' spaces of vulnerability 1

*Chair: Benjamin Etzold, Tabea Bork*

### **Multi-local livelihoods. Case studies on international labour migration from Thailand.**

*Patrick Sakdapolrak (University of Bonn)*

Castles and Miller (2003) has named the period of intensifying human mobility that is continuing to evolve since 1945 as the 'age of migration'. International migration has become one of the most important factors of global change - it has never been as widespread and its socio-economic and political significance has never been as high. The majority of people on the move are labour migrants, who embody the prototype of the migration of modern societies. One of the countries where international labour migration plays an important role is Thailand, which is a major receiving as well as sending country of migrants. Most international migrants from Thailand are originating from peripheral and marginal areas in the North and North-Eastern region. These areas have benefited less from the dynamic economic development since the 1980s and are more vulnerable against social and ecological stresses. This paper studies international labour migration on the basis of two empirical case studies from North and North-Eastern Thailand. It utilises the livelihoods approach as a frame work of analysis and as a way to embed migration in the context of social vulnerability and multi-locality. It is argued that the livelihood approach as a holistic concept, which focuses on households and daily life of people while embedding them in a broader context, is a way to enhance the understanding of migration as a multi-local livelihood strategy. The results presented are based on data gathered through quantitative, qualitative as well as participatory methods in villages in the provinces Lamphun and Khon Kean. The paper describes migration movements from the study areas as structured through changing external demands and institutionalised networks. It focuses on the causes and effects of international migration and aims to reveal constraining and enabling factors of migration. The paper shows that while social as well as ecological stresses can initiate migration, feedback processes triggered by international migration are driving forces for continuing migration flows. The paper concludes that for the explanation of migration movements there is a greater need to embed migration in multi-local networks through which resources, ideas, information and commodities flow.

### **The Link between Remittances, Farm Investments and Water consumption in Kerala, India**

*Agnes Pohle (Kassel University)*

The paper answers the question how far remittances from international migrants have an impact on farm households. International Organizations as well as many experts see remittances as tool to increase income, as an engine for development, as safety net for the rural poor, and as coping strategy and/or buffer against economic shocks (Mouhoud et al., 2008; Ratha, 2007; Yang, 2007). Critics claim that remittances increase inequality of regions, do not contribute to poverty reduction, and erode social structures (Acosta et al., 2009; Åkesson, 2009). A number of surveys reveal that remittances enable households to invest into the farm sector (Taylor 2006; Cohen and Rodriguez 2005; Wouterse and Taylor 2009). Based on the New Economics of Labour Migration (NELM) and empirical evidence supplied by Möller (2002) and Wouterse and Taylor (2009) we hypothesize that households invest remittances for reducing risks by diversifying agricultural production and for overcoming credit constraints. The extent paper investigates the following questions by considering the case of Malappuram district in Kerala, India: (1) How far are remittances to rural areas used for farm investment? (2) How far do these investments influence water consumption? Malappuram district has been chosen as case study because of the high share of migrants and the high amount of remittances transferred from international migrants (Zachariah and Rajan, 2010) as well as their specific situation of water shortages during February and May (Nair and Chattopadhyay, 2005). Data encompasses 400 interviews conducted between 2010 and 2011. Results of descriptive analysis show that out of 400 farm households 32% received remittances and 21% invested remittances in the farm sector. Altogether farm households received a total of 19,176,600 Rs remittances (282,178.30 EUR) in 2010. 85 households invested 1,605,000 Rs (23,604 EUR) remittances in the farm sector in 2010. During 2006 and 2010 farmers invested a total of 5,619,158 Rs (82,582 EUR) remittances in labour wages, fertilizer and irrigation facilities and rent of farm machinery. Our analysis highlights that in the short term remittances relieve the economic situation of farm households giving room even for investments. In the long term, however, remittances increase water consumption and may contribute to water shortage. While initially mitigating socio-economic vulnerability of farmers, remittances may thus in the long run even enhance their vulnerability by deteriorating their ecological environment which has, in turn, severe repercussions on their socio-economic living conditions. Hence, this research points to the indispensable

need of including environmental impacts of remittances into the overall account. The findings help governments and national and international agencies to adequately respond to the challenges from the use of remittances by seizing their respective opportunities while preventing avoidable harm.

### **Lines across the desert: Mobile phone use and mobility in the context of trans-Saharan migration**

*Max Leonard Schaub (University of Oxford/ University of Oslo)*

In West and Northern Africa, mobile phone coverage has been expanding parallelly to increased attempts by Africans to migrate overland to Europe. This paper explores possible links between the two phenomena, looking specifically into the role of mobile phones in trans-Saharan migration. It provides a first detailed description of the telecommunication processes underlying contemporary trans-Saharan migration. An analytical framework is presented that helps to explain how mobile phones facilitate migration by interacting with the social and spatial factors shaping migrants' mobility. By drawing on this framework and fieldwork conducted among Congolese migrants in Morocco, it is shown that the expansion of the communication infrastructure is, on the one hand, only one of several factors that have turned the region into a more 'transitable' space. On the other hand, the use of mobile phones is demonstrated to be central to the migration process: migrants draw on the unprecedented accessibility of contacts equipped with mobile phones to tie together novel, geographically expansive networks. Phones are also shown to be used by migrants' 'helpers' for the purpose of internal coordination.

### **'Under the radar': Undocumented immigrants, Christian faith communities, and the liminal spaces of belonging**

*Patricia Ehrkamp (University of Kentucky)*

The recent proliferation of anti-immigrant legislation in the U.S. South has created new threats of detention and deportation for undocumented immigrants, and puts those at risk who provide support and services to undocumented immigrants. In this context, this paper examines how Christian faith communities seek to provide spaces of belonging and advocacy for undocumented immigrants who find themselves in increasingly precarious situations due to policing and border enforcement in the interior of the U.S. The U.S. South as a "new destination" for immigration in the U.S. serves as a case study of the rapidly changing landscapes of anti-immigrant legislation and the ways that

communities of faith have challenged such legislation (as in Alabama) and provide safe havens for immigrants at risk of detention and deportation. This paper investigates faith communities as liminal spaces of citizenship in which pastors and lay members of the congregation work through numerous tensions surrounding Christian principles of "welcoming the stranger" and the contradictory impulses provided by "law-and-order" understandings of anti-immigrant legislation and citizenship frameworks in wider society. Contrary to existing work on immigration and faith that focuses narrowly on the role of religion for civic engagement, this research is interested in the challenges and tensions that emerge within communities of faith in relation to undocumented immigrants, law enforcement, and faith interpretations. It examines the multiple strategies in which individual pastors and congregants implement their ideas of faith and social justice in ways that help undocumented migrants, but neither challenge nor affirm dominant normative and legal frameworks. Interviews with pastors show that communities of faith become important spaces of spiritual, social, and material support for vulnerable undocumented migrants. For example, some pastors provide character evaluations in order to secure undocumented migrants' path to legal residence and citizenship. Others publicly affirm the notion of "law and order" while simultaneously communicating with law enforcement officials in efforts to find strategies that reduce immigrants' risks of detention and deportation. These strategies frequently entail "laying low," that is, not disclosing support strategies to lay congregants and advising undocumented congregants to avoid public spaces where possible. Together, these findings show that communities of faith emerge as highly conflicted spaces in which pastors and lay members (among them undocumented migrants at risk of detention and deportation) have to tread carefully in efforts to open up spaces of hospitality that are always at risk of erasure by conservative and anti-immigrant forces within the community of faith and beyond.

## UDC 07-02 - International migration and 'glocal' spaces of vulnerability 2

*Chair: Benjamin Etzold, Tabea Bork*

### The everyday integration of migrants: some examples from Morocco, DR Congo and Zambia

*Oliver Bakewell (University of Oxford)*

Much of the analysis of international migration focuses on the interaction between the migrants and the destination state, in particular its policies on immigration, integration and the settlement of migrants. International migration is widely associated with an increase in migrants' vulnerability to economic and social exploitation, political repression and even violence. The integration of migrants into the destination society is seen as a crucial step for reducing this vulnerability. While it may be appropriate to focus on state policies in the case of highly developed states - where the administration reaches into nearly every corner of life - it must be questioned in poorer regions of the world, where the capacity of the state may be very limited, especially in remote border regions. Many countries in developing regions have very limited policies on migration and the gaps between policy and practice may be enormous. Drawing on research in Morocco, DR Congo and Zambia, this paper looks at the way different sets of migrants have integrated themselves, either in the absence of or contrary to government policies. By establishing economic, social and cultural links with local residents, different sets of immigrants have been able to establish a place in the society, even to the extent of gaining effective citizenship. It may prove politically impossible for many poorer states to adopt more liberal notions of integration. Nonetheless, it is important to analyse the processes of everyday integration that are continuing regardless. The paper argues that the complex mix of interests and negotiations which might be agreed below the level of the state - perhaps invisible to the state - may in practice, have much more significance for the lives of migrants than the best efforts of states or international organisations.

### Navigating Urban Space in Eastleigh's First Avenue

*Margaret Macharia (Katholieke Universiteit Leuven)*

Eastleigh commercial centre in Nairobi, Kenya has undergone significant social and spatial transformations largely as a result of the redevelopment strategies

which have been initiated by the increasing Somali refugee traders in the area. Following the civil war which broke out in neighbouring Somalia in early 1990s, a huge influx of refugees migrated into Kenyan urban centres, a large number of which migrated into Eastleigh area in Nairobi. The initial perception of the refugees as a marginalised social group has however changed significantly, especially since they began to integrate economically and spatially as enterprising informal traders with access to social networks operating at both the global and local level. It examines the spatial expression of the social relations embodied in these multi-scalar networks by analysing the needs these networks are able to address. It further seeks to analyse the mechanisms that structure these commercial developments along Eastleigh's First Avenue and explores the tangible spaces being produced as a response to the social networks. Further to this, the case analyses the redistributive aspects of access to collective consumption goods such as infrastructure and public services in relation to all users of Eastleigh's First Avenue. This paper examines the concept of 'glocal' spaces of vulnerability as applied to the use of urban space in Eastleigh. Users of the urban space in Eastleigh include the local residents, the local authorities, Somali refugee businessmen operating huge shopping mall complexes and the informal street traders. The spatial reach and accessibility of the centres of distribution and consumption situated in Eastleigh's commercial area are analysed including the underlying logic guiding their organization. It also considers how the different conceptualisations of space and spatial quality of the different users in the commercial distribution centres of the shopping mall complexes on the one hand; and of the informal street, souk-like, market on the other hand; have evolved, conflicted, and been integrated in compromises on space and spatial quality. In addition it considers whose conceptualisations of space and whose spatial qualities have been or have not been integrated into these compromises and which methods have been pursued in the realisation of these compromises.

### The living and working situation of African migrants in Guangzhou and Foshan, China

*Birte Rafflenbeul (University of Cologne)*

The living and working situation of African migrants in Guangzhou and Foshan, China. Birte Rafflenbeul, Department of Geography, University of Cologne, Germany Due to China's economic opening in the late 1970s and the following implementation of reform policies, one of the main goals set by the government was to open up the country in order to attract foreign investments and

technologies. China's rising economy attracts migrants from various countries with different social, economical and educational backgrounds. In the last three decades, and especially since China joining the WTO in 2001, the number of foreigners has constantly increased. The case of African migrants is special: Guangzhou is one of the main destinations for African traders in China due to numerous reasons (location of many factories in the PRD, the biannual occurrence of the Chinese Export Commodities Fair, proximity to Hong Kong, a well developed infrastructure, etc.). Their migration to Guangzhou started in the early 1990s but even though it got more challenging over the years, a constant increase was observed. In the preface of mega events (e.g. Olympic Games 2008 in Beijing or Asian Games 2010 in Guangzhou) the Chinese government substantially tightened its entry regulations for foreigners, making work conditions for temporary international migrants more difficult. Further, after a protest of African traders in Guangzhou in 2009, the police started to increase controls on migrants in clusters with high African densities. This was done in order to decrease the so-called "three illegalities": illegal entry, illegal housing and illegal work. These regulations made life and work of African migrants in Guangzhou and Foshan more difficult, as it got harder for them to apply or renew their visa. This paper focuses on a detailed analysis of the living and working situation and the related vulnerability of African migrants in Guangzhou and Foshan. These migrants live in different ethnical enclaves, which underlie rapid urbanization processes combined with ongoing segregation and fragmentation processes. This dynamic leads to socio-spatial clusters of African migrants that show different economical and social-cultural characteristics. The following analysis is based on a quantitative survey with 253 African migrants and a variety of different qualitative interviews that were conducted between March and May 2010. These qualitative interviews were done with different stakeholders like African traders, representatives of the migrant communities, a local resident's committee and a representative of an international organization in Guangzhou.

### **Roma Migrants in Germany and France: Mobility, Vulnerability and Coping Practices**

*Verena Sandner Le Gall (University of Kiel)*

Roma migrants from South Eastern Europe figure among the poorest and most marginalized inhabitants of European cities, many of them living in precarious conditions. Like other, non-Roma migrants from the recent EU-member states Romania and Bulgaria, Roma have been seeking economic opportunities in

several EU states. With regard to migration processes and characteristics, such as the importance of circular mobility and transnational networks, they do not seem to differ much from non-Roma migrants from these countries (Legros and Vitale 2011)<sup>1</sup>. However, in the regions of origin the situation of Roma - although these are far from being a homogenous group - often differ from non-Roma in that the previous are not only suffering to a greater extent from poverty, lack of opportunities for income generation and poor housing, but they also have to face discrimination and a marginalized position in society. Under these circumstances with often highly vulnerable living conditions and insecure livelihoods, international migration can be interpreted as one coping strategy. This contribution aims at focusing on the vulnerability of migrants in places of arrival where Romanian and Bulgarian Roma, in many cases, again face extremely poor living conditions, which include precarious habitat, often on territories at the margins of the cities, as well as difficulties concerning access to the job market and income generation, access to health services and education. At the same time, these poor living conditions as well as the high visibility Roma attain due to their specific economic survival practices call attention to the public and to policy-makers (cf. Legros and Vitale 2011)<sup>1</sup>. Policies and administrative measures on different political levels, some of them specifically targeted at Roma, affect their daily lives (e.g. evictions and expulsion measures in France, EU migration policies and restrictions to the access to job markets etc.), and they partly also reflect actual trends of the securitization of migration policies. In this context, it is the aim of the presented research project to study the coping practices and resources that may play a role for resilience of Roma migrants who live under precarious conditions of exclusion in Germany and France. Of special interest are those ways of organising daily lives and those coping practices that are linked to political and administrative measures and requirements. The study combines a political geography perspective focusing on policies on different scalar levels with an actor-oriented approach to vulnerability. The presented contribution will explore the situation of Roma migrants from Romania in two cities in Germany and France (Hamburg and Bordeaux), presenting first results of a comparative study based on qualitative research methods. 1: Legros, O. & T. Vitale, in: Géocarrefour 86-1/2011, pp. 3 - 14 &

## UDC 08-01 - Learning beyond borders: Exploring the spatialities of student mobility 1

*Chair: Maggi Leung, Johanna Waters*

### Unsettling spatialities of student mobility and knowledge

*Parvati Raghuram (The Open University), Clare Madge (University of Leicester), Pat Noxolo (University of Sheffield)*

Discussions of internationalisation of higher education have been marked by a dominant 'flat' spatial imagination, in terms of fixed exchange notions of knowledge acquisition, fixed flows of travelling bodies, and the acquisitive agency of both students and institutions. We argue that, with few exceptions, the focus has been on knowledge acquisition, rather than on the circulation of knowledge produced in multiple locations. The emphasis has been on multiply-routed flows of students from particular peripheries to particular global education centres, with less attention to the complex south-south and multi-scalar interactions that characterise the shifting and uneven terrain of global student mobility. International students themselves are often hollowed out, as vessels that fill up with knowledge through mobility, rather than as potent sources of transnational knowledge circulation, producing and establishing knowledge institutions within (albeit uneven and contingently connected) transnational networks, not least through the pedagogic practices that the circulation of international students calls forth. This paper aims to unsettle the flat terrain of international student mobility. It re-examines practices of student mobility and of institutional pedagogy, to build towards an approach that is more malleable, flexible and contingent - one that thinks through the unsettling unevenness of international student mobilities.

### Researching the international student experience: A methodological perspective

*Laura Prazeres (University of London)*

Young people are becoming increasingly mobile at a global scale. International mobility among young people is increasingly becoming the 'norm' in our globalised society. Some scholars have noted the rise of a youth mobility culture that has been socialized into a lifestyle of international mobility (Findlay et al., 2011; Fränberg, 2009; Woodfield, 2010). The growing internationalization of higher education is also contributing to the increase of internationally mobile

students. Despite this increase, international student mobility has received little attention from geographical scholars. This paper will contribute much needed attention to geographical research on international student mobility. The purpose of this paper is to provide a geographical perspective and methodological discussion on conducting research in this area. Prior work on student mobility has largely focused on the use of quantitative methods. Recent studies in the area have adopted more inductive and qualitative methodologies. This paper will discuss primarily qualitative methodological approaches to research on international student mobility, particularly visual methods and participatory approaches. The discussion will be supported by an empirical case study from my current doctoral research project on place-based and mobility-based identities among study abroad participants. My doctoral study examines the impact of place and mobility on students' sense of identity during short-term academic exchanges between Canada and the Global South. As such, the discussion will provide methodological considerations for examining the place-based and spatial dimensions of international student mobility

### Negotiating heteronormative performances of gender: The experiences of international students from India in Canada

*Gunjan Sondhi (University of Sussex)*

This paper aims to contribute to the growing body of work on ISM experiences and extend it by introducing a gendered approach - by exploring how the living and studying abroad (re)shapes the Students' performance of gender identity. Specifically, the discussion explores the interactions between international students from India studying in the Greater Toronto Area (GTA), Canada and members of the South Asian community in GTA across multiple scales (body, family, community) and places (bars/clubs, cafes, universities, houses of friends and family, banquet halls, places of community and cultural events). In doing so, the paper serves two purposes: (a) highlights the differences between the expectations of heteronormative performances of masculinity and femininity by the members of the South Asian community, and the gender performances of the Students; and (b) shows how these differences (re)shape the gender performances of the students as they live and study in Toronto. The analysis is based on data collected between September 2010- May 2011 through in-depth interviews and participant observations with International Students from India, studying in Toronto, Canada.



### **Graduate migration policies and regional development in Canada & Germany**

*Tim Elrick (University of Erlangen-Nuremberg)*

Increasingly, industrialized countries have to compete on a global scale for scarce, (highly) skilled human resources, in order to keep pace with structural changes and the growth of knowledge-centered economies. As (highly) skilled workers favor certain location factors that are generally found in urban environments, the competition is bi-scalar: the regions have to compete nationally against more attractive ones as well as internationally for 'the best brains'. While many countries have recently relaxed migration policies for certain groups of migrants, among them especially international students, many of these tend to cluster in urban agglomerations. Increasingly, non-metropolitan regions seem to take up the challenge to attract these international migrants, in order to keep up with urban regions. In this paper I will compare the political approaches of selected Canadian and German non-metropolitan regions in their challenge to attract and maintain international students to keep up in the regional development of knowledge societies.

## UDC 08-02 - Learning beyond borders: Exploring the spatialities of student mobility 2

*Chair: Maggi Leung, Johanna Waters*

### Destination Dublin: Motivations for UK students seeking international study in Dublin

*Allan Findlay (University of St Andrews), Russell King (University of Sussex), Jill Ahrens (University of Sussex)*

This paper seeks to theorise international student mobility in relation to the complex intertwined influences linking the globalisation of higher education to the changing global spatial differentiation of universities, and the drive by some students (and their families) to build cultural capital through acquiring the distinction of an international degree at a prestigious university. The paper arises from a major project analysing the motivations and experiences of UK students in USA, Ireland, Australia, France, Germany and the Czech Republic. The focus of this paper is a group of UK students interviewed in Dublin. As with other destination choices, Dublin attracted a specific cohort of students that was differentiated from other flows in interesting ways relating to the socio-economic and cultural contexts that shape student mobility at individual, household, school and state levels. The paper also touches on the specificities of the relations between Northern Ireland and the Republic of Ireland, as well as the rising significance of fee levels for students remaining in UK universities. The paper therefore illustrates the need to go beyond a transnational educational perspective and to recognise other spatialities and to embed international student mobility in the context of wider understandings of people's lifecourse mobility strategies.

### The Transnational Migration Strategies of Chinese and Indian Students in Australia

*Ghim Tan (The University of Adelaide)*

Migration is increasingly transient, particularly among the highly skilled. In addition, countries engaged in a race for highly skilled labour are prepared to modify immigration regulations to attract those migrants. Australian immigration policy reflects how Australia sees international students as highly skilled migrants. Despite abundant research regarding the mobility of the highly skilled, there is a relative lack of investigation into the mobility of international students

and their subsequent migration patterns. This paper explores the nexus between immigration policy and international education by investigating the determinants of the mobility of Chinese and Indian students in Australia. While commentators are increasingly shedding more light on how international education can be a pre-cursor to permanent immigration in a host country, the emergence of transnationalism in migration literature suggests a need to examine how study locales are configured as gateways en route to an ultimate/central destination upon the student's graduation. This paper uncovers the underlying factors that motivate Chinese and Indian students in going abroad to study, as well as their future intentions when they graduate; and in the midst of this process, investigate the implications for immigration policy and the role it has in shaping their migration strategy.

### International Student Decision Making: The Role of Friendship and Kinship Networks

*Suzanne Beech (Queen's University, Belfast)*

Over the course of the last two decades unprecedented numbers of students have chosen to leave their home countries and pursue higher education overseas. As a result, they are increasingly part of international knowledge networks, which provide them with the opportunity to study (almost) anywhere they wish, provided they have the capital to do so. My doctoral research investigates the motivations behind these mobilities and how students choose where to study. It shows that international student decision making is of a complex and multi-faceted nature. While the reputation of the university, cost of studying and job prospects all have a role to play, students are also influenced by the opinions and advice of those around them, building up complex ideas of place through these social networks. The individuals involved are diverse - friends, family and, at times, even relative strangers - share knowledge which they have gained either through their first-hand experience of studying overseas or based upon geographical imaginings they have constructed through their own networks. This paper seeks to establish how these friendship and kinship networks are embedded within the decision making of international students by drawing upon evidence from three UK universities. In short, students are influenced by a diverse range of networks when deciding to study overseas and the participants involved offer information, not only about the universities and courses at their disposal, but the cities and the regions as well.



### To stay or to return? Dilemmas, decisions and justifications about cross-border educational migration

*Monika Mária Váradi (Hungarian Academy of Sciences), Ágnes Er'ss (Hungarian Academy of Sciences), Patrik Tátrai (Hungarian Academy of Sciences), Doris Wastl-Walter (University of Bern)*

The topic of educational migration arose in the framework of a migration research project, called Transmig (Integrating Transnational Migrants in Transition States) financed by the Swiss National Science Foundation. Transmig studies the migration processes triggered by the South Slavic wars in Vojvodina (Serbia) and Hungary by the analysis of data derived from semi-structured interviews conducted with migrants. The studied educational migration can be understood and be interpreted in the theoretical framework of both transnational and ethnic migration. Ethnic Hungarian students arriving from Vojvodina to study at universities in Hungary are transmigrants who simultaneously live in two countries and whose relations link them to two countries, albeit in different ways and with different intensities. In the frame of this specific form of transnational educational migration migrants, who are members of the transborder minority, move to a country which many of them consider their mother country, and although they are separated from this mainland by national border and the Schengen Agreement, there is no harsh cultural or language barrier. According to our research findings, educational migration is in most cases the first step towards permanently leaving behind the native country, Serbia. Nevertheless, in other cases, educational migrants, after finishing their studies, decide to return back to Vojvodina and/or try to develop and sustain a transnational, translocal life between Hungary and Serbia. In the presentation, our aim is to show what kind of reasons, underlying motives, push and pull factors (e.g. prospects of livelihood, command of the Hungarian and Serbian language, transnational networks) can be revealed behind the individual and family decisions on staying in Hungary or turning back to Vojvodina. From the interviews we have learn that next to mentioning practical reasons and motives the interviewees tend to interpret their own migratory decisions in the migrants' narratives of longing, belonging and identity; that is why we analyze data from this point of view as well. The decision about returning back can possibly be embedded either the narratives about remaining at the motherland and the moral obligation to thrive there as a minority Hungarian and/or the narratives about Vojvodinian/regional identity, described as a strong emotional linkage. Interviewees arguing about staying/returning often illustrate differences between the two countries applying the dichotomy of (developed, civilized, organized) Europe and (declining,

uncivilized, chaotic) Balkan. By this way, mentioning the 'balkanization' as main factor restraining them to return to Vojvodina, they unwittingly connect to the traditions of orientalist discourse.



## UDC 09-01 - Managing changes in cultural heritage cities of South-East Asia

*Chair: Mohammad Gamal Rindarjono, Thean Siew Tan*

### Urban heritage conservation, the case of Solo City, Indonesia

*Putu Ayu P. Agustiananda (Universitas Islam Indonesia)*

Urban heritage conservation, the case of Solo City, Indonesia The rapid physical development in the cities in Southeast Asia has put great pressures to the historic urban areas. It has caused deterioration, or even, loss of historic fabric. Many historic buildings had to give way to the development. The challenge that has to be resolved at present is how to promote conservation as an important principle in the progress toward sustainable development. This paper is intended to look at how Solo City, Central Java, Indonesia, has made a significant effort to conduct conservation of its urban heritage. It studies the role of the Solo Municipality in determining, planning and implementing priority programs in urban development. Reflecting its slogan 'the Solo the past is Solo the future' as well as the spirit to reaffirm the city as 'City of Culture', the city restored several historic urban space through revitalization program. This program not only consisted of physical rehabilitation, but also was related to crucial issues on social and economic improvement, like street vendor and community relocation along with traditional market revitalization. Sensitivity for local culture and cultural issues of the local authority has resulted a great success in restoring Solo's urban heritage that serves as valuable assets for tourism development. This paper concludes by addressing what has been done and what has not in the attempts of Solo to conduct 'balanced heritage management', where heritage conservation and tourism are mutually developed, that is conservation values are used as basis for sustainable tourism development. List of recommendations for the Municipality and other stakeholders will be provided at the end of the paper.

### Urban Heritage Preservation and Challenges

*Som Sangvasak (Battambang Municipality)*

Battambang City, Cambodia Battambang is the one of the oldest cities of Cambodia, which has been transferred from a small fishing village in 19th

century. When Thai returned Battambang back to Cambodia in 1907 after more than a century of its ruling, the French took over the position and immediately started to set up a first urban development plan for the city with a very robust and functional layout. The city has inherited a rich urban heritage with a great variety of fine architecture from different historic periods of the last 150 years, representing the diverse phases of the city's development. The city center is characterized by a coherent ensemble of about 800 heritage shophouses most of them from the French protectorate period and some from the independence time (1953-1970), which was the time that Modern Khmer Architecture movement was born with its distinguished and unique style. All over the city, the outstanding Khmer architectures, French -classical style villas and beautiful Khmer traditional wooden houses and Wats (monastery), representing the city's religious heritage, can be found. Different historical urban landscapes and their respective architectures contribute to the city's unique character and beauty. Unfortunately, in the last ten years of economic boom, rapid urbanization and modernization in Cambodia are increasingly creating pressure to utilize urban land for commercial purposes and investments. Land prices have by far outstripped the value of buildings and easily encourage heritage owners to sell their properties. State land with heritage buildings in prime locations is privatised and given to developers in exchange for new public facilities in more remote areas. Furthermore, small business and shop owners from urban core areas are increasingly modernizing their properties with inappropriate renovation which contributes a lot to the irreversible loss of substance and character of heritage districts. In conjunction with weak laws and poor development control in urban planning and construction, this leads to a mix of neglect, incompetence and unawareness in dealing with cultural heritage. With this concern and seeing the significance and values of these historical buildings, urgent measures are needed to stop the continuing loss of heritage substance through inadequate new construction and modernisation. The initiative on heritage conservation was launched in 2009 by the administration. The goal of the initiative is to preserve and safeguard the unique character and authenticity of the diverse built heritage of Battambang City. The paper will demonstrate the procedures, strategies and challenges in conserving the urban heritages under the high demand of modernisation and development. Sangvasak Som, Adviser of Municipal Master Plan Team.

### **Cultural Heritage and Sustainable Tourism Development of Mrauk-U, Myanmar**

*Zin Nwe Myint (Yangon University)*

Many recent studies point out the potential of tourism as an anti-poverty strategy. Over the last three decades, the growth of tourism had given opportunities for economic development of several Southeast Asian countries. Due to macro-economic significance of tourism in Southeast Asia, this industry has also played an important role. However, tourism can have negative impacts if it is not responsibly planned, managed and monitored. Endowed with many physical, historical and cultural resources, Myanmar has promoted tourism as a means for economic development especially after the introduction of market-oriented economy in 1989. Thus, 'Visit Myanmar Year 1996' was launched, and many laws and regulations have been enacted. Rich in historical and cultural heritage, Mrauk-U, an ancient capital of Rakhine, has high potentials for tourism development. To promote tourism, Mrauk-U came to be designated as a cultural heritage zone in 1996. However, arrival of tourists to Mrauk-U is still relatively few, with less than 2% of the total number of tourists visiting Myanmar. The main aim of this study is to seek the best way for Mrauk-U to be able to use tourism as an effective tool for economic development with least negative impacts. The objectives are: to find out the major problems that hinder tourism development of Mrauk-U, to examine the perceptions of the local residents, institutions and stakeholders related to tourism in Mrauk-U, and to suggest feasible means for sustainable tourism development of Mrauk-U. Rapid Appraisal method is mainly used in primary investigations. A questionnaire survey concerning the perceptions of various local residents on tourism business in Mrauk-U was conducted in June 2009. It is followed by series of interviews with all tourism related business personnel, authorities from government institutions and local handicraftsmen were undertaken. The interpretation of data is mainly qualitative and suggestions are given for community-based sustainable tourism development in Mrauk-U. Keywords: Mrauk-U, cultural heritage, tourism, poverty reduction

### **Urban Renewal Concepts for Yangon Downtown Living Heritage Area**

*Hlaing Maw Oo (DHSKD)*

With change in its political system from decentralization to democratization, Myanmar has become one of the last countries recently emerging on the world arena after several decades of isolation. While Myanmar is eager to accept

foreign investment to catch up in the development with the rest of the region, foreign investors are eager to tap into Myanmar's literally untapped resources including its diversified urban heritage. Yangon, the primate city, the previous capital of Myanmar and home to around 25% of its urban population, is rich in urban heritage both tangible and intangible. Its buzzing downtown, formed of six administrative townships around the ancient Sule Pagoda and lying along Yangon River, is one of the last still surviving old downtowns in the Southeast Asia. Its liveliness and diversity makes it one of the most attractive areas for both the local users as well as the tourists. However, with vulnerability and deterioration due to its age, new demands and needs of foreign investors, as well as of modern urban quality living and social wellbeing of the city dwelling population, its survival is under increasing threat. It is therefore, urgent to develop urban renewal strategy that is based on systematic understanding of the different time, heritage and generation layers of the downtown area as well as the needs and perceptions of the users. This study analyses the evolution and the morphology of Yangon downtown area from its history and in terms of the current state of built up area, clustering of different social and economic activities, the present and the potential users as well as underlying issues in an attempt to categorize it into different zones. The study further attempts to analyse the present role of the downtown area in the overall development of Yangon City. Based on that analysis and zonation, possible guidelines for sustainable urban renewal of differentiated zones are proposed to achieve sustainable urban renewal vital for long term conservation of this unique and intricate living organism under the pressing demands of the transformation.

## UDC 10-01 - Mega events, globalization and urban development 1

*Chair: Eva Kassens-Noor, Jan-Erik Steinkrüger*

### Connection and Exclusion: Event Space and Globalization

*Laura Huntoon (University of Arizona)*

Event space is created by cities to enhance and create connections between the host city and the global system of cities. International expositions, Olympic Games, and similar global events are useful organizing devices to assemble resources and create the political will needed to support the creation of event spaces that can serve a city over time. The city-management strategy is to use a focused period of effort to develop connections that will serve the city's development in the period after a mega-event. The mega-event with its connections and attendant infrastructure hopefully will advance a city's position in the global hierarchy, increasing regional income and prestige. The theoretical perspective of this paper is that mega-events, vehicles such as Olympic Games, International Expositions, or World Cup Games, operate in similar ways at the level of urban development, city branding, global profit, local economic development, and social change. In addition to categorizing outcomes of these events by event type this paper seeks to characterize the outcomes sought by cities by focusing on connections and infrastructure that tightens the links between a host city and the global economy. In particular, changes in a city's brand and policies directed toward place promotion and tourism promotion as well as urban redevelopment or regeneration from various types of mega-events can be argued to have similarities based on the longer-term effects of these events on urban regeneration. Urban redevelopment is somewhat enigmatic as it can be locally focused or can be globally focused. Perhaps because the Spanish regions view themselves as nations and desire to make a statement on a world stage, Spanish regional cities invest more significantly in mega-event spaces and public spaces than similar cities in other national contexts. In Spain, these event spaces represent one of the expressions of a shift to economic entrepreneurialism at sub-national scales as cities redevelop in pursuit of global competitiveness. This European form of the 'new regionalism' represents new identities using 'old' regionalist politics of culture and identity expressed through urban planning. Using case studies of two Spanish autonomous regions and their event space I explore how political regionalism and economic competitiveness create a form of regional entrepreneurship that advantages distinctive identities

promoted by events and unique practices. Planners guide this regional entrepreneurialism that responds to global and local imperatives, creating spaces that represent a symbolic and an actual landscape.

### Rio de Janeiro's Mega-Event Strategy and the Re-Ordering of Urban Space

*Gabriel Silvestre (UCL Bartlett School of Planning)*

In October 2009, the city of Rio de Janeiro was announced the host of the XXXI Olympic Games. The news came as surprise to many commentators which have previously placed the city as the underdog amidst more high-profile bids, but for those involved with the Brazilian bid the award was the culmination of a project initiated almost fifteen years ago. During this period Rio de Janeiro's mega-event strategy evolved through failed Olympic bids, the hosting of the Pan-American Games and the engagement with hosting experiences elsewhere, most noticeably that of Barcelona. However, despite the relational nature of the project a local perspective reveals how the strategy is part and parcel of a marked change in urban governance, expected to accelerate current processes of city-making. This presentation reviews the pre-award period in order to highlight the contested development of Rio de Janeiro's Olympic project and examine the transformation of the urban space ahead of the 2016 Games.

### Planning Mass Events: Management of Pilgrim Flows at the Hajj

*Sven Müller (University of Hamburg)*

There is a growing number of mass events throughout the world. At the same time these mass events get larger and larger. Typically examples for mass events are the FIFA world cup and the olympic games. The management - particularly in terms of security - of these events become more and more relevant: Crowd disasters as witnessed at the German Loveparade 2010 in the city of Duisburg or at the Great Pilgrimage to Makkah (aka hajj) force authorities towards a security based planning. With more than 3 million pilgrims the hajj is known as the largest pedestrian problem in the world (<http://www.trafficforum.ethz.ch/crowdturbulence/>). During hajj several rituals have to be performed by the pilgrims. One of the most dangerous ritual in terms of crowd disasters is the stoning of the jamarat at the jamarat bridge in the mena valley. In this contribution we propose a management approach based on a mathematical program in order to schedule and assign pilgrims to pre-defined routes. The schedule and the route plan yield a good balance of pilgrim



flows in space and time as shown by simulation and revealed data from several years.

### **Mega Events – the Promise and the Betrayal: FIFA 2010 in South Africa**

*Brij Maharaj (University of KwaZulu-Natal)*

The 2010 FIFA World Cup (FWC) extravaganza had been widely touted as a great African mega-event which, while located in South Africa, would bring economic and social benefits across the continent. The aim of this paper is to critically assess these claims. The key arguments of the paper are that: i) the African connection was mythical; ii) the benefits for poor and disadvantaged South Africans was exaggerated and at best ephemeral; iii) the bid process for 2010 was not transparent and the ruthless profit motive and political machinations of FIFA were ignored as it was subliminally presented as a philanthropic organisation; and iv) the billions spent on preparing for the 2010 FWC would have made a huge impact in addressing South Africa's social, welfare, health and education challenges.

## UDC 10-02 - Mega events, globalization and urban development 2

*Chair: Laura Huntoon, Mark Wilson*

### The Transport Legacy of the Summer Olympic Games

*Eva Kassens-Noor (Michigan State University)*

This paper analyzes transport legacies that remain in cities post-Olympics. Legacies in this paper are defined as infrastructural modifications catalyzed by the Olympic Games. Through in-depth interviews, document analysis, and archival reviews, the paper cross-compares the impacts the Olympics have had on transport by drawing on multiple Olympic hosts: Barcelona, Atlanta, Sydney, Athens, and London. Even though the host cities' transport systems were intrinsically different pre-Olympics, the author finds that similar features of the Olympic Transport System produced similar legacies. In explaining the creation of transport legacies through Olympically motivated drivers, the author suggests that the Olympic Games might trigger similar transport developments in future Olympic host cities.

### Bad Practice? How negative role models shape the planning of mega-events – the case of London Olympics 2012.

*Joachim Thiel (HafenCity Universität Hamburg), Gernot Grabher (HafenCity Universität Hamburg)*

Urban planners and political strategists, in the common perception, learn primarily from good examples. 'Best Practice', in fact, seems to constitute the chief learning paradigm for planning. This paradigm not only shapes the professional ethos of planners, but also major lines of planning-oriented research. However, a closer look at actual planning practices reveals that negative experiences from 'planning disasters' (Peter Hall) influence both urban development strategies as well as specific urban projects. The proposed paper presents findings from an in-depth case study of the planning and organization of the London Olympics 2012. This research explores the impact of positive and negative past experiences on the planning strategies and actual planning practices. It particularly focuses on the role of 'bad practice' both in similar major urban development projects in London as well as in previous host cities of Olympic Games. The proposed papers aims to answer two key questions: First, it asks from which negative experiences actors and organizations involved in the

planning process learn. In this context, the paper mainly addresses bad experiences gained with attempts to re-use the Olympic venues and infrastructures after the event. Second, it asks how actors and organizations actually learn that is through which channels and practices (e.g. consultants, recruitment of staff, policy travel, desk research) experience from the past is transferred into current planning and management action.

### Olympic dreams or nightmares? A comparative analysis of mega-events housing impacts.

*Luis Vasconcelos (University of Barcelona)*

Mega-events as a catalyst of urban transformation have been associated with driving urban change. The sporting mega-events act as a spotlight, highlighting political, economic and cultural benefits related to urban development. This paper aims to do a comparative critical analysis of the adverse social and spatial impact of mega-events on local residents and neighbourhoods. It examines the case studies of Barcelona as an Olympic city, the 2007 Pan-American Games, and the forthcoming 2014 FIFA World Cup and 2016 Olympic Games to be hosted by Rio de Janeiro in Brazil. In particular, it attempts to develop an evaluation framework to assess all potential housing impacts of the respective mega-events on the most vulnerable community segments of both Barcelona and Rio de Janeiro, and assess what they actually mean for the future of the cities and the role of mega-events in redeveloping urban space.

### Is a just urban development possible? The Biennale of Landscape Urbanism in Bat Yam.

*Efrat Eizenberg (The Technion)*

As elsewhere, also in Israeli cities, globalized techniques of urban regeneration took over. Among these techniques is the branding of the cities under a special theme such as 'children city' (in Holon) or 'Music City' (in Kafar Saba). As part of these branding efforts there is a more recent use of art and culture events as means to enhance the city's visibility, attract visitors to it, and set processes of development in motion. The Biennale of Landscape Urbanism in Bat Yam (a medium size city adjacent to Tel Aviv) will take place in October 2012 for the third time. This specific event is particularly interesting for the examination of urban regeneration through art events. As a Biennale of Landscape Urbanism this event focuses on the locale - the actual space of the city. The different projects are located in multiple urban sites and focus on Bat Yam's public space



- its usage, design, and interactions in it. In addition, the Biennale of Landscape Urbanism in Bat Yam includes many projects that focus on nature, parks, gardens and deal with semi-urban, non-urban, or anti-urban themes and objects. The exposure of local residents to these art projects and in many cases even their direct involvement with them are practically inevitable. This paper presents the Biennale of Landscape Urbanism in Bat Yam, Israel as a technique of urban regeneration that because of its special characteristics has the potential to set in motion urban redevelopment through the betterment of the local community.

## UDC 11-01 - Megacities: Informal dynamics of global change

*Chair: Frauke Kraas, Peter Herrle*

### Informal Dynamics in Global Value Chains - The Case of the Leather Industry in Dhaka/Bangladesh

*Joseph Strasser (Humboldt-Universität zu Berlin), Elmar Kulke (Humboldt-Universität zu Berlin)*

The Bangladeshi leather industry outshone by the giant textile and garment industry has long been paid little attention to by policy makers. Although being highlighted as a 'thrust sector', the fifth biggest export earning industry has been losing ground contributing now only less than 3 % to both the country's export revenues and its GDP. While the higher value-added leather goods and leather footwear subsectors record soaring export growth rates, structural problems weigh on the growth and competitiveness of the still labour intensive leather processing subsector. Notwithstanding the governmental discourse on backing the inefficient tanning industry, fiscal and economic policy efforts to increase higher value-added leather exports have been insufficient. Concomitant measures to support small and medium sized tanneries upgrade their production facilities have been neglected for too long. As a response to this entry barrier, informal arrangements and strategies have been established to keep outdated factories operating and catering to the export market. Yet low enforcement of environmental regulation and comparative advantages in labour costs have given the tanneries scope in the global market. If, however, urgent investments in production technology are further delayed, foreign markets such as the EU will put into effect the threat to increase non-tariff trade barriers. In contrast, international production networks have been shaping the dynamically growing leather manufacturing subsector. Small and medium leather goods and footwear producers often strongly depend on large local lead firms and only occasionally supply foreign buyers. Tight subcontracting schemes prevailing in the domestic market in some cases even link undercapitalized local producers to international markets without providing them direct access to these. Captive relationships between both foreign and local buyers and local suppliers appear to be a dominant feature of the leather value chain. Drawing on the Global Value Chain approach, this study examines the Bangladeshi leather industry for opportunities and drawbacks that are to feed into upgrading paths. In analysing power relations at the nodes emphasis has been given on buyer-supplier

relations dissociated from the traditional concept of a large multinational lead firm governing and exerting power throughout the chain. By taking qualitative semi-structured interviews with selected stakeholders along the leather value chain this study is to shed light on as to whether and to which extent informal arrangements and strategies are beneficial for producers connecting to the global market and dealing with power asymmetry. Focusing on informal negotiation processes and practices rather than on structures has been proven useful in understanding the informal dynamics of globally intertwined economic activities.

### Floating or settling down? Migrant workers and mega-urban development in the Pearl River Delta, China.

*Pamela Hartmann (University of Cologne), Sabine Beißwenger (Research institute for regional and urban development), Desheng Xue (Sun Yat-Sen University)*

The flexibility of China's migrant workers, i. e. their moving 'on demand' and their abundant availability as low cost labour in export-oriented manufacturing is a critical success factor of the Chinese economic growth. Despite the central importance of migrant workers in fuelling economic growth with their manpower, investors and local authorities shaped mega-urban development in the Pearl River Delta (PRD) while ignoring migrant workers as relevant actors. Until recently, the Chinese Government categorised migrant workers as rural population on a short-term working stay away from home. The case study area of Tangxia Town, a part of Dongguan, represents a typical pattern of Chinese mega-urban development. There, migrant workers' living and working conditions have been investigated in order to give an example of local development strategies under which workers take their migration decisions. By analysing own survey data of 566 migrant workers, it will be discussed which factors favour a return, what supports migrant workers' decision to stay and which migrant workers are most likely to settle down in the PRD. Building on this empirical evidence, this paper seeks to contribute to the most recent debate on the reform of the unique Chinese household registration system (hukou) and its implications for urban governance.

### Mapping multi-decadal growth of the Sao Paulo urban agglomeration

*Reinaldo Paul Pérez Machado (University of Sao Paulo), Christopher Small (Lamont Doherty Earth Observatory of Columbia University)*

The city of Sao Paulo has evolved from small town with about 20,000 inhabitants at the very end of the XIX century to one of the biggest metropolis of the world in less than 90 years. This explosive increase of population was very noticeably during the 70's of the XX century, when the city growth with a variety of economic uses that marked, and determined, the way it expanded its urbanized surface. Evidently, among the different uses that were given to the ground, most of the territory was covered by housing facilities, to give shelter to the exponentially increasing population. The fact is that it is very difficult to differentiate from aerial photographs or satellite imagery formal-non-precarious neighborhoods from informal and precarious settlements. Spatio-temporal change mapping with remotely sensed imagery has the potential to inform a wide variety of urban research and management questions. However, conventional classification methods used at scales compatible with the sensor spatial resolution have proven to be of limited utility in urban areas, due to the spectral heterogeneity of this complex environment, which commonly combines several different materials. Spectral mixture models, on the other hand, may provide a physically based solution to the urban spectral heterogeneity issue, especially because it is possible to reduce the dimensionality of the multispectral reflectance by converting it to fractions of land cover components, thus facilitating the interpretation. The purpose of this study is to analyze the most outstanding changes occurred on the city of Sao Paulo (considering its urban agglomeration) using multi-temporal spectral mixture analysis of Landsat imagery. The analysis was based on a three component linear mixture model incorporating substrate, vegetation and dark targets, directly used for visualization on false color composites of red, green & blue respectively. Winter and summer image pairs, were selected for quality and consistency of solar illumination for two time intervals: 1986-2005 and 2000-2010. Results so far indicate an amount of change of 688.5 Km<sup>2</sup> (3.27 %) for the 1986-2005 and 708.4 Km<sup>2</sup> (3.37 %) for the 2000-2010 periods, regarding the quantity of changed surface that altered its fraction predominance from vegetation into substrate. The amount of 3.3 % calculated for both time intervals is only detectable above a given threshold. There should be certainly more changes that aren't resolvable by the satellite or they lay near the detection limit. Changes in fraction mixtures and texture also highlight high rise construction as well as vegetation abundance. A peculiarity of the increase in shadow on several parts

of the city points to the increment of the verticalization process on these areas. The phenomena appear with more intensity on the longer time span considered (1986-2005). A quantitative and visual analysis of these changes at different spatial scales is presented.

### Growing Pains: Shepherding Mega Cebu through informal civil society-private sector-government arrangements

*Evelyn Nacario Castro (Ramon Aboitiz Foundation Inc.), Lorna Manila (National Economic & Development Authority Region 7)*

Growing Pains: Shepherding Mega Cebu through informal civil society-private sector? government arrangements. The current development turmoil in Cebu, Philippines is only symptomatic and indicative of a larger deficiency. Attendant to metropolitan Cebu's increasing population and urbanization are worsening problems related to pollution, water supply, flooding, traffic and transport, peace and order, informal settlements, health and security, and inadequacy of basic infrastructure - all affecting the productivity of public and private sectors, welfare and prosperity of people and communities, and sustainability of the environment. One of the main causes of inadequate and ineffective delivery of basic services is the absence of an institutional mechanism: policy and structure to oversee and coordinate trans-boundary inter-local planning, implementation, and monitoring of metro-wide programs and projects. In 2011, local chief executives of local government units, directors of national government agencies, and leaders of civil society and private sector organizations have recognized the importance of inter-local public and private sector collaboration - with the aim of jointly assessing and addressing common trans-boundary issues and challenges. Through a Memorandum of Agreement, they agreed to band together, cooperate and work with each other under a mutually agreed structure, the Metro Cebu Development Coordinating Board (MCDCB) as the coordinating body for the development of area. Metropolitan Cebu covers 13 cities and municipalities located in eastern Cebu, Philippines namely: the cities of Cebu, Carcar, Lapu-Lapu, Mandaue, Naga, Talisay, Danao, and the municipalities of Compostela, Consolacion, Cordova, Minglanilla, Lilo-an, San Fernando. The MCDCB, while only a collegial and voluntary coordinating mechanism, acknowledges the value of a comprehensive and integrated metro-wide plan for a growing metropolis and thus intends to undertake urban development planning to address problems related to land use and urban development, transport and traffic, infrastructure and utilities, public safety and security, environment and health, and, subsequently facilitate sustainable, equitable, and





inclusive social and economic development in the city-region. To facilitate its work, ensure coordination, and synchronization of LGU plans and programs - the ownership of the city-region concept, the active participation and support of all LGUs, the support from regional and national government, and the establishment of a stronger and formal institutional and policy framework are crucial. It would be worthwhile to note that, at this stage, full buy in and ownership of this Mega Cebu framework and process, particularly from local government units, is still currently being obtained - while the issues and challenges facing metropolitan Cebu has compounded with the mounting threats and increasing impacts of a changing climate.

## UDC 12-01 - Megacity research for government action

*Chair: Eckart Ehlers, Andrea Koch-Kraft*

### A comparative study of Southeast Asian and Japanese Megacities with a focus on urban areas

*Masato Ikuta (Ritsumeikan University)*

In consideration of future metropolitan policy across East Asia, we compared six metropolises, Jakarta, Manila, Singapore, Kuala Lumpur, Bangkok, and Ho Chi Minh City, in Southeast Asia, and two in Japan, Tokyo and Osaka. Both similarities and differences exist between current Southeast Asian and Japanese metropolitan areas. For example, the manufacturing industry has been vital for growth in both regions. Clear differences, however, can be found between Japan and Southeast Asia. In Tokyo and Osaka, the leading industries for continuing sustainable growth cannot be clearly indentified, despite the growth of research and development within the local manufacturing sector. Land use patterns also have similarities between the two regions. Western geographers have expressed a Southeast Asian metropolis as an Extended Metropolitan Region or Desa-kota model in comparison with western cities. Japanese metropolitan regions have densely populated suburban areas with wet rice cultivation, the same as in Southeast Asian metropolitan regions, and industrial plants and other urban facilities are often also located in these areas. In both regions, metropolitan development is controlled and led by the state and the central government. When assessing the urban geography of megacities, it is important to identify whether urban functions are built mainly by the public sector or by private enterprise. In Jakarta and Manila, the largest metropolises in Southeast Asia, conglomerates have played crucial roles in shaping the urban landscape, not only through industrial estates, shopping centers, and housing units, but also through various basic infrastructures. Bangkok and Ho Chi Minh City, medium scale metropolises, are the growth poles in the Greater Mekong Subregion, which is changing rapidly and includes the southern interior part of China. In Bangkok, urban planning was ineffectual until the 1990s, while Ho Chi Minh City has been changed dramatically in response to the introduction of market economies. In Kuala Lumpur and Singapore, small scale metropolises, public sectors have had a strong influence in shaping their urban areas. In particular, state and public corporations have played a crucial role. The metropolitan areas of Tokyo and Osaka were shaped mainly by private enterprises, similar to the cases of Jakarta and Manila. In contrast, public

sectors which had administratively matured tried to control expansion of the urban areas during the period of high economic growth in Japan, 1955 to 1974. Taken together, the metropolises of Southeast Asian nations are controlled more tightly by the central government than those in Japan. Regardless of the situation, we should consider creating a mechanism for systematically sharing the development experience of each metropolis.

### From understanding to implementation: Meeting Ho Chi Minh City's needs for improving climate adaptation and energy efficiency

*Harry Storch (Brandenburg University), Frank Schwartz (Brandenburg University)*

Our urban risk assessment highlights that for exposure to climate-related impacts, rapid urbanisation driven by socioeconomic development is proportionately more crucial for emerging deltaic Asian megacities, like HCMC, than projected extreme climate changes up to the year 2100. From the implementation of the land-use plan up to 2030, the total estimated exposure to flood risk of built-up areas results chiefly from planned urban expansion into low-lying areas, which are widely known as flood-prone at the current max-tide. Traditionally only snapshots of the current urban situations have been partially integrated into impact assessments, resulting often for highly dynamic urban regions in an overestimation of climate change as a stressor of risk. Our study highlights, that the influence of non-climatic stressors - like urbanisation as the spatial manifestation of socio-economic processes - is still widely under acknowledged. As a main result, urban adaptation measures that provide benefits under current climate and a range of future climate change conditions are reliable starting points for addressing projected urban risks related to exposure, vulnerability, and climate impacts. Many of these low-regrets strategies are incorporated with other urban development goals, such as improvements in livelihoods, well-being, and environmental enhancement and so reduce the risk and scope for costly mal-adaptation. The implementation of measures in adapting the city is however still inadequate. This gap between awareness and action leads to the conclusion that HCMC faces not only a lack of reliable information but also a lack of effective planning instruments and limitations in its institutional setting. In order to mainstream climate change responses into the urban planning system and to improve response capacity, the project applies a dual strategy. The top-down oriented regulatory approach is applied firstly in response to a lack of regulation regarding environmental policy and climate change responses in the planning sector. In order to fill this

gap, 'Guidelines for Energy Efficiency and Climate Adaption' are developed. Based upon an analysis of the formal planning system, opportunities for their legal integration are identified, and their implementation pursued. The implementation of guidelines is assisting the mainstreaming of climate change responses across levels and localities. It does not ensure, however, their effective application on the local level. This top-down approach is complemented by a bottom-up strategy. Here a diverse approach including a 'Community Based Adaptation Scheme' and the elaboration of a research-based practical guide - 'Handbook for Green Housing' - that shows how energy-saving and mitigation can be integrated in the Vietnamese housing production are developed.

### **Adaptation to climate change in Santiago de Chile – hazard exposure and participation**

*Kerstin Krellenberg (Helmholtz Centre for Environmental Research - UFZ),  
Juliane Welz (Helmholtz Centre for Environmental Research - UFZ), Anke  
Schwarz (Helmholtz Centre for Environmental Research - UFZ)*

In the framework of the international research project ClimateAdaptationSantiago (CAS) a climate adaptation strategy is currently being developed. This contribution shows the results that have been achieved within the science-policy approach and discusses opportunities as well as obstacles that this approach evolves focusing on social and physical exposure to flood and heat hazard in the Metropolitan Region of Santiago de Chile. It builds on scientific results regarding hazard exposure in combination with socioeconomic population data and includes irreplaceable practical knowledge from local stakeholders from different administrative levels. The results show that hazard exposure is not distributed uniformly: Whereas people with lower socioeconomic status are more likely to be heat exposed, higher status groups are more exposed to flood. Accordingly, different locations within the city call for specific adaptation measures. Some recommendations that have been discussed with local stakeholders within a broad participatory process are presented and discussed.

### **In the absence of statutory planning – planning on the ground**

*Wolfgang Scholz (TU Dortmund)*

In Sub-Saharan Africa urbanization is progressing at a rate unprecedented in human history. In most countries, the state is not in a position to apply a

responsive legal framework and to mobilize adequate resources to guide urbanization. A major obstacle are the outdated legal framework and the inappropriate planning concepts inherited from colonial governments which often contradict post colonial policies and are unsuitable to respond to rapid urban growth. The chronic underperformance of the public sector vis-à-vis rapid urban growth caused a large cumulative backlog in the provision of building land and basic services. In addition, uncontrolled informal urbanization has often caused dysfunctional settlement lay-outs and urban structures. In Dar es Salaam, Tanzania, informal settlements cover now more than 70% of the city areas because the statutory system cannot provide sufficient building land and settlers have to find plots on the informal land market. It shows the need for a new approach to statutory planning in order to guide urban development effectively, to create more functional settlements, to assist the urban poor to access affordable plots with basic services, and to release financial assets for the urban economy. The paper will present results of a joint research analyzing empirically factors that determine space standards and land use in prevalent types of formally planned and informal settlements in Dar es Salaam. Goal is to identify parameters to ascertain the long-term suitability of settlements, understood as being functional and flexible to respond to future demands reflecting from socio-economic development. The research reveals that today there is not much difference between planned and unplanned settlements in regards to land use changes, land use conflicts and violation of planning regulations and procedures. More important are therefore negotiation procedures on the local level to replace the statutory system and to find solutions on the ground. The paper will present potentials but also limitation of this approach. At the centre of the research are the livelihood strategies of the residents. The overall aim is to evolve a responsive framework for statutory planning including spatial standards for settlements that reflect the current reality of urbanization under poverty while addressing future needs. Main actors will be local leaders and the community to ensure sustainable planning. Joint research project together with Prof. Dr. Sabine Baumgart, Faculty of Spatial Planning, TU Dortmund and Prof. Dr. Wilbard Kombe, Ardhi University, Dar es Salaam, Tanzania

## UDC 12-02 - Middle East-North Africa (mega)urbanization processes (MENA region)

*Chair: Eckart Ehlers, Andrea Koch-Kraft*

### Architectural Energy Efficiency for Megacities

*Farshad Nasrollahi (TU Berlin)*

The available technologies for saving energy in buildings as well as for active use of renewable energies have made it possible not only to have zero-energy buildings, but also to build plus-energy buildings. But for production of these materials and technologies, a great amount of resources are consumed and a high amount of CO<sub>2</sub> is emitted. Therefore only the amount of energy consumption of buildings is not a suitable indicator even for decision about the ecologic aspect of sustainability. From the economic point of view, the investment costs of some energy efficient buildings are sometimes so high, that the payback time of the investment is very long. Therefore constructional and technological methods of energy efficiency must not be considered as the main and the sole methods of energy efficiency. However, available technologies and building materials must also be utilized for improvement of energy performance of buildings. It must be attached more importance to cost-neutral and more ecologic methods of energy efficiency. One of these methods is architectural energy efficiency. It deals with the optimization of architectural design of buildings in order to improve the energy performance. This method of energy efficiency minimizes the resource demand as well as CO<sub>2</sub> production. Architectural design is a very effective method towards an integrated, cost-efficient energy concept. Factors like orientation, building form, zoning of functions, opening ratio in different orientations, sun shading etc. exceedingly affect the energy consumption of buildings. In this research, the effect of architectural design and architectural factors on energy consumption of office buildings in the climate of Hashtgerd New Town is studied. The result of this research is implemented in the architectural design of an office building, which is designed as a pilot project within the Young Cities Research Project. The energy consumption of this office building is decreased about 40% compared to available office buildings under the same conditions and with the same constructional materials. It shows that it is possible to save a high amount of energy in office buildings solely through optimization of architectural design and without needing any further material or technologies. By increasing the thermal resistance of the building envelope, the energy demand will decrease much

more. For example the sum of heating and cooling energy demand of New Generation Office Building is 57kWh/m<sup>2</sup>a, which is about 85% less than average energy demand of buildings in Iran. Based on the estimated primary energy factors in Iran the primary energy factor of this building for heating and cooling is 140kWh/m<sup>2</sup>a. The CO<sub>2</sub> production of this building is 196 ton per year, which is very less than other office buildings in Iran. The energy demand of this pilot project is even less than energy efficiency class "A" as the most efficient class in Iran.

### Procreation of Environmental-Cultural Sustainability in the megacities of MENA cities

*Somaiyeh Falahat, Mohammadreza Shirazi*

Modernization and industrialization's large number of negative urban impacts on the Iranian cities becomes markedly critical and crucial in the case of the megacity of Tehran due to its current social and environmental problems. On one hand, pollution, high energy-consumption, lack of green space and water supply, and natural hazards make the city environmentally unsustainable. On the other, the lack of social cohesion and justice, unequal access to urban facilities particularly for disabled people, the social polarisation and the lack of respect to cultural and ethnical diversities make the city socially unsustainable. This matter makes achieving environmental and cultural sustainability one of the essential demands of the city, whereas achieving sustainability has not been yet integrated seriously in the urban policies of the city. Also the rupture between old and new built environment in the Middle Eastern cities, as the result of industrialization, modernization, and globalization, makes bridging the past and the future an ongoing discussion and necessitates paying attention to the cultural context in new designs. This paper assumes that the typomorphological approach can link environmental and sociocultural requirements by studying the various existent urban typologies, and can be related to a medium urban scale, between the building and the city. The goal is achieving a number of optimum urban typologies at micro-urban scale in a warm semi-arid climate by studying three-dimensional form of different compositions of voids-solids in urban textures of megacities.

### **New Generation Pilot Project – Finding and Realizing Transferable Technology and Materials, a Common Target of TU-Berlin and BHRC Iran**

*Effatolsadat Shahriari (ETH), Klaus Rückert (TU Berlin)*

Iranian traditional architecture, whilst always in harmony with nature, has been using available eco-friendly local energy and low-energy-consumption constructions. Following this principle, and paying attention to the location and specific climate zone, New Generation Residential Pilot Project is trying to utilize appropriate methodology. In this way it can maximize inner space comfort without jeopardizing the environment; at the same time utilizing maximum renewable energy, providing higher flexibility and optimal use of land. Consideration of house as a residence and a place of comfort - whereas sustainability, energy efficiency and cost efficiency are the main Characteristics- is one of the most basic objectives of project, a place that can meet various cultural, social, environmental, economical and political aspects of the concept of habitation. Despite the current definition of habitation within Iranian society, - and considering cultural, social and also environmental and ecological standards - from the qualitative point of view - the main effort of project has been to achieve a relatively all-encompassing definition of residential architecture based on Iranian ideals and values. This portrays the state of nature, architecture, man, and his primary needs for habitation as an integral part of nature. Considering cultural, social, ecological and especially economical specifications of Iranian society - from the quantitative point of view we have three other crucial factors: Social - environmental potential and limitations considering target and potential groups. Topographical background of the 35 ha. Site. Technical potentials and limitation. The project has concentrated not only on the apartment but also on blocks and the sub-neighborhood as well. As mentioned before main project concept is the development of energy efficient low density buildings with a reduced building height that reflects the regulation set by master plan of 35 ha area, that is, energy efficiency, earthquake protection in the frame of maximal three stories building to keep the natural profile of area. Through the development of a energy awareness design and construction in one hand and modular system that attempts to allow flexible configuration to create multiple unique apartment buildings, the project aims to address the solutions that are contrasting widespread mass building construction, that are, large anonymous residential blocks, without paying attention to the globally important issues such as: reducing energy consumption, introducing renewable energy sources,

innovative solutions for saving energy, efficient construction techniques and affordable technology.

### **Evaluation of the Effect of Landscape Parameters on Outdoor Thermal Comfort in Young Cities**

*Alireza Monam (TU Berlin), S. Neda Ghazizadeh (TU Berlin)*

According to the nature of open public space, it is involved a huge part of urban activities. One of the most important principles in designing is considering thermal comfort in order to improve the quality of space and increase user's satisfaction. Thermal comfort in outdoor settings is a topic that, until recently, has received little research attentions. Most of the researches concern thermal comfort focusing indoor spaces. This research proposes to investigate aspects of landscape architecture, which could contribute to improve outdoor human thermal comfort using landscape design elements. The present work was primarily motivated by the will to link the theoretical knowledge on Outdoor thermal comfort and the practical landscape design process in young cities. The core of the proposed research consisted of the findings relate to meteorological and geographical parameters and human comfort outdoors. This study sought to contribute towards a deeper understanding of the thermal sensation in urban open spaces. The proposed methodology can be divided into four stages: In the first stage, a review of literature relevant to urban climate and outdoor thermal comfort were applied. In addition, Area of Study and structure of the computerized model were described. At the second part of the research, outdoor thermal comfort was simulated by numerical method and measured by instruments. The model took into account the physical processes between the atmosphere, ground, buildings and vegetation, afterward simulates and measures the climate within a chosen urban open space. Then the relationship between architectural feature and outdoor thermal comfort was evaluated. At the end, the guidelines for improving outdoor thermal comfort were suggested. The focus was put on the applicability of the results. In this study, a microscale climate analysis conducted using the software ENVI-met 4 to examine the effects of various meteorological and geographical parameters on outdoor human thermal comfort. The study was focused on a part of open space in the 35 hectare of new Hashtgerd city in Iran.

## UDC 13-01 - Migration trends of the baby boomer generation.

*Chair: Caroline Kramer, Carmella Pfaffenbach*

### European Retirement Migration to Spain – Impacts, Dynamics and Characteristics

*Vicente Rodriguez (CCHS-CSIC), Heiko Haas (CCHS-CSIC), Stefan Kordel (University of Erlangen-Nuremberg), Raúl Lardies (University of Zaragoza), María Casado-Díaz (University of the West of England), Michael Janoschka (Autonomous University of Madrid), Rafael Durán (University of Málaga)*

When analyzing the international retirement migration in Europe, Spain stands as the prime destination for individuals, who like to relocate either permanently or temporarily there, particularly to Spanish coastal areas. In a general view, those moving Spain are shaping a relatively small group, but their influence is locally important as movers are carrying some selective features regarding their demographic situations, financial resources, life expectancy or family and social patterns of behaviour. In fact, they are searching for sun and self-realization after finishing their professional lives as it is assessed in varied research projects and papers. To a fully knowledge, a representative, large scale research project called MIRES (Migración Internacional de Retirados a España), run by the Spanish National Research Council and several other universities, started investigating the multiple facets of European retirement migration to Spain. The research was conducted in the most important regions of retirement migration in Spain by means of a standardised questionnaire and qualitative interviews, addressed to European retirees, aged above 50 years. Interdisciplinary and multi-thematic in its scope, the MIRES research project searches a set of outstanding aspects, such as mobility patterns, transnational behaviours, identity, integration, social and political participation and the use of public goods and services of retired European residents. Relying on other individual socio-demographic data, such as age, household size and composition, educational attainment, income or countries of origin, the study provides details about characteristics, impacts and dynamics of a large-scale social phenomenon. First, the existence of both, permanent and temporary residents can be regarded as a distinctive model of mobility between the countries of origin and Spain. Apart from focussing on transnational links, such as the meaning of keeping housing property in the countries of origin, we explicitly examine the link between retirement migration and tourism and impacts on social behaviour. A

further aspect we take into consideration within this context is, whether Spanish public authorities are aware of migrants' mobility and able to respond to their needs. Taking this into account, we also examine further, mainly informal strategies for individually perceived difficulties in Spain, like problems concerning legal acts or public health services. Second, we examine attachment to place in a transnational setting by analyzing satisfaction with daily life in general as well as concrete aspects like lifestyle, language skills, neighbourhood or social interactions to the Spanish population and among other residents through participation in associations and social engagement towards fellows. Another aspect, we focus on within this context encompasses socio-political involvement and European citizenship in the light of identity and belonging.

### Retirement Migration of the Baby Boomers in Australia: Beach, Bush or Busted?

*Nikola Sander (Wittgenstein Centre)*

In the twenty-first century, Australia, like most other countries of the world, will experience an unprecedented rate of population ageing, due to declining fertility and increasing longevity. Knowledge of where the growing elderly population will live in the future is vital for the development of strategies to ensure the timely provision of adequate health, housing, welfare and aged care services. Migration of the baby boomer generation, as its members transition into retirement, will play a major role in shaping the age structure of Australia's regions.

Focussing particularly on internal retirement migration, this paper presents population projections for 23 regions of Australia to 2036, by which time most boomers will have retired. We use 2006 Census data in a multiregional cohort-component projection model to explore alternative future migration trajectories of this large generation based on a set of empirically-based scenarios. We hypothesize that three fundamental issues will shape the intensity and spatial patterns of retirement migration over the period 2006 to 2036: the distinctive behaviour of the baby boomers; the changing nature of the retirement transition; and the destination choices of retirees. The results show that changes in the intensity of retirement migration and shifts in retirement age are likely to have little impact on regional population age structures, but changes in the spatial patterns of retirement migration could significantly reshape the pace of population ageing in key destinations.

### Does second home ownership trigger migration in later life?

*Emma Lundholm (Centre for Population Studies), Roger Marjavaara (Department of Geography and Economic History)*

While most rural and peripheral areas in western societies are suffering from depopulation due to out-migration and an unfavourable population structure, there is in many cases a positive net flow of later life migrants to rural areas. There are, however, regional differences as not all areas are equally attractive. In general, amenity rich locations tend to attract both permanent and temporary residents in older age groups. For rural and amenity rich areas, people born there or with other links to the place are more likely to move in compared to others. One important link to rural areas is second home ownership and this group is hence also potential permanent residents. The relation between temporary and permanent migration among elderly is disputed. One hypothesis is that temporary mobility substitute permanent mobility; once retired you can spend more time in a second home without having to change the permanent residence. On the other hand, it could also be hypothesised that access to a second home triggers migration; ownership of a second home nurture place attachment to that location, which might lead to migration. In Sweden, second-home ownership is frequent, especially among older age groups. Most common is second homes located in the vicinity of urban areas, close to the owner's permanent home, while other second homes are typically located in amenity rich rural areas. Second homes might also be a way to keep the links to the place of origin by keeping a property in place of birth. The generation now approaching retirement in Sweden is to a large extent an urbanisation generation, where many moved from rural areas to urban areas in the 60s and 70s, thereby constituting a potential for return migration into rural regions struck by out-migration for decades. The aim of this paper is to analyse later life migration in Sweden to explore how ownership of a second home affects migration in the age group 50+. The empirical study also explore if there is evidence of a stronger migration trigger if the location of the second home is also the place of birth. The study is based on Swedish register data and include all Swedes in the age 50+ and their mobility in the time period 2004-2008. The data also include place of birth and ownership of properties, both permanent and second homes.

### Aging Baby Boomers In Germany – Migration Biographies and Residence Choices for Retirement

*Natalia Zenk (RWTH Aachen), Melanie Kappler (Karlsruhe Institut for Technology)*

The population development in Germany is characterized by the current demographic change and hence the German society has to face the task of dealing with its consequences. Increasing amounts of elderly persons are one facet of this change that concerns the academic discussion in the social sciences, demography and geography. In the coming years, the German baby boomer generation will reach retirement age. Due to the social change in the German post-war era, it is assumed that this generation - the future retirees - will live differently in comparison to the senior citizens of today. As a result of increasing life expectancy, retirement is becoming a self-contained stage in which later-life migration could take place. Biographical approaches in migration research describe the transition to retirement as a period of increased migration likelihood as the former fixed local workplace has lost its relevance. The current academic discussion in Germany focuses retirement migration mainly concerning the returning of this cohort to core cities, after they have left them in their family expansion phase in the 1960ies and 1970ies towards suburbia. Another aspect often mentioned is the (temporary) move to popular tourist regions in sense of an amenity migration. In contrast, recent studies point out the trend of the German future retirees towards constancy and therefore the tendency to maintain their current residences. Our talk focuses the migration biographies of the baby boomers under a life cycle perspective and links them to their desired living arrangement for retirement. Migration biographies in this case seem to be important regarding future migration acts or persistence. Long-term stability has a negative influence on mobility whereas former successful moves can encourage changes in the living arrangement of the future retirees. But the link between migration events in early and late ages is still not satisfactorily answered yet. The residence history analysis is undertaken by a combined methodological approach. In a quantitative data evaluation, migration patterns of nearly 2900 baby boomers (born 1948-1957) in selected German cities are being examined. The qualitative analysis is based on 70 qualitative interviews with persons of the same population group. The findings of the study show that only 8% of the respondents have plans to relocate their residence after retirement. Furthermore most of them would like to move only within short distances. Their preferred residential location for the future often lies in the same part of the town with the advantage of keeping the daily scope. An analysis of the migration biographies concerning social structure, lifestyles and spatial



differences will be followed by a typing of migration patterns. These in turn are related to the desired living arrangements and future residences which should target the research desideratum of the link between former and future migration.



## UDC 14-01 - Multi-local living arrangements on national, inter- and transnational levels: A new old phenomenon?

*Chair: Caroline Kramer, Gerald Wood*

### Holiday homes and multi-local living arrangements amongst urban élites: remaking an old tradition. The example of Naples

*Thomas Pfirsch (University of Valenciennes)*

Holiday homes and leisure-based multilocality are now widespread in European societies. But they still display marked peculiarities amongst the old urban bourgeoisie, where people often own several holiday homes and where multilocality is a long-standing tradition based on prestigious inherited family homes. This élite multilocality was initially founded on the leisurely pastimes of a life of ease, on unequal inheritance traditions, and on long out of town holidays that could last for several months. Recently, however, it has had to adapt to the rise of wage earning amongst the upper classes, a new leisure culture based on short holidays, and profound changes in family structures. Taking the example of Naples, this article analyses the evolution of holiday practices amongst the old urban bourgeoisie during the twentieth century, and the role that holiday homes play today in its living arrangements. It demonstrates that by reorganising the spatial uses and symbolic functions of their properties, traditional urban élites have been able to structure 'multilocal holiday systems' that have remained relatively stable over generations, and where the difference between 'main' and 'second' homes has never been clear. Using life stories, the residential careers and holiday practices of 50 kin groups from the Neapolitan nobility and bourgeoisie, spanning four generations from the end of the nineteenth century to the present, have been reconstructed. Individuals' residential mobilities can thus be compared to those of their relatives from a geohistorical and intergenerational perspective, within a framework of 'family residential systems'. The Neapolitan context is interesting since the nobility and the old propertied bourgeoisie are still relevant in the city élite. In fact, before Italian unification in 1861, the city was an important capital which attracted all the Mezzogiorno élite and landowners. These old families managed to structure long term multilocal systems based on four kinds of places: neapolitan palazzi, family homes located in their Italian or European regions of origin, suburban country houses, and high society seaside resorts in the Gulf of Naples? But since the 1960s, faced with the city's decay and its own declining fortunes - which instigated mass emigration to northern Italy and Europe amongst its members - and confronted by profound changes in

family practices, the Neapolitan bourgeoisie had to reshape its residential systems. The focus of its holidays was shifted from the interior Mezzogiorno to the city's neighbouring seaside resorts. Despite still relying on traditional inherited properties, the multilocal system was reorganised, within a context of property division, to suit all year round short stays, turn-taking arrangements among relatives, or international family gatherings.

### Infranationale und transnationale Multilokalität: Ein empirischer Vergleich der Profile auf Basis einer französischen großen Befragung/ When age makes multilocal. Some results about the emerging multi-residentiality of young adults in Switzerland

*Cédric Duchêne-Lacroix (Universität Basel)*

The last months triggered uncertainty in Switzerland: Swiss voters decided to limit the construction of second homes. Some villages located in alpine resorts count today far more "cold beds" (not inhabited second homes) as principal residences. The controversy has given the image of old or foreign people who monopolize the local habitat just to live for a few weeks per year. But who know that they are more second homes in swiss urban areas? And who knows that second home dwellers are not just people between 50 and 65 years old, but also young adults. We could intuitive profile them: Students living partly in a sharing accommodation and partly by their parents. Is it really the case? Based on the swiss microcensus mobility and transport and the Panel Tree the proposed paper will show some key figures on second home in Switzerland and will focus on age effects of the multiresidentiality.

### Multi-local dwellings of European Retirees in Spain – strategies of mobility and impacts on destinations

*Vicente Rodriguez (CCHS-CSIC), Heiko Haas (CCHS-CSIC), Stefan Kordel (University of Erlangen-Nuremberg), Michael Janoschka (Autonomous University of Madrid), Joaquín Rodes (Catholic University of Murcia), Rafael Durán (University of Málaga), Mayte Echezarreta (Facultad de Derecho)*

Against the background of a growing mobility of people, relocating from northern or central parts of Europe to Spain either permanently or temporarily can be regarded as a privileged form of leisure and lifestyle orientated mobility. Fulfilling their aspirations and expectations, Spain has evolved as the prime destination for individuals reorganizing their daily lives in retirement age by means of keeping up multi-local dwellings both in their countries of origin and in particularly Spanish

coastal areas. In 2008 the Spanish National Research Council (Consejo Superior de Investigaciones Científicas) started a representative, large scale, multi-method research project called MIRES (Migración Internacional de Retirados a España) investigating the multiple facets of European retirement migration to Spain. The research was conducted in the most important regions of retirement migration in Spain by means of a standardised questionnaire and qualitative interviews. Interdisciplinary and multi-thematic in its scope, the MIRES research project approaches both to socio-statistical data (age, income, previous working life, countries of origin etc.) and to other aspects such as mobility patterns, political participation, identity, transnational strategies and the use of public goods and services residents, to provide details about the impacts and the most recent developments of the transnational daily lives of the European retired in Spain. We explicitly focus on patterns of travelling to or receiving visits from their countries of origin as well as means of communication. Apart from transnational relationships, some individuals also maintain property in their countries of origin which may encourage the decision for returning in the light of aging. In this context, we also reveal factors of satisfaction with concrete aspects of daily life, such as language skills, neighbourhood or social interactions among European nationals (intra- and inter- relations) and with the Spanish population occurring, for instance, through joining associations or forms of social involvement. Finally, impacts on destinations, affected by leisure and lifestyle-orientated mobilities should be revealed. Considering individuals' identity and belonging, we examine strategies of registering in municipalities, as essential strategy for planning and organising public services like healthcare or infrastructure. In the light of the right of free movement within the European Union as well as the right to vote on a local scale, we finally focus on both formal and informal political involvement of EU residents in Spain. By means of the representative and large scale study, we are able to make differentiated statements due to characteristics of that privileged form of mobility as well as impacts on destinations in Spain that may even become more important with a growing amount of baby-boomers entering retirement age.

### **Multi-local lives of transnational retirement migrants: From voluntary to vulnerable?**

*Claudia Kaiser (BAGSO - Federal Association of Senior Citizens' Organisations)*

International retirement migration to places with climate benefits and attractive landscapes is a growing phenomenon of the ageing populations of industrialized countries. Many retirement migrants use their new homes only seasonally and

travel between two or more homes across borders. In many cases, the decision in favour of a transnational multi-local life has been guided by experiences as tourists and by the desires and requirements of younger stages of old age. But what consequences does a mobile life-style have for the retirement migrants' experiences when becoming older? What kind of potentials and risks do they face as transnational migrants when facing age-related problems? This paper will investigate multi-local retirement migration in a transnational perspective by focussing on the individual and collective networks and social spaces encompassing both the origin and destination countries. With the example of elderly German migrants in Spain, the paper will focus on the consequences of transnational living arrangements with a closer look at the migrants' different eligibility to health care and long-term care entitlements both in Germany and in Spain and at the dynamic development of ethnic economies in the health care and long-term care sector which try to meet the specific needs of multi-local older migrants. (Cf.: Kaiser, Claudia (2011), *Transnationale Altersmigration in Europa. Sozialgeographische und gerontologische Perspektiven*. Wiesbaden: VS Verlag.)

## UDC 15-01 - Naturbanisation: Urbanisation in nature and environment conflicts 1

*Chair: María-José Prados, Julia Lourenço*

### Urbanisation in coastal nature, water management conflicts, and biodiversity impacts in Spain

*Angela Hof (Ruhr Universität Bochum)*

The new concept 'naturbanisation' which focuses on the challenges of residential demand in highly valued natural areas, such as national parks, shares conceptual approaches with research on environmental impacts and conflicts associated with new urban models and coastal urbanisation in the Mediterranean and Spain in particular. Here, the development of the real estate market, international capital flows, economics, institutions and policies in conjunction with tourism development and more specifically, tourist specialization, are the main drivers of urbanisation in coastal areas. Development pressure has come from changing urban lifestyles and people who seek a vacation home in rural landscapes that epitomise the aesthetical value of unspoilt coastlines, agricultural, and semi natural landscapes. The development of second homes and an increasing preference for suburban environments have resulted in the spread of more disperse land use patterns with significant impacts on land and water resources. To the extent that low density urban areas are gaining ground, a substantial increase in water consumption for outdoor uses is expected. This urban sprawl and the transformation and artificialization of the landscape is not without potentially positive effects such 'novel urban ecosystems' may have on biodiversity and which are increasingly coming into the focus of urban ecology. The presentation focuses on the environmental impacts in terms of water demand to sustain these new urban landscapes. In turn, the impact on biodiversity is discussed both in terms of habitat loss for native species and the gain of new and different habitat in gardens and other urban green spaces. The process of change in urban form, the interrelatedness of land use pattern with water consumption and biodiversity is demonstrated with results from empirical case studies in Spain. The case study areas are verging on natural areas with high ecological value and future urban expansion can only be realized by encroachment on these areas. Apart from this environmental conflict, the uncontrolled rise of water demand and the lack of anticipatory planning in the face of climate change aggravate water scarcity and the impacts of meteorological drought. A typical sign of imminent water

management conflicts is the critical level of the water demand-supply ratio and the implementation of water-use restrictions. These environmental conflicts are discussed in the wider international context, arguing that the new urban models produce social-ecological systems with specific challenges to urban biodiversity conservation, water management, and planning. This approach shares insight into spatial transformations and environmental conflicts with the new concept of 'naturbanisation', adding to the debate on displacement of land use demands and related impacts on areas with great landscape value.

### The effects of naturbanization in the Catalan Pyrenees: The risk of forest fires in the wildland urban interface

*Antoni F Tulla (Universitat Autònoma de Barcelona), Anna Badia (Universitat Autònoma de Barcelona), Ana Vera (Universitat Autònoma de Barcelona), Joanmanuel Soriano (Universitat Autònoma de Barcelona), Albert Pelachs (Universitat Autònoma de Barcelona)*

The Catalan Pyrenees are surrounded for several urban areas which generates an intensive use of functional mountainous land: winter and summer resorts, second homes and infrastructures. Besides that, landscape quality helped to set up some natural protected areas in the region with the result of a land use conflict. Moreover, most of the land, hamlets and villages far away from main valleys are abandoned. This study addresses the issues arising from natural protected areas and the processes of disperse urbanization or 'naturbanization' based on the replacement of agricultural land with urbanized residential space, as well as territorial abandonment, which results in the loss of the area's traditional primary sector. Nowadays, the intensity of "urban" uses contrasts with territorial abandonment in mountain zones and obligates us to consider new models for territorial management. The objective of this research is to analyze how changes in the framework of territorial organization increase the risk of fires in wildland-urban interface. Our hypothesis is that changes in land use provoke changes in the natural dynamic that increase the fire risk and at the same time produce changes in social behaviors that affect the perception of risk increasing vulnerability of the surrounding area. The methodology used to analyze changes in land use between 1956 and the first decade of the 21st century and fire statistics for the period 1994-2008 added new elements to the discussion of forest fire risk in mountain zones, while making a contribution to plans for improving territorial management and designing better organization of the territory. This research is conducted within the context of the international Land Cover-Land Use Change (LCLUC) project and the debate generated by the

impact of global climate change on land cover and land use, which we study on the south slope of the Pyrenees, a mountain zone of the NE Iberian Peninsula. Keywords: Forest fires, Land Cover-Land Use Change, naturbanization, Natural Protected Areas, Pyrenees, vulnerability, wildland urban interface.

### **Unevenly escalating conflict between a national park and the expansion of urbanization in Warsaw (for example, municipalities Leoncin and Czosnów)**

*Izabella Lecka (University of Warsaw), Mirosława Czerny (University of Warsaw)*

Warsaw is just a one of the few European capitals, adjacent to large protected area - Kampinos National Park. The park covers vast areas of swamps and sand dunes in the valley of the River Vistula and because of these characteristics of the environment, was not a once attractive areas for housing development. However in the 80, especially the 90. XX, was initiated a process of expansion on the outskirts of the park which threatening the natural ecosystem. At the same time the status of protected areas greatly reduced the possibility of farming and contributed to "push" of population from the relevant area of "the park on its periphery. Edges of national park became an area of intense conflict over the land. Farmers look for a new forms of economic activity. In Leoncin and Czosnow they hope to develop tourism, e.g. they want to set up stables for horses and riding clubs. Due to the small distance from Warsaw, tourists do not plan spend night here. So it is not profitable establishment of hotels or B & B. In such conditions farmers again start to sow their fields and are waiting for subsidies from EU. And besides that, due to the market in Warsaw, and greater income of the inhabitants in the capital, than in the other regions of the country, organic farming is growing. Organic farming was introduce at the border of the protected area Vistula 2000. The authors of this paper assumes that space-legal and social conflicts on the outskirts of the protected area lead to chaotic urbanization and intensification of the process of urban sprawl in the municipalities closest (to 1 hour of travel) to Warsaw. It is a process which is now very characteristic for the urban area of Warsaw. Municipalities located further away from Warsaw (1 hour travel and more) bypass the negative effects of rapid urban sprawl and benefit from its location at the crossroads of nature protected areas (national park and program Vistula 2000).

### **Blurring the Line between the Urban and the Rural: Transformation of Natural Spaces Into Urban Spaces in Finland**

*Juha Kotilainen (University of Eastern Finland)*

The line between urban and rural spaces is continually being contested and transgressed in current European spaces. While the distinction to urban and rural may have been more clear in the past with urban spaces associated with certain occupations and the rural with agriculture and forestry, the decades long transformation of rural life-styles to match urban ones and movement of people to dwell in rural spaces while working in cities as well as the downturn in traditional rural livelihoods in some areas has been leading to the distinction becoming blurred. This paper explores the case of Finland and investigates its urban planning policies and practices on several scales. Finland is specific in some ways in terms of the sprawl of urban areas to rural spaces. Due to a late urbanization and sparse settlement structure within cities with many green spaces, cities in Finland are not only spreading to rural and natural areas outside the urban spaces, but also into rural spaces and natural areas inside current urban areas. This trend is moreover intensified by the aim of the governmental policy, motivated by the state environmental administration and central government alike to conform to the requirements of international climate change policy. It has been politically decided that these requirements will in part be met by urban planning efforts aiming to make the built urban spaces more dense all over the country. This goal has been set on the level of the central government, in effect obligating the planning authorities on the regional and urban scales to follow these environmental political planning goals. This environmental political planning aim raises a number of issues and challenges for the planning process. The new urban spaces being planned currently include rural areas with traditional rural activities such as animal pastures as well as protected areas including national parks. This paper sets out to analyse and compare the conflicts arising from the current planning trends. These conflicts and contestations are multi-scalar and involve a multitude of actors and policies. Planning documents and other documentary sources are used as research material.

## UDC 15-02 - Naturbanisation: Urbanisation in nature and environment conflicts 2

*Chair: María-José Prados, Julia Lourenço*

### Threats to traditional agriculture and connectivity in Peneda-Gerês National Park

*Julia Lourenço (University of Minho), Marta Fernandez (Universidad de Sevilla),  
María-José Prados (Universidad de Sevilla)*

Traditional agriculture faces growing pressures as it suffers processes of intensification and abandonment. At the same time, being landscapes modeled by these activities characterized by a close interaction between man and environment, they are increasingly being valued for their contribution to biodiversity preservation. It is often claimed that certain humanized ecosystems and elements of the landscape contributing to its resilience and integrity need to be included into biodiversity preservation strategies. Traditional agricultural systems are not only biodiversity rich, but they are potential buffer and connect areas designated for biodiversity preservation. This is particularly important in a current context of increasing pressures such as expanding urban areas or climate change, throwing doubts on the ability of designated areas to effectively preserve biodiversity. Naturbanization was recently defined as a specific form of counter-urbanization that takes place in the proximity of Protected Areas. It refers to the attraction of residential and other urban activities to remote rural places, as a response to greater population mobility and the increasing share of natural values in quality of life perceptions and consequently in residential choice. As a consequence, socioeconomic and ecological impacts, often negative, take place. This paper studies land use shifts in Terras de Bouro, a municipality within Peneda-Gerês National Park, in North Portugal. The aim being to understand the extent to which intensification of land use is taking place at the expense of valuable agricultural lands, and the way these transformations could be threatening connectivity and integrity of a Protected Area. The study of Peneda-Gerês National Park is of particular interest, in the first place naturbanization processes have already been identified in this area by previous studies; in the second place, with the edition of Land Cover Map of Continental Portugal for years 1990 and 2007, this country counts on a very detailed cartography. Its minimum mapping unit being one hectare allows a better detection and understanding of some processes threatening Protected Areas, such as low intensity urbanization, which are not detected by more common

cartographic sources such as Corine Land Cover. The paper puts forward some policy suggestions for a planning for biodiversity preservation that includes not only designated areas or natural habitats, but also traditional agricultural areas. This would allow planning for social as well as environmental goals and implementing a more dynamic and sustainable management based on processes generating landscapes.

### Cerros de Bogotá – objectives of the spatial expansion: Where, why and what are the consequences?

*Mirosława Czerny (University of Warsaw)*

Rights are earned in the city by fighting. ('). It's hard to talk about the community where people do not have common goals around which they can organize. May buy the place, but whether this act of commercial relations creates a community? (D. Harvey, 2006). The process of settlement and urbanization of new areas in the city is not devoid of tensions and conflicts. They concern how to deal with the land, its spatial organization, and finally its management. These conflicts may take the form of violence and even armed struggle. Conflicts and violence in cities are caused by various factors and it is never just one factor that leads to them. Socio-economic conditions, spatial segregation, exclusion, the weakness of the state, are only some of these factors. At the same time constant process of expansion of building area and the influx of new immigrants only worsen the situation. Bogota is Colombia's largest urban center and currently has about 8 million inhabitants. Very rapid population growth of the city and urban areas on its periphery in the past two decades has for many years been caused by the influx of settlers from rural territories. But these migrations are not ordinary wanderings on economic grounds as in other countries in the region but forced displaced people. It is now one of the most serious social problems of Colombia. The consequences of these processes for the development of Bogota are: 1. Population growth 2. Dealing with land in acts of invasion of the area or establishment of districts pirated 3. Social marginalization and growth of informal economic and spatial processes in the city. 4. Development of the city of refugees and the city of the hiding.

### **Naturbanization: Urban Patterns Changes in Doñana and Sierra Nevada (Spain)**

*María-José Prados (University of Sevilla), Alfonso Doctor (University of Huelva)*

Naturbanization describes the process of urbanization in relation to the existence of protected natural spaces of great value. These processes include the search for new residential space in which the quality of the environment will be a concrete factor; the restart of traditional economic activities; the influence over the promotion of activities concerned with new activities related to the consumption of nature; the development of the construction sector; and public investment in infrastructure to improve access. All these factors have consequences for land use planning and environmental conservation in protected natural spaces. Naturbanization means the transfer and expansion of urban process to areas far from centres of urbanization, to is linked to the existence of natural resources, environmental and aesthetic landscapes. On these areas the population mobility and landscape values are strongly related. In this sense, naturbanization processes are opposed to the metropolitan de-concentration processes because the demographic size and low density of population in rural areas. This paper confirms that the population growth, residential development and the preferences of naturbanites. The paper analyses how the existence of natural protected spaces stimulates urban growth in their surroundings. The aims are to demonstrate how urban growth and urban sprawl related to naturbanization processes provoke urban pattern changes on national parks surroundings and secondly, which could be the motivations and expectations of new residents over these areas. The study is based on the information from the building endorsements approved by the Architects Associations and the aerial photographs from 1956 to 2006. Combining statistical data and photo interpretation may be possible to explore the residential development and urban patterns changes. The study areas are in the vicinity of Doñana and Sierra Nevada National Parks on south Spain, where urban areas growth and the appearance of new scattered habitat completely cut off from the traditional activities are occurring.

### **Changes uses of landscape in the economically influence area of Doñana National Park**

*Marta Barceló Villalobos*

This paper presents the results of a research project about the changes uses of landscape related to naturbanisation process in the protected area of Andalusia,

Southern Spain. In particular, this project analyzes the changes landscape uses in the socioeconomically influence area of the Doñana National Park. There is statistical data about the existence of an increased resident population during the period 1975 - 2008. This factor, together with the presence of natural resources, environmental and landscape value in the territory enable the development of naturbanisation processes in the territory. The project has demonstrated empirically the increasing of land devoted to farming. It is given a quantitative description of the changes uses of landscape that occurred between 1975 and 2008. So, this proves the existence of naturbanisation processes in the field of study. In addition, it is discussed the management implications in a multidisciplinary context. It is due to the agriculture is one of the most important drivers of the economy of Huelva. To keep the importance of this activity in Huelva, a land-use plan focusing on environmental issue is essential. Otherwise, this activity is going to disappear sometime later. That is because it depends on the water resource. It is exposed the transformation rate of irrigated land uses in 1975 - 2008 period, was the largest one. The irrigation work had been multiplied two and a half times since 1975 until 2008. The extension of irrigated lands is increased by 44.518 Ha approx. These hectares came from crops under plastics and irrigation uses. The analysis of the sprawl of irrigated agriculture in the area of influence of a protected area is a clue to further assessment of the weight of the naturbanisation, and to analyze factors influencing the attraction of new residents. To do this, well-established methodologies have been developed for treatment of digital information for the development of interpretive maps of territorial processes. This methodology is articulated through the use of a geographical information system. Keywords: naturbanisation, Doñana National Park, changes uses of landscape Author: Marta Barceló Villalobos

## UDC 16-01 - Neighborhood governance under conditions of globalization – An international perspective

*Chair: Matthias Drilling, Olaf Schnur*

### Chilean and European neighbourhood regeneration policies: Comparative approach on neighbourhood concept and its delimitation

*Verónica Tapia (Universidad de Barcelona)*

The neighbourhood has been construed as an important focus of action for urban policy, particularly as related to regeneration tasks, as Atkinson, Dowling y McGuirk (2009:2818) state "In countries like the UK, France, and the US, the neighbourhood has become a primary scale through which service delivery, regeneration, and moral agendas around citizenship and cohesion have been approached". By observing the current panorama, we can also add Spain as well as several Latin American countries. Why this emphasis on the neighbourhood? The literature suggests a few reasons strongly related with governance issues: the neighbourhood has been considered the basic building block for maintaining social cohesion, illustrates saturation of poverty and disadvantage in parts of major cities and is perceived as the site of local community (Forrest, 2009). Also, in the current context where governments are not able to control global capitalism, the neighbourhood is the most feasible scale in which to intervene (Kearns and Parkinson, 2001). Finally, this neighbourhood approach offers an attractive alternative for tackling social exclusion through strengthening social capital (Meegan and Mitchell, 2001) and local government (Kennett and Forrest, 2006). However, the literature shows two main difficulties pertaining to the neighbourhood scale: First, there has been difficulty coming to a consensus on the explicit and commonly accepted conception of the neighbourhood scale. Second, there is the operability problem, in other words, how can we delimitate areas of intervention in order to carry out urban policy objectives (Dietz, 2002). Related to these issues several questions arise: Which neighbourhood concept is behind urban regeneration policies? How are these concepts related with governance tasks of urban regeneration policies? How do these policies define neighbourhood intervention areas? Considering the neighbourhood emphasis in regeneration policies, at least in the western world, and consequently the importance of distinguishing the different approaches, the present paper proposes to discuss these issues under a comparative perspective: Firstly, based on content analysis

methodology of official documents, this paper will identify the main trends of the most representative current neighbourhood regeneration programmes of Western Europe, delving into three points: explicit or implicit neighbourhood concepts; relations between neighbourhood concepts and governance tasks; the process of defining intervention areas. Secondly, in order to offer a geographic counterpoint, this paper will analyze these three aspects in the Chilean regeneration program "Quiero mi Barrio". This programme started in 2006 and is focused on 200 neighbourhoods throughout the country; also, this program is a relevant case because it signified the recognition of the neighbourhood scale as an explicit planning dimension in Chile.

### Social Activation in a Master Planned Community: Inclusion and its Ambiguities

*Nico Stefanovics (University of Edinburgh), Nico Stefanovics (University of Edinburgh)*

In the context of housing, governmentality studies have largely focused on behavioural politics enforced as legal obligations upon the tenant (Flint, McGuirk and Dowling). This paper makes a point for a more direct, although not necessarily more emancipatory case of inclusive governmentality within urban redevelopment, drawing on the master planned community of HafenCity in Hamburg. Several factors have combined to create a plethora of voluntary initiatives over the first few years of HafenCity's existence, as the project misses the neighbourhood acquaintances, business clusters and shop customer loyalties found in established neighbourhoods. This indeterminacy is an asset capitalized on by ambitious individuals living in HafenCity, united in their goal to turn the area into a success, but in competition with each other. The discovery of this new build scheme by the media as a new area of innovative consumption and its growing popularity among tourists are catalysts for the successful marketing of HafenCity. Key players running initiatives in the site are alert to these circumstances, which they can reinterpret as preferable for their own self-actualisation. The Netzwerk (network) is a platform in HafenCity for residents, business people, and other institutional actors alike. My paper argues that participation in it is driven by the ambition to secure social capital, and the entrepreneurial way in which this is done may be disruptive rather than conducive to neighbourhood cohesion. The double identities of the members of the netzwerk as both neighbours and pursuers of individual interests are at unease with the supposedly collaborative spirit of the group. A missing consensus on how to calibrate diverging interest spheres in addition to the



desirability of conflict avoidance with your next door neighbours produces a 'vacuum of accountability', particularly visible when ambitious individuals exploit events hosted in the name of the *netzwerk*, as occasions to strengthen their own position. A post-occupancy evaluation in HafenCity had concluded that the bulk of needs raised by residents warranted the employment of a sociologist as a permanent 'care taker'. For the members of the *netzwerk*, he acts as advisor and conflict manager for the disparate stakeholders represented in HafenCity. The imperative of acting impartial towards all local factions alike, ingrained in his function as a mediator, however, restrain his ability to reconcile clashing interest spheres. Attempts to instruct clearly or discipline someone would make him appear as an extended limb of the planning board rather than as a partner at eye level. I will exemplify this through the case of a neighbourhood event jointly organised by the *netzwerk*. The limitations of settling tensions amongst neighbours are grounded in the lack of authority such a counsellor has, ironically because the definition of his role is to be non-authoritarian.

### Neighborhood governance in metropolitan area of Paris: An erratic model

*Anne-Lise Humain-Lamoure (UPEC - Lab'Urba)*

This paper aims at introducing and discussing the forms of neighborhood governance in metropolitan area of Paris (France). A law on 'local democracy' adopted in February, 2002 has substantially reconfigured the political-geographic organization of urban neighborhoods. The law strongly encourages (or, sometimes, imposes) the creation of political subdivisions within the territories of communes, thereby institutionalizing new political spaces for participatory-oriented local governance. The social consensus that seems to have been created around notion of the 'political neighborhood' for Paris-area residents is less uniform than it appears, and the political status of this new kind of political neighborhood remains uncertain for municipal actors. In despite of the law, the legal regulations are very limited. Thus the variety of scope and forms as well as reasons and results of governance depends to a large extent on three factors: municipal actors' willingness, social characteristics of the neighborhoods, and conflicts related to specific interests of actors with different strategies. Especially, the methods and procedures through which this neighborhood governance take place are diverse and are tied to questions of political loyalties and socio-spatial morphology that vary in their own right from place to place. The dynamics inherent in the progressive appropriation of these neighborhoods by different local actors - dynamics tied to local political

affiliations and identities - accentuate already-visible differential effects at work in the creation of political subdivisions under the law. Neighborhood governance in the Paris area seems as erratic practices without only one theoretical or political model, at the risk of segregation effects. However these forms of neighborhood governance create new forms of connectivity between actors involved in urban administration and across different governing hierarchies and territories for public action. In this way, these forms of local governance might be perceived as a new multi-scalar perspective on regional governance in progress, from neighborhood level to metropolitan area level, without a strong municipal level. This paper is based on a long work from 2002 to 2011 about neighborhood governance in metropolitan area of Paris. This paper will be especially, but not exclusively, focused on Paris neighborhood districts.



## UDC 17-01 - Neoliberal urban transformation processes in the Arab world

*Chair: Ala Al-Hamarneh, Leila Vignal*

### The End of the Mega-Projects? Economic Crisis, « Arab Springs » and urban fabric in Egypt and Arabian Peninsula

*Roman Stadnicki (CEDEJ / Ambassade de France en Égypte)*

This contribution aims at questioning ourselves about the combined effects of the economic crisis and the 'Arab Spring' social protests on urbanization in Egypt and Arabian Peninsula. These concomitant events seem to have delayed or even cancelled some urban mega-projects (new towns, malls, touristic and luxury compounds, etc.) which have been negotiated, since the beginning of the 2000's, by high-ranking public authorities and powerful multinational companies. More generally, speaking from this part of the world, we notice that the neoliberal models of urban planning are slowly running out of steam, judging the recent criticisms made by more and more public and private actors or civil society's members. On the one hand, the property developers' debts, which are particularly important in the Gulf area, and the implosion risk of the real estate bubble since the 2008's financial crisis, question the current norms of urban planning. The 'Dubai model', which has been exported out of GCC, seems to have been weakened at its source: some big urban projects symbolizing the urban planning-architecture one-upmanship, either unachieved (Dubailand) or unfrequented (Global Village), constitute nowadays huge urban margins. On the other hand, the Arab spring popular uprisings appear as an additional sign of the decline of an urbanity model shaped by mega-projects and authoritarian urbanism. In Egypt, January 25th Revolution has highlighted the difficulties to have access to housing and main public services in most of cities. The 'Cairo 2050' Master Plan, which was envisaged by Mubarak as a way to improve Egypt's international competitive edge and to continue the desert's conquest, will be probably entirely reviewed. Then, the illegal occupation of vacant houses in Six of October City by squatters in October 2011, strongly repressed by the army, questions the success of the 'desert cities', in which less than 1/20th of the Greater Cairo's population live. Moreover, it shows the public authorities' incapacity to resolve the housing problem of the urban societies' lower fringes. With the advent of international circulation of urbanism models? and of what can be called the Arab Spring's 'second act', comparing Egypt and Arabian Peninsula allows to wonder if a new urban era is being outlined in the region,

both inspired by the severe economical and societal blow against the neoliberal urbanism and by the resurgence of the socio-spatial margins ('ashwa'iyat in Egypt, places of expatriate's labour forces in GCC), where inhabitants claim a right to a more equal, democratic and sustainable city. The results which are proposed in this contribution have been drawn up thanks to a mission achieved at the beginning of 2011 in GCC and also to some surveys which are conducting in Cairo since September 2011.

### Neoliberal urbanism and the reassemblage of state power in Morocco and Jordan

*Koenraad Bogaert (Ghent University)*

Most scholars working on the Arab World typically view the state's power as something congruent with its cartographic boundaries. Power emerges from an institutional core – the regime – which exerts, via direct intervention, its hegemony over subordinated institutions, spaces and scales. As such, the regime presents itself as the privileged site of political formation, intervention and inquiry. The result is a body of scholarship that has largely neglected the dynamics of 'new state space' formation on the urban scale. Drawing on the dynamics of exemplary cases like the Bouregreg urban development project between the twin cities of Rabat and Salé, Morocco, the Abdali Urban generation project in Amman and the Aqaba Special Economic Zone, Jordan, this paper investigates the dynamics of agency formation implicated in the creation of so-called new state spaces and considers what it reveals about the whereabouts of state power and the rise of new governmental arrangements that have been elided by mainstream accounts on the Middle East and North African region. By critically engaging with the new state space literature (Brenner, 2004), we argue that neoliberal urban politics have given rise to new, wider and more open assemblages of (state-/class-)power. Foreign investors, architects, urbanists, real estate developers, etc. have become new players on the field of the state. Yet, this not necessarily means that traditional state elites are losing their power, but rather that new (capitalist) actors are drawn within reach (Panitch, 1998; Allen & Cochrane, 2010). In contrast to the neoliberal adage of economic and free market 'borderlessness' and the withering away of the national state, imagined through globalized spaces such as Bouregreg, Abdali and Aqaba, contemporary configurations of capitalist accumulation are produced by particular operations of state power. The conception of 'borderlessness' is not so much a political space outside or beyond the reach of the state, but a particular formation of power that suggests recourse to a more

complex framework of our understanding of the state. Economic borderlessness is always a produced within state borders. As such, these spaces are not really extracted from state control. Rather, their configuration involves state power and represent particular forms of an “interiorized outside” (Butler & Spivak, 2007).

### **Urban planning in Casablanca: An impossible convergence between neo-liberalism and spatial justice?**

*Pascale Philifert (Université Paris Ouest Nanterre- LAVUE)*

In Morocco, the priorities established in the name of economic openness and competitiveness of the territories have become essential elements of public politics. Within the territorial policies, the new protocol resulted in a number of initiatives from the National Debate on Regional Development launched in 2000, adopted in 2004 to SNAT. The renewal of management strategies is built on new reference framework based on a triple challenge: economic efficiency, social equity, ecological balance. In their wake, a reconfiguration of scales of action (region, metropolitan area ...) and governance is encouraged. However, the implementation of these guidelines in urban strategies - or operational - highlights a number of deep reconstructions locally and also reveals the strong antagonism between environmental approach, economic performance and recognition of spatial justice. In this regard the pattern of functional organization and development (SOFA) of the central metropolitan area (2006) and the new master plan of the Grand Casablanca (2008) are emblematic of these dilemmas. Moreover those master plans and great urban projects are highly influenced by neoliberal models of growth. This paper aims to highlight the contours of the new territorial policies for the coastal region where the central social issue may seem secondary to the tangible and intangible investment that seems to require the anchoring of large Moroccan cities in the global competition claimed by power and the elites, under the influence of international agencies.

### **Building a new Sultanistic city: The Bouregreg Project and the Moroccan monarchy**

*Joomi Lee (University of Texas at Austin)*

My paper studies Morocco's Bouregreg Project, a large-scale Bouregreg river valley redevelopment project. I view this project, which has been constantly emphasized as 'une initiative royale' since its official launching in 2006, as a strategic urban political enterprise of the powerful Moroccan monarchy (the Makhzan). To elaborate, rather than framing this project simply as an example of

the neo-liberal urban renewal currently sweeping the Arab world financed by Gulf petro dollars, I regard this project as the Moroccan monarchy's attempt to build a new iconographic landscape befitting their capital of a 21st century Islamic Kingdom, designed to change the image of the capital from 'Lyautey's colonial city' to 'the King's city'. It is somewhat ironic that a contemporary resurrection of the colonial urban ideologies - a realization of modernity and conservation of (indigenous) tradition over the course of the Bouregreg project - is being strongly backed by the royal palace. The Bouregreg Agency, the powerful governing body of the Bouregreg project created by a royal decree, claims that the project aims to overcome 'la parenthèse coloniale' of modern Moroccan urban history. Yet, the project's imposed royal vision of creation of a 'modern but historical' capital has a strong colonial flavour, demonstrated in both its official discourse and its rehabilitation practices. In particular, the Bouregreg Agency's persistent emphasis on 'exceptionality' of historical memory inscribed in the Bouregreg valley, heavily charged with historical monuments, and its claim to restore 'la splendeur des temps anciens' of the site, have resonance with a colonial assertion made by Lyautéy at his arrival in Rabat: 'We found here the vestiges of an admirable civilization, of a great past. You are restoring its foundations.' With the case of the Bouregreg project, this paper specifically focuses on which parts of history and what kinds of tradition have been restored in order to produce contemporary myth in the re-imaging of the country's capital as a modern Sultanistic city. By recognizing that the Bouregreg agency conceives Rabat's past identity as a 'Great Almohad city' as well as a 'Sacred city', this paper is concerned with an investigation of how the project's re-defining of the identity of Rabat and restructuring of the Bouregreg valley landscape are deeply - politically and historically - interwoven with the distinctive power of Moroccan monarchical rule, which is a phenomenon Hammoudi (1997) refers to as the 'ethnography of dispersed authoritarianism' (xiv).

## UDC 18-01 - Old and new mobilities in Asia: Challenges for geographical development research

*Chair: Matthias Schmidt, Basabi Khan Banerjee*

### New mobilities, translocal communities and livelihood networks in the Asian mountain periphery: The case of the Wakhi of Gojal, Northern Pakistan

*Andreas Benz (FU Berlin)*

Translocal networks have become a key issue for securing rural livelihoods in the mountain periphery of South and Central Asia. Increasing levels of migration and new forms of mobility led to the emergence of translocal communities and livelihood networks. The highly mobilized and spatially dispersed Wakhi community from the high mountain region Gojal in northern Pakistan is an illustrative case in point, which provides a better understanding of the recent processes of mobility change and the increasing importance of translocal networks for rural livelihoods. Based on results from extensive fieldwork in Pakistan in 2011, the presentation will provide an outline of the shifting mobility patterns of the Wakhi in Gojal in the context of changing livelihood systems and framework conditions. It will show how people of the Wakhi community gradually increased their mobility level and expanded their social networks to distant places to secure a living and in search for new livelihood opportunities. It will be worked out how old forms of mobility - e.g. in the context of animal husbandry and combined mountain agriculture - have been transformed, complemented, and partly replaced by new mobilities in the context of labour migration, student mobility and various forms of circular movements, leading to complex migration networks, multi-local livelihoods and the development of a translocal community. These spatial mobilization processes de-territorialized the Gojali community, where large proportions of the population have physically left their home region but maintain their identity attached to the collective representation of an imagined 'Gojal'. Translocal social networks unite this virtual community, where intensive flows of people, goods, money, information and ideas oscillate between its various sites. Gojali households today rely on translocal livelihoods, where household members are spatially dispersed and combine various income generating activities and livelihood opportunities in different contexts. In the context of this empirical example, new approaches of livelihood research, which combine 'classical' livelihood approaches with new forms of mobilities and the multi-locality of households, will be applied and tested for their potential to deal

with the analytical challenges of multiple mobilities from the perspective of geographical development research. Equally, recent concepts of translocality and translocal communities will be discussed and presented as an alternative to the predominant transnational approaches.

### Across localities: Livelihood strategies and new mobilities in the Indian Himalaya

*Juliane Dame (Heidelberg University)*

In the context of globalization, political and socio-economic change has created new employment opportunities and changed mobility patterns in the rural South. This trend can be observed in the high mountains of South Asia, where rural households increasingly rely on diversified livelihood strategies. Against the background of field research in the Indian Himalaya (Ladakh region), this paper analyses spatial mobility as a livelihood strategy of mountain households. In Ladakh, a dissolution of the 'traditional' household - which used to rely on subsistence agriculture and to be defined as a place-based unit of production and reproduction - can be observed. Therefore, the concept of translocality is used to assess how households that are increasingly spread across localities shape their livelihoods. Empirical data from two Ladakhi villages show that mobility is associated with aspirations of enhanced well-being through better education or higher monetary income. Household members move to different destinations including the Indian lowland, the regional district capital or neighbouring villages. The findings highlight that interconnections between the (temporary) migrants and the village of origin not only encompass economic ties, but the creation of new social networks and cultural links. Movers still consider themselves as villagers (yulpa). They continue to be part of the household and social structures that they were born into. This identification of 'belonging to the village' is symbolized through participation in social events, the exchange of gifts and monetary remittances. At the same time, the dissolution of households has changed societal relations in the locality of origin (e.g. reciprocal labour arrangements in the agricultural sector). In such ways, mobility not only affects the movers, but the livelihoods of those who stay. The results highlight the complexities of new mobilities in mountain regions with a diversity of flows of people between different localities that have often been neglected until today.

## Recent Internal Migration Patterns and Its Determinants in Thailand and Vietnam

*Vera Junge (Leibniz Universität Hannover), Javier Revilla Diez (Leibniz University Hannover)*

In fast developing countries such as Thailand and Vietnam internal migration increases rapidly. Theory on migration and development has already recognized that migrants can contribute positively to the process of convergence of living standards by distributing knowledge and income. Something neglected for a period of time is the idea of changing destination patterns and a possible polarization reversal trend with new emerging regional centers. New trends regarding destination patterns of migrants can be formed by two groups of migrants; firstly, by the possible new migrants who decide whether to move or not as well as by their destination choices. Secondly, by the existing migrants who may change their current location and often return to their home provinces. The central question is therefore, which current patterns of migration can be found for rural households in Thailand and Vietnam and whether destination patterns are shifting towards regional destinations and a polarization reversal may take place. Based on the results, we analyze how recent migrants and return migrants - who shape this process - are influenced in their migration and destination decisions. This work is embedded into the DFG-Research Unit 756 on the "Impact of shocks on the vulnerability to poverty: consequences for development of emerging Southeast Asian economies?". The data is based on household surveys conducted in 2007, 2008 and 2010 in three provinces in Northeast Thailand (Buriram, Nakhon Phanom, and Ubon Ratchathani) and three provinces in Vietnam (Ha Tinh, Thua Thien Hue, and Dak Lak). The data enables us to follow individual behavior and migration decisions over time which is crucial to understand and distinguish determinants and consequences of migration. The results show that although internal migrants still move most likely to the economic core regions of Bangkok in Thailand and Ho Chi Minh City (and Hanoi) in Vietnam, the relative importance of destinations outside of these core regions and especially within the home provinces is increasing significantly. In particular for Vietnam, a beginning polarization reversal can be therefore assumed. To analyze recent migration decisions we use multilevel logistic regression and find that regional nonfarm opportunities and migrant networks have a significant impact on the individual migration decision. Also significant differences between migrants moving to regional destinations in contrast to those moving to national economic core regions can be found. In a last step, we currently analyze the characteristics of internal return migrants and their contribution to regional

development and reduction of vulnerability of the households and home regions. These processes are accompanied by reduced communication, information and transportation costs which in turn ease migration networks and are likely to further enhance the fast change of destination patterns in the future.

## The Effects of Polycentric Development on Labor Mobility in Metropolitan Areas: A Review of the Debates and an Analysis of New Perspective

*Dong Lin (University of South Australia), Andrew Allan (University of South Australia), Jianqiang Cui (University of South Australia)*

Sustainable labor mobility within metropolitan areas is predominantly characterized by minimising employees' job commuting distances and travel times and the application of a sustainable travel model. With urban decentralization and the evolution of mega-cities from a monocentric to polycentric spatial structure in recent decades, urban geographers and urban planners have from various perspectives highlighted their interests in polycentric models of urban development. Of particular interest is how employment decentralization in metropolitan areas that is based on polycentric spatial development affects employees' commuting trips length and their travel times has created many intense debates. There are two major reasons for the debates. One reason is whether the evolution of a polycentric spatial structure in mega cities could provide more opportunities to enhance spatial matches between the job and housing location selections of employees who live in suburban areas. Accordingly, employment decentralization would improve commuting patterns and urban congestion such as shortening individual commuting distances and travel times, thereby resulting in less reliance on private cars. Another reason is whether and how jobs-housing balance policies minimise employees' commuting trips and enhances their job accessibility. From the 1980s onwards, China's urban spatial structure changed dramatically with the 'Economic Reform and Opening-up' policy which occurred simultaneously with a new policy on housing reform, resulting in dramatic urban spatial restructuring of China's largest cities. The urban spatial structure of the majority of China's mega cities' changed from a monocentric to a polycentric model. Spatial agglomeration and dispersion were coexistent. It is generally recognized that such urban spatial evolution is accompanied by changes in people's work and residential locations, and subsequently changes in their patterns of commuting. Accordingly, China's urban spatial restructuring of its cities has created new connections and new commuting patterns between jobs and



housing locations in its metropolitan areas. To date, relatively few studies have investigated the specific characteristics of this unique Chinese situation. This article will review and discuss the debates of how polycentric spatial development in metropolitan areas impact on patterns of commuting, through a review of experiences in cities of western countries. Furthermore, the analysis will explore its implications for China's mega cities.

## UDC 19-01 - Re-ordering the city – Neoliberalization, travelling policies and local context 1

*Chair: Iris Dzudzek, Kevin Ward*

### **Faster, Higher, Stronger Policies: Olympic models and the making of Rio de Janeiro 2016 Games**

*Gabriel Silvestre (UCL Bartlett School of Planning)*

Ever since the early 1990s, successive governments in Rio de Janeiro have pursued the strategy of flagship urban projects and the attraction of mega-events as part of a wider agenda to reposition the city as a consumption-oriented economy. Having the city of Barcelona as an explicit reference point, this rationale was part and parcel of the 'Plano Estratégico da Cidade do Rio de Janeiro', an urban strategic plan elaborated with the assistance of Catalan consultants which has become emblematic of the transformation of local urban governance. Among the most high-profile new policies, the bidding for the Olympic Games was as an enduring objective and a platform to engage with experiences from elsewhere. After winning the bid to host the 2016 Olympics, local organisers have pursued a dual strategy of on the one hand, forging international networks (by, for example, hiring the services of international advisers such as Tony Blair, Rudolph Giuliani and Pasqual Maragall, and establishing partnerships with the London 2012 Organising Committee) whilst on the other hand, re-defining local planning regimes to facilitate the Games. In becoming an 'Olympic city', Rio de Janeiro seems to have mobilised the necessary conditions to replicate the 'Barcelona model' and other policies drawn from previous hosts. However, an understanding of the apparent 'success' of former hosts is tied with specific historical-geographical circumstances which make the model a stylized version and a partial account of it (McCann and Ward 2010). The outcome of this policy transfer process is thus bounded by the action and selective translations of policy agents and the specific context of the new environment. This presentation draws from an ongoing doctoral research in response to the double call for continued critical research that add empirical depth to processes of policy mobilities (McCann 2011, Peck and Theodore 2010), and the need to expand contingent analyses of local embeddedness outside the North-Atlantic zone (Larner 2003, Peck 2004, Robinson 2011, Ward 2006). If former Brazilian president Luis Inácio 'Lula' da Silva was right, in affirming that mega-events will provide the 'international citizenship' of Brazil (Sanchez et al 2010), symbolising the

emergence of the country as a world leader, the making-off of this 'emancipatory' process certainly deserves great scrutiny.

### **New Urbanism heads South: The Case of Santiago de Chile**

*Michael Lukas (Universidad de Chile)*

This paper presents a critical reconstruction of the introduction of new urbanism and smart growth principles in Chile in the last 15 years. Drawing on key informant interviews with real estate developers, planners and public authorities as well as the analysis of documents and media coverage, I show how in Santiago in the early nineties some of the leading business groups started to make city building one of their core businesses and in that context embarked on strategies of knowledge production on issues of urban-regional development. Cooperation agreements between neoliberally and elite-oriented Chilean and US-universities were signed and promising young architects were sent abroad in order to study disciplines as urban planning and urban design. In the late 1990s and early 2000s the returning experts made career in the public and private sector introducing new urbanism principles from different institutional sites. The result has been a profound transformation of the institutional landscape regulating urban-regional development. Modernist-style comprehensive planning has been replaced by so called 'planning through conditioning', case-by-case negotiated and contract based development agreements between the public sector and private developers, making viable a boom of Master-Planned Communities on the urban edges. While, on the one hand, the advancement of new urbanism in Chile can be understood as the result of successful entrepreneurial and neoliberal strategies aimed at legitimizing further edge urban growth through 'sustainable' large scale real estate projects, on the other hand it is important to note that it has not been a clear cut and uncontested process. The paper identifies several conflicts and contradictions between the imported principles of new urbanism and smart growth and local institutions, discourses and several opposing actor groups.

### Politics of Selectivity- The process of Splitting Dhaka City Corporation

*Shahadat Hossain (TU Dortmund), Md Musleh Uddin Hasan (Bangladesh University of Engineering and Technology), Afsana Haque (Bangladesh University), Shakil Bin Kashem (Bangladesh University)*

### Disorder in an urban quarter? Contested transformations in Hamburg-St. Pauli

*Anke Strüver (University of Hamburg), Katharina Wischmann (University of Hamburg)*

The contemporary restructuring of urban spaces is accompanied by changing economic and cultural practices, including a global as well as local competition of and within cities. In this context, Mark Gottdiener (2001) for example has argued that the production of signs is elementary for entrepreneurial success - because symbolic value seems more important for economic success than commodity value - and has suggested to analyze symbolic processes as part of the urban condition. In this paper we combine the economic and the symbolic, as well as discursive processes in order to disclose current urban transformations in Hamburg-St. Pauli that are characterized by globally competitive developments and marketing strategies on the one hand and local ideas of regeneration, political and social participation on the other. St. Pauli, having experienced exclusion and stigmatisation due to its images as nightclub district and as poor neighbourhood and place of alternative life-styles and politics at the same time, is currently confronted with far-reaching urban changes: As a consequence of post-fordist transformations and inner-urban modernization, restructuring processes in Hamburg-St. Pauli have impacts on socioeconomic circumstances - such as expulsion and impoverishment - but also on the quarter's built environment in terms of demolition, rehabilitation and real estate. However, these processes do not concern residential premises only: An increasing number of recent high-rise buildings can be observed in the quarter, which primarily include office-buildings and hotels. Designed by internationally renowned architects (e.g. David Chipperfield, Hadi Teherani), the outlines of these high-rises often correspond with global trends and standards and therefore represent 'globally replaceable architecture' Against theses 'local' backgrounds, the paper addresses the questions - How recent urban redevelopment strategies are negotiated and take place (both in a literal, e.g. architectural, and a symbolic sense) and make space in the quarter; - how local inhabitants express and legitimise their relations to the place and its symbols; -

how global discourses on urban restructuring are adopted locally for St. Pauli (by investors, estate agents, architects etc. but also by private firms); and - how local strategies of resistance are related to globally observable forms of public contestations.

## UDC 19-02 - Re-ordering the city - Neoliberalization, travelling policies and local context 2

*Chair: Iris Dzudzek, Kevin Ward*

### Global models, territorial politics and the formation of homelessness policy initiatives for Australian cities

*Tom Baker (University of Newcastle)*

This paper builds on recent interest in the mutative geographies of policy - the necessary and ongoing changes to mobile policy knowledges as they encounter new territorial configurations. It begins by charting recent shifts in the landscape of urban homelessness policy in Australia that has led to a period of extrospective policy engagement before focusing on how a specific US-based policy model, known as 'Common Ground', was re-territorialised into a number of Australian cities. In doing so, it explores three key areas. First, the paper focuses on how the 'Common Ground' idea was re-imagined into a mobile model fit for the Australian context, which involved contested abstractions from the particularities of its policy origins. Second, the paper reflects on the way that a variety of territorially-embedded actors and political projects assembled around the development and subsequent territorialisation of the policy model. Finally, the paper concludes by reflecting on the forms of governance enacted through this mutative moment in Australian policy-making and the competing urban visions it reflects.

### Consulting Firms – Travel Agents of Neoliberal Urban Policies?

*Anne Vogelpohl (Goethe Universität Frankfurt a.M.)*

Policy advice has become a common feature within the process of finding general principles for urban development, especially since 'knowledge' and 'learning' are seen as crucial moments of contemporary societies. The argument of this paper is that consultancies play a key role in making neoliberal urban agendas mobile for they are offering their expertise in different cities at the same time and present simple entrepreneurial solutions to complex social problems that cities face. These two aspects of the argument - the multi-local presence and neoliberal scheme - will be made evident by exemplifying consulting practices of an international operating firm in German cities: Consultants from McKinsey & Co wrote the three studies dortmund-project. Das Zukunftspaket [The package for the future], Hamburg Vision 2020 as well as Berlin 2020.

Taking these studies as examples I will first analyze the "local globalness" (McCann 2011) of consultants' advices by comparing the presented (allegedly) local specificities on the one hand and the similarity of consequent solutions on the other. And second, I will show that references to global challenges build the ground for standardized policy advices in every city. Drawing on these analyses, I will conclude with some reflections on correspondences between the consultants' global-oriented rhetoric and abstractions from concrete local problems. These correspondences lay the ground for both the policies' movability and the consultancies' promises for successful advice.

### Travelling Concepts – the Role of Ideology in Transnational Urban Neoliberalization

*Jenny Küinkel (Goethe University, Frankfurt)*

The paper analyzes the transfer of three key urban policing concepts from the US to Germany: zero tolerance, broken windows and community policing. Based on a content analysis of the police expert discourse since 1990, a media analysis and expert interviews it shows how the reference to US policy models is shaped by and shaping local politics, often through negative transfer and (intended) transfer failure rather than successful transfer. Transfer of policies and ideas has proven to be a useful meta-concept. It can link the broad macro-analyses of the worldwide structural neoliberal change with micro-level analysis of the local diversity of real-existing urban neoliberalism. For neoliberalization is evolving through multiple local policy experiments, often including the adaptation of globally available neoliberal concepts, but also their failure. Classical policy transfer literature asks if and how fast processes of copying policies occur. The recently rising urban studies literature on urban policy mobilities foregrounds the multiscalar nature of these processes, the need to move beyond rigid classifications of transfer agents, and last but not least the way how policies change through adaptation to local contexts. The paper argues that both strands of literature can learn from a closer look at the role of ideology in processes of international and interurban learning. The German example shows that rather than aiming at transferring policies in a blue print like manner to German cities or Länder, local stakeholders strategically use references to international policing models to shape local power relations. The paper therefore concludes that the study of travelling concepts needs to distinguish more clearly between policy and ideology and to focus more strongly on politics rather than foremost policy.





### **The moving map of the global financial crisis: A comparative analysis of four European cities**

*Sara Gonzalez (University of Leeds), Ramon Ribera-Fumaz (Universitat Oberta de Catalunya), Stijn Oosterlynck (University of Antwerp), Ugo Rossi (University of Cagliari)*

This paper investigates the uneven geographies of the global financial-economic crisis at the urban scale across Europe. We do so by making a comparative analysis of the uneven impact of and responses to the crisis in four different European cities: two located in North-Western Europe - Brussels (political world city) and Leeds (second-tier financial city) - and two located in the Euro-Mediterranean region - Barcelona (one of the most dynamic cities in Southern Europe) and Cagliari (the capital city of an insular 'less-favoured region'). The analysis draws on recent scholarship exploring variegated forms of neoliberalism, which focuses on how neoliberal projects 'exploit, transform and reproduce inherited geo-institutional differences' (Brenner et al 2010: 207). The added value of this approach lies in its combined focus on the (a) broader macro-economic and institutional patterns within which the uneven urbanization of the global crisis takes place, (b) local political experimentation and (c) mobility of policies across places. Although this approach allows to discover geo-institutional variation, we argue that one of its shortcomings is precisely the lack of explanation of how geo-institutional variation is produced and what the role of discourse is in all of this. Thus, to overcome this limitation, we combine with it a cultural political economy approach (Jessop, 2007), paying explicit attention to how local actors narrate the crisis and offer potential solutions to it in terms of proposed accumulation and governance strategies. By bringing together both approaches, we explore how the global crisis circulates around different locales across Europe, analyzing the diversity of impacts and responses and assessing if so far it has represented the emergence of post-neoliberal governmental rationalities. Our preliminary conclusion is that the crisis is narrated very differently in the four different cities (and is in two of the cases not even a prominent narrative feature) and that, despite the rise of promising grassroots struggles and opportunities for urban policy change in two of the four investigated cities, alternatives to urban neoliberalism have not yet emerged or are at best in their early, embryonic stages.

## UDC 20-01 - Revolution or transformation? The rise of supermarkets and malls in developing countries and their urban and social impact 1

*Chair: Ulrich Jürgens, Ronnie Donaldson*

### Multi-faceted modernity: Negotiating wholesale and retail infrastructure development in Central Asia's commercial centre

*Henryk Alff (FU Berlin)*

Almaty, the largest and most populous city of Kazakhstan, after the economic shock in the 1990s and with the rise of an emerging urban middle and upper class as well as increasing purchasing power of the population in general, has seen an unprecedented growth of trade infrastructure. However, the retail and wholesale landscape in the city is polarized between bazaars with local and (inter)national importance and western-style shopping malls and supermarkets. As a subject to urban renewal, bazaars are often negatively connoted as 'traditional' or 'unmodern' by decision-makers in the city and nation-state authorities, whose policies since the start of the economic boom actively advocate a modernisation agenda. However, the 74 city bazaars of different size and structure remain dominant in their share of trade real estate and sales of all kind of groceries and consumer goods. They play also an important role in providing (informal self-)employment to hundreds of thousands of people and the consolidation of small-scale trade entrepreneurship. 'Modern' shopping malls and supermarkets, mushrooming both within the city and the suburban area, on the other hand, largely due to deficits in management and a focus on wealthier customers find varying acceptance by the local population. The proposed paper in form of a field report is based on recent empirical data from 2011/12. It outlines the key dynamics of interrelated sides of the 'modernisation' process of wholesale and retail infrastructure in Almaty in two selected cases. It will predominantly draw on interviews with entrepreneurs, consumers and representatives of city authorities, as the main actor-groups involved, and planning documents as well as newspaper articles. In my paper I will focus on the articulation and implementation of top-down 'modernisation' goals of the local administrative bodies, how these are challenged or used by trade entrepreneurs and investors and how they are met by different groups of consumers and their specific needs. I, therefore, argue that the dichotomous notion of 'traditional'/'modern', widely applied for wholesale and retail

development, partly fails to meet the point of the local discourse. More so, the interests of the actor-groups, seemingly contradicting at first glance, unexpectedly coincide in many ways, leading to rather different short- and midrange scenarios for the development of wholesale and retail infrastructure in the transformation context of urban Kazakhstan.

### Malls as nuclei of urbanization processes? A view on Chinese industrial zones

*Sabine Beisswenger (ILS - Research Institute for Regional and Urban Development)*

The Pearl River Delta mega urban region in Southern China has undergone industrialization processes unprecedented in other regions of the world. It therefore depicts a land use pattern which is dominated by factory space and a population majority that consists of a constantly changing mixture of inner-Chinese migrant workers. Meant for industrial production, the consumption and retail infrastructure in this region was neglected and the industrial workers' supply was mainly organized through the employing companies and small scale retail facilities. This structure is changing recently and supermarkets, hypermarkets and shopping malls are established to service the needs of the industrial workers and to free employers from the obligation to provide goods and services for their work force. Malls in focus here have little to do with high end consumption 'cathedrals' featuring luxury brands as they can be found in the centres of the main Chinese cities. The malls of the industrial zones mostly consist of a ground floor with clothes retail and an upper level with supermarket facility and do not target at the middle class as main shoppers but at the local migrant workers. The paper is based on own survey data of approx. 560 migrant workers and evaluates their usage patterns of the local retail facilities. It shows which groups are drawn to the malls, for what purpose and in which frequencies. While the survey data is used to illustrate the manifest functions (according to Merton) of the malls, additional observation and qualitative interviews are presented to analyse the latent functions those places have. It can be shown that the functions these malls fulfill for the adjacent urban area go beyond providing supply of food, clothes and basic household equipment. Instead they are foci of urban functionalities that no other institution can or is willing to provide. It is investigated which functions the malls take over, which gaps - left by employers and state institutions - they fill. Malls perform as platforms for social interaction and entertainment in various ways and are therefore interpreted as crucial nuclei of urbanization processes.

## The Changing Geography of Consumption: Exploring the Rise of Super and Hypermarkets in Turkey

*Nuri Yavan (Ankara University Department of Geography)*

Recently, there is a growing interest on retail geography and consumption space. To understand the urban economic geographies of retailing and consumption, it is useful to look at Turkey as an example. As service sectors have experienced rapid expansion, especially the food retail industry, since 2000s, super/hypermarkets have dramatically developed in Turkey and become the winning format in fast-growing retail sector. Indeed, the rapid rise of super/hypermarkets in Turkey has changed not only traditional retailing structure and urban commercial space, but also the consumption behavior of citizens. Despite growing investment and ongoing hot debate on urban retailing and consumption sector in Turkey, however, no study has been conducted at the provincial/regional level. Therefore, this paper examines the spatial distribution and location characteristics of super/hypermarkets in Turkey. The paper uses both regression analysis and geographic information system techniques to capture socio-economic factors that determine the location of super/hypermarkets in Turkey. The paper also looks at and compares different retail formats, namely discount supermarket, classic supermarket and hypermarket, at provincial level in terms of spatial patterns and determinants. Our descriptive analysis reveals that spatial distribution of super/hypermarkets within Turkey is extremely uneven. Most of super/hypermarkets are located mainly in coastal regions and in the developed western part of the country. Some provinces/cities located in the eastern part of the country were not chosen by retail chains and thus did not receive any super/hypermarket investment so far. The hypermarkets are mostly found in the metropolitan city that are economically developed and have a relatively large population while supermarkets have spread across the regions of Turkey, mostly in intermediate cities. Our empirical results indicate that there are important differences among different retail formats regarding location determinants. Keywords: Retail, consumption, urban economic geography, supermarket, hypermarket, spatial distribution, location determinants, Turkey

## Business and tourism – Engine for development for good and bad

*Lotta Braunerhielm (Karlstad University), Thomas Blom (Karlstad University)*

To an ever increasing extend regions, often peripheral geographical regions, puts a great faith in commerce and shopping which is regarded as a substitute

to traditional industries. Shopping is of course an essential factor for our economy and occupation, but is it enough for a stabile and long-term sustainable ground for our future challenges and international competition? The industry of business production is in some regions regarded as an important factor for building sustainable societies. At the same time it is the importance to encouraging the individual creativity. Creativity and cultural industries is looks upon as important conditions for creating local and regional development. Cultural attractive regions attract both business and individuals and culture is an important resource for marketing of places and for the experience economy. Today we can also see a wider selection of culture-related businesses. There is though a balance needed to look after the interest of a place in contrast to 'selling' a place. This problem is often discusses rather uncritical. Instead shopping and tourism as a solution on many of the structural problems of development are emphasized. These businesses are positively creators of occupations for youths but at the same time there lies a danger in regions where strategic investments again are made in an one-sided branch of business. A structure of one-sided business, apart from the position, is problematic for a regions possibility to develop successfully and on a long-term basis. This is a matter of importance irrespective from if it is a dominant paper industry, a large shopping mall or a dominant tourism industry in a region. In the same way as cites has been transformed from cities of traditional industries to cities of culture there is a development in peripheral regions on shopping and tourism. Today societies are built on shopping, business and tourism in an increased speed and places with an earlier one-sides industry are seldom investing in an non one-sides industry, an industrial community - the mill spirit. National and international stores are expected to work as an 'engine' and generate development and growth. Statistics are at the same time showing that the interests of higher education among youth in these regions are often very low. The explanation is often that the demand for higher education is non-existing or very low for the benefit of an occupation in the shopping industry. The aim of this paper is to illustrate the problems within regions which has transformed from one-sided industry to another. The level of high education, the interest of higher education among youth, high unemployment and the problem of migration within these regions are factors which are going to be the starting point in the discussions in the paper by Lotta Braunerhielm and Thomas Blom.

## UDC 20-02 - Revolution or transformation? The rise of supermarkets and malls in developing countries and their urban and social impact 2

*Chair: Ulrich Jürgens, Ronnie Donaldson*

### The Khayelitsha Business District and Mall Development: An Urban Renewal Success story in Cape Town?

*Ronnie Donaldson (University of Stellenbosch), Danie Du Plessis (Stellenbosch University)*

In his state of the nation address in 2001, former President Mbeki announced the launch of the Urban Renewal Programme (URP) as an area-based approach as a ten year initiative to address poverty and underdevelopment in targeted areas, with specific emphasis on improving joint government planning and implementation. Townships were spatially engineered by the architects of apartheid and excluded by design; and are today, typified by high levels of poverty and crime. It is in the undoing of these two social malaises that the URP has anchored itself on the policy agenda. The excluded by design areas have also become excluded by decline areas. The URP focused on eight urban townships in the country as pilots that would pave the way for an urban development strategy on urban renewal to be developed and implemented nationally once the ten year pilot period elapsed. The paper is a review of best lessons learnt and practices of the development of the Khayelitsha business district.

### The hyperplaces and the trade districts in the Brindisi experience

*Stella Pietrarossa (Bari University)*

The city of Brindisi is on a natural harbor, its territory lies between the sea and the plain of 328 km and is characterized by a high agricultural vocation. Considering the morphological system, it is possible to distinguish two macro-contexts: the first consists of the old town and the modern city, the second is represented by the suburban system, where the residents suffer the consequences of the distance from the central areas also in relation to civic functions (Municipality of Brindisi, 2009). The old town of Brindisi is the epicenter of relations and exchanges, and has developed hand in hand with the business, representing the current city center. The area has a commercial vocation,

therefore, a central location and includes 200 economic activities, two-thirds of which operate in non-food sector. The problems related to the lack of parking and the general decrease in consumption lead to a loss of polarity for the exclusive benefit of the province. The "enhancement networkpath of some municipalities in the province of Brindisi" is to be worthy of attention. In fact, in 2007 and 2008 marketing strategies were launched, aimed at generating liveliness and attractiveness while shopping in town centers (AA. VV., 2009, pp. 26-36). Examining the data provided by Dr. Rotondo, the official of the "Trade in permanent employment", it emerged that in recent years the City has been restrictive in the modern type distribution, so much so that the on the territory we have a few large plants. However, it is expected the construction of a commercial integrated area that responds to the need to modernize a system in state of crisis and out of step with the times, which proved unwilling to experiment with new patterns of consumption. At the same time, considering the decline and loss of polarity of the historic center, Brindisi has followed the example of many Italian cities and in April 2010 initiated a program of actions for the creation of an urban trade district, aimed at improving the attractiveness of "a commercial container which consists of an agglomeration of spontaneous offer" (Municipality of Brindisi, 2010). Its implementation refers to a long-term goal, in order to create an environment that facilitates high-quality social relationships and activities of common life, allowing people to meet the needs related to purchases and relational aspects (Municipality of Brindisi, 2010).

### Shopping Center: Between place and placeless

*Flavio Bartoly (Federal Fluminense University)*

In the decade of 1940 in United States and in the years 60 in Brazil, probably, the affirmative that the shopping centers were less representatives for the everyday life and that the relation the public had with this spaces were very distant would not be contested. There were not much to do in a shopping center, because the administrations didn't get the potential of being more than a center where people would just buy things and with this, attract more people. Going to the mall was then unusual, quick and only for shopping. This first insertion of the shopping in the city, characterized as a space just for shopping, homogeneous, objective and little communicative, made this urban equipment a possible example of what some authors would call 'placeless'; a standardized landscape, projected without take in consideration contexts or particular factors which could promote an identification with the people who are there. A space without peculiarities, a landscape without form, without soul, materialist (valuing

spiritual and intellectual things too little) which reduces the communication to the minimum necessarily required by objectivity. This point of view argues that shopping, by its own lack of authenticity, can't be reputed as a place. For many years, a lot of factors contributed for the considerable modification of the shopping's insertion inside the urban areas, even if the homogenized form and the main goal of the commerce are prevail. The shopping became also a space of sociability, where people meet everyday, have fun and go for a walk. Despite we can qualify the shopping's sociability as 'instrumental' (because it is a strategy of the administration in order to amplify the time to people stay and buy), the sociability is an objective itself to the users. So we took the challenge of establish a discussion about the valuation of calling the shoppings of today as placeless, especially because in nowadays, there are much more deep relationships between the shopping, the users and the city itself. Through its spatial organization, the search for a 'placed' dimension of the shopping can bring to geography, important contributions towards the comprehension of the aspects of the contemporary urban reality. With this objective, we made a bibliographic search, which provided us with the instruments to establish discussions about the conceptions of place, placeless and sociability, and also, a possibility of a better comprehension of the insertion of the shopping at urban space in nowadays. We collected also a number of data in BarraShopping and Iguatemi, well as made interviews with the administrations and users of these shoppings of Rio de Janeiro city, in Brazil.

### **Supermarkets Effects in India with emphasis to Kolkata**

*Sanjukta Ghosh (Calcutta University)*

India is one of the world's fastest growing economies with a present population of 1.21billion. Due to recent economic escalation and high potential of purchasing cum spending capacity of the consumers particularly young generation are making money at a faster pace with wide employment avenues availability are moving towards the concept of supermarketisation which started in kolkata during mid 2000s registering a rapid leap of development within a span of ten years. These malls are basically acting as a means of parasites who are engulfing the small traders. The implications is particularly accelerating the wayout by which supermarkets are acting as dominant food suppliers all over India and kolkata is no exception in this regard. It has been found that the regular hectic urban lifestyle of kolkata has contributed in making daily grocery shopping from malls with a mission to get all ingredients under one roof at no extra transport costs. Percentage of shoppers are basically youngsters to high income

people who aspire for living better urges them for spending maximum. Primary drivers are the young groups who are born and brought up with television, internet and are exposed to the evergrowing transformation and cultural adoption of the urban cosmopolitan culture. Positive macro trends like mass awareness, more affluence, plastic money, promotional offers, status symbols and finally high percapita income of people involved in secondary and quinary activities are acting as prime factors for the continuous developments of supermarkets and malls in kolkata. Further analysis reveals that para-shops or corner shops of kolkata are facing difficulties due to lack of capitals which are obstructing them from providing consumer services to the customers. On the other hand concept of packaged foods are gaining importance due to their ready availability all time. Foreign food purchase is also a common phenomenon observed in malls of kolkata. Peculiarities are also observed in consumers where a large portion of able buyers consider malls as a means of "family - hangout place". The main theme of this paper is the study of the changing socio-cultural aspect of kolkata with their onsets. In nutshell supermarkets and malls are posing a great threat to the traditional retailers and unorganised sectors. Key words: Supermarketisation, Food products, Young groups, Urbanisation, Cosmopolitisation, Better Living, Transformations.

## UDC 21-01 - Spatial analysis and modeling of the human-environment interface of urban areas 1

*Chair: Lex Comber, Tobia Lakes*

### **Metropolitan urban growth in Latin America. Instruments for participatory planning: Experiences with simulations models**

*Cristian Gabriel (Urbanismo y Diseño- Universidad Nacional de Córdoba)*

Latin American cities show a urban growth process that continues the metropolization processes started in '70 and '80 of the past century, however showing different characteristics in the past two decades: changes in population structure (fall of the population growth rate, decline in growth of metropolitan central cities and related to this the growth of small and medium towns in some cases explosive in the metropolitan areas), changes in land uses (monofunctional areas following connectivity criteria), fragmented spatial organization (enclaves with limits and controlled accesses) and associated with this a social segmentation where gated neighborhoods of homogeneous high incomes groups stand in contrast to slums, agricultural fields or industrial areas. Add to this there is a lack of consideration of the territorial support with a consequent strong impact on the natural systems, only with mitigation reduces to the intervention area and in many cases with a cosmetic character and a historical resistance to investing on infrastructure. All of this in a context where planning has a weak tradition. All these factors lead to present the current urban conditions as critical and unsustainable in the short term. Moreover urban management currently has some tools such as simulations models through computer-assisted system (GIS) to visualize and to plan urban futures, incorporating citizen participation. This work records experiences in using of simulations models as planning instruments in the Latin America context, in cities with metropolitan growth and in particular discusses the experience in the construction of an urban growth simulation model for the small town of Rio Ceballos (17.000 inhab.) that integrates the metropolitan area of Córdoba (the second largest city in Argentina with 1.5 million inhab.) Finally, this paper seeks to provide some answers to the question: If it has instruments that allow understand and explain the urban growth processes and its consequences as well as different possibilities for the future, is it possible to integrate political, social, and economic actors and the general public in a virtuous planning participatory process towards sustainability horizon.

### **Simulating the Future Spatial Pattern of Natural Environmental Impacts of Urban Growth by Cellular Automata and Multivariate Statistics**

*Hsing-Fu Kuo (Department of Urban Planning), Ko-Wan Tsou (Department of Urban Planning, NCKU)*

Changing land use and urban expansion are key drivers of global environmental change, and inevitably consequences of economic and social development for most cities. The change of land use in the city is unavoidable during the process for urban development. Most land utilization changes will produce negative impacts to the natural environment, especially to surface temperature, run-off and urban habitat which are easily affected by local factors. Although many case studies have already discussed about the impact to the natural environment for urban land use in the past, most have focused on single environmental index rather than the comprehensive impacts. Meanwhile, possibly owing to the lack of more detailed and identical information of land use change, most studies failed to explain spatial analysis more deeply and to master the spatial characteristics of the natural environmental impacts. This paper aims to provide a systematic assessment method to simulate and analyse the future spatial pattern of natural environmental impacts of urban growth by cellular automata, factor analyst and component analyst. We took Tainan as study area and compared impacts on future urban spatial development under two periods: (1) 1994-2005, and (2) 2005-2030. Tainan is located in the southwestern coastal plains of Taiwan, governing an area of 175.645 km<sup>2</sup>. It is the oldest and now the fourth largest city in Taiwan, In terms of the impact, we describe three important environmental performance indicators to evaluate the impacts more thoroughly on heat island effects, run-off and habitat diversity, which have been used from recent studies, and then evaluated and compared the characteristics of natural environmental impacts and spatial pattern of urban land use change. The dataset of land use data for years 1994 and 2005 was collected by land use survey and year 2030 was simulated by SLEUTH-CA model. The result shows that the characteristics of natural environmental impacts can be divided into six clusters, and all three natural environmental impacts including surface temperature, run-off and urban habitat affect the city centre area seriously. With the distance farther from the city center, the surface temperature change increases and the amount of run-off decreases. Such results indicate that the urban expansion has occurred and that the habitat diversity has higher values in areas with the practice of policies or ordinances.

### **Sensitivity analysis to identify sensitive LULC parameter(s) when using CA Markov modeling to predict urban LULC**

*M. Surabuddin Mondal (Indian Institute of Technology, Roorkee), Nayan Sharma (Indian Institute of Technology, Roorkee), Martin Kappas (University of Goettingen), P. K. Garg (Indian Institute of Technology, Roorkee)*

An attempt has been made to explore and evaluate the Cellular Automata (CA) Markov chain modeling to monitor and predict the future land use land cover pattern scenario in Kamrup (Guwahati) Metropolitan district, Assam state, India, using land use land cover map derived from multi-temporal satellite images. CA Markov is a combined Cellular Automata / Markov Chain / Multi-Criteria / Multi-Objective Land Allocation (MOLA) land use land cover prediction procedure that adds an element of spatial contiguity as well as knowledge of the likely spatial distribution of transitions to Markov chain analysis. In this study, evidence likelihood map were used for as knowledge of the likely spatial procedure in CA MARKOV model. This study also establishes the validity of the CA Markov process for projecting future land use and cover changes in the study area. The validation calculates various Kappa Indices of Agreement (KIA or Kstandard) which indicate how well the comparison map agrees and disagrees with the reference map. The validation shows Kstandard is 0.7928. Sensitivity analysis has been also carried out to identify the LULC parameter(s), which have the highest, lowest or intermediate influence on predicted results. The results shows that the land with or without scrub appeared to be most sensitive parameter as it has highest influences on predicted results of LULC of 2007. The second most sensitive parameter was lakes / reservoirs / ponds to predict LULC of 2007, followed by river, agricultural crop land, plantation, open land, marshy / swampy, sandy area, aquatic vegetation, built up land, dense forest, degraded forest, waterlogged area and agricultural fallow land. The least sensitive parameter is agricultural fallow land, which has minimum influence on predicted results of LULC of 2007.

### **Modeling regional urban dynamics with a modified version of the SLEUTH urban growth model**

*Roland Goetzke (University of Bonn), Andreas Rienow (University of Bonn)*

SLEUTH is a well-known urban growth model based on cellular automata (CA), which simulates urban growth with four simple but effective growth rules: spontaneous growth, edge growth, new spreading center growth, and road influenced growth. A 'self-modification' functionality makes the model very

suitable for the simulation of long time spans including 'boom' and 'bust' phases of urban growth resulting in the typical S-curve expansion rate of cities. For the calibration routine at least four historic urban datasets are needed in order to calculate fit statistics between simulated and observed urbanization using different least square regression scores. Many studies that implement SLEUTH as a regional urban model are based upon remote sensing data and hence investigate a time span of maximum 40 years. Especially for larger study areas a time series of four control points (or five for an additional validation) is difficult to establish and homogeneous national or transnational land-cover datasets like CORINE or NLCD are not suitable as a data source because of their small number of individual time steps. To address this and other drawbacks of the model and to make it extendable in order to integrate new scientific findings, we re-implemented the CA-component of SLEUTH in the JAVA-based modeling platform XULU (eXtensible Unified Land Use Modeling Platform). By this procedure the original calibration routine has been replaced by the 'Multiple Resolution Comparison', a well-established method that measures the agreement between maps at different spatial resolutions. Thus, the amount of required control datasets is reduced to two. Other benefits of the re-implementation of the model are a simplified handling including the visualization of the step results, establishing the extendability of the model by object-oriented programming, and the realization of a coupling mechanism that offers the possibility to integrate human decision making to the simulation of urban growth from other static or dynamic models. Here we show exemplary different applications of the modified SLEUTH urban growth model from sample regions in Western Europe (Cologne/Germany, Dublin/Ireland, and Porto/Portugal). We use CORINE land-cover data and classified Landsat imagery as data sources, and enhance the urban growth model with external static models that deliver information on socioeconomic, biophysical, and political driving forces of the urbanization process.



## UDC 21-02 - Spatial analysis and modeling of the human-environment interface of urban areas 2

*Chair: Lex Comber, Tobia Lakes*

### Implications of climate change for livelihood conditions: A system dynamics perspective

*Tabea K. Lissner (Potsdam Institute for Climate Impact Research), Dominik E. Reusser (Potsdam Institute for Climate Impact Research), Jürgen P. Kropp (Potsdam Institute for Climate Impact Research (PIK))*

The causes and consequences of climate change have strong implications for development pathways: the need for a transition towards more sustainable resource use is becoming increasingly clear. On the one hand, societies have to increase their resilience to cope with increasing pressures and adapt to expected changes. On the other hand, further development should aim at mitigating climate change to prevent further pressure. Ideally, mitigation, adaptation and development should be pursued in complementary strategies with the goal of increasing and maintaining a high Quality of Life (QoL). Concepts that address the requirements for high life quality so far remain conceptual and are not applicable to model implications of management strategies for relevant domains of QoL. To address this lack of measurability, we introduce a modelling framework to quantify relevant livelihood dimensions, based on an extensive, interdisciplinary literature review. While the fulfilment of physiological needs is essential for human survival, further elements are relevant to attain adequate livelihood conditions. A quantification of these requirements can provide insights to several important issues in human-environmental systems: situations of instability or conflict may arise in those regions where the basic core needs are no longer fulfilled, whereas the potential for self-determined and stable development is possible where the fundamental needs are satisfied. Addressing the livelihood complex from a system view, strong inter-linkages between the single components become apparent. Processes deriving from global change can thus have strong direct effects, but also affect many elements indirectly. The system perspective also allows indicating where interventions (e.g. climate change adaptation) are most promising and where feedback processes or secondary impacts have to be expected. This can inform decision-makers on how to optimize decisions to improve livelihood conditions and human well-being.

### The dynamics of binational urban expansion along the U.S.-Mexico border

*Erick Sánchez Flores (Universidad Autónoma de Ciudad Juárez), Rolando Díaz-Caravantes (UACJ), Luis Carlos Bravo-Peña (UACJ), Marisol Rodríguez-Sosa (UACJ), Iván Ruiz-Hernandez (UACJ)*

Land dynamics have been identified as a complex natural and anthropogenic multi-causal phenomenon affecting geosystems balance in several forms including, among others, urbanization, which have become a major driving force at global scale. Characterizing thus the patterns of urban expansion is critical for recognizing the magnitude of its effects and designing the policies to satisfy population growth needs according to the land resources capacities. The analysis of this dynamic is particularly complex in adjacent discontinuous areas such as border regions, where socioeconomic forces act in function of the restraints imposed by different political administrations. In this work we advance in the assessment of land change and urban growth around the main bi-national conurbations along the U.S.-Mexico border, based on remote sensing models derived from 1975 to 2010. Models show a recent period of urban sprawl, mostly in the Mexican border cities, resulting in an asymmetrical growth of the bi-national conurbations. It is plausible to link this expansion pattern to the greater southern population fluxes attracted to the border by the intense industrial activity during the 1990 decade, and the subsequent peri-urban land development seeking to offer cheap labour housing, mostly in the first half of the 2000 decade. These processes, along with insidious land speculation mechanisms, produced urban growth patterns that increased the social and environmental costs of living in border cities. The main distance to functional urban centres increased in most cities in the last 15 years, despite the emergence of the multicentre urban structures; the land use mix decreased mostly in the peri-urban fringe producing enormous dorm cities with limited access to services and urban facilities. In the same way the urban fragmentation increased, in some cases with up to 30% of the urban area left as empty space, which seems unlikely to be occupied in the short term due to the recent deceleration in population growth. This characterization of the urban expansion in bi-national conurbations of the U.S.-Mexico border allowed observing the results of different planning strategies and land control mechanisms that might help to guide a better design of effective land management policies for a more equilibrated development of the border region.



### Social segregation in urban areas – an exploratory data analysis using different statistical regression models

*Christian Levers (Humboldt Universität zu Berlin), Tobia Lakes (Humboldt Universität zu Berlin), Tobias Kuemmerle (Humboldt Universität zu Berlin)*

Social segregation in urban areas shows distinct spatial patterns. Because this phenomenon is influenced by a variety of cultural, socio-economic and environmental factors, it is often difficult to define a set of risk factors correlated with segregation processes in urban areas. However, such a set of site-specific risk factors would be important for drafting development and planning strategies for disadvantaged areas. The aim of this study was to identify the spatial determinants of and their influence on social segregation patterns in the city of Berlin, Germany, using two statistical approaches. We use a dataset of eleven environmental, socio-economic and demographic variables to assess their relationship with a social status index, taken as an indicator for social segregation. All data was available for the entire administrative area (434 spatial units) of Berlin for the year 2009. First, we applied a selection algorithm (best subset selection) to find the 100 best linear models for each model dimension and used the BIC to select the best overall model, thus accounting for explanatory power and model complexity. Subsequently we assessed the contribution of each explanatory variable to the total explained variance via hierarchical partitioning. Second, we used a data mining technique (Boosted Regression Trees, BRT) for model selection and assessing their relative importance. Finally, we compared the results of both approaches. The linear model best predicting the patterns of social status in Berlin was able to explain 47.23% of the target's variance. We identified the following predictors with their relative contribution: Predicted Mean Vote (53.0%), population density per km<sup>2</sup> (28.6%), proportion of green and open spaces (9.3%), standard ground value (4.8%), number of 'creative' companies (2.7%) and distance to water bodies (1.6%). BRTs omitted just one variable and resulted in a better model fit (mean correlation = 0.77). The identified most influential variables were very similar to those selected by the traditional approach. Running BRTs with the predictors selected by the best subset GLM resulted in a slightly worse model fit and similar orders of importance. However, the shares of variable contributions of both BRT models differ from the linear one, which might be caused by the consideration of more variables or allowed variable interactions in the model. We show that the two different statistical approaches both highlight similar spatial determinants linked to social status in Berlin. Furthermore, BRTs enable us to show possible varying influences of the predictors along their data range. We

can conclude that environmental, social and economical factors have an influence on social segregation patterns in Berlin. These first quantitative and spatially explicit insights may allow future mapping of risk areas to allocate decision-making in an integrated environmental and socio-economic approach in urban development.

### The use of urban structure types for hydro-meteorological hazard assessment

*Rene Höfer (Helmholtz Centre for Environmental Research - UFZ), Annemarie Müller (Helmholtz Centre for Environmental Research (UFZ), Rüdiger Glaser (Universität Freiburg)*

Currently ongoing processes of population growth and urban expansion lead to changes in land use and land cover. Besides the creation of new spaces for living and the provision of a range of opportunities, urbanization implies the disturbance of ecosystems and amplifies the generation of hazards. In addition to that urban land-use changes often take place at a high temporal speed meaning that exact data about the new physical urban body are a scarce resource. That complicates the evaluation of hazard generation in dense and heterogeneous urban areas. The potential of high and very high resolution satellite data for the monitoring and analysis of changing urban land-use patterns has frequently been shown in the past. With the application of urban structure types (UST) this research employs a more recent tool of geodata-based urban research. The objective of this research focuses on the explanatory power of UST for the analysis and assessment of hydro-meteorological hazards. The study tests if distinct USTs can be used to explain the generation of heat, flood, and water scarcity hazards in different Latin American urban settings. One municipality of Santiago de Chile was used as an in-depth study area. The analysis is based on high and very high resolution satellite (Landsat TM, Quickbird), census and GIS data. The first analysis step is the determination of hazard prone areas that are later used as a dependent variable. The second step comprises the identification and derivation of UST for the study area. The UST do thereby contain information on the proportion of vegetation, the amount and socio-economic level of the population, the elevation, the spatial location, and the distance to green spaces. Finally, the regression model is applied to proof the explanatory power of USTs in the context of hydro-meteorological hazard generation. The study shows the potential and also the limitations of UST for the estimation of hydro-meteorological hazards in a large and heterogeneous urban setting.



## UDC 22-01 - Spatial justice in cities in the South: What can spatializing information tools contribute to urban governance networks? 1

*Chair: Isa Baud, Yola Georgiadou*

### In principle, who benefits from SDI?

*Christine Richter (University of Twente), Yola Georgiadou (University of Twente), Yola Georgiadou (University of Twente)*

SDI research to date has focused on how SDI should or can be developed, how SDIs are evolving, what problems are encountered during implementation, and what the results are, often from the point of view of taken-for-granted western principles underlying the need to develop SDIs. The INSPIRE principles are a celebrated set of SDI principles in the EU. The official Indian NSDI discourse justifies the need to develop SDI by mobilizing INSPIRE-style principles. These (western) principles are being contested in India. NSDI meets opposition at the level of its underlying justifications from those who would become excluded and those who speak from the perspective of people potentially excluded. The 'losers', some of whom are able to actively oppose, are people excluded from data construction, access to land and money, and decision making if principles were fully translated into practice. We analyze qualitative, empirical data collected in Indian cities. The data captures slum mapping practices, the development of urban digital property databases, and GIS work in district mapping centers. We identify who would benefit and would lose from adherence to the western NSDI principles and how opposition to NSDI manifests itself. Who loses (opposition) and who benefits depends on situation, and does not neatly follow agency, administrative level, or socio-political categories. Therefore, we derive a typology of opponents based on who loses ability to construct data (including classifications, paper based lists, etc.), access to land and money, and/or influence on decision making. We show how NSDI shapes up in the face of such opposition. Finally, we propose a conceptualization (and explanation) of the current form and function of NSDI in India. We conclude on an optimistic note. The western principles underlying NSDI development benefit some, but not others. They are still up for debate in India, and NSDI provides a productive stage for such debate to take place.

### The Politics and Knowledge Management of Megaprojects in Fast Growing Cities of the South

*Loraine Kennedy (CNRS, CEIAS-EHESS)*

Large-scale economic and infrastructure projects in developing countries, aimed at leveraging the potential of cities as growth engines, throw up particular challenges for urban sustainability by fuelling land speculation, exacerbating urban sprawl, reorienting employment patterns, displacing local populations and livelihoods, and increasing environmental health risks. These specialised spaces usually aim for maximum global connectivity without necessarily favouring linkages with the local economy, thereby creating risks for urban spatial fragmentation and social exclusion. As part of an international comparative study on urban resilience, two aspects of megaproject development are examined: knowledge management systems and governance patterns. We analyse the mobilisation, generation and sharing of knowledge involved with the conception of mega-projects including the models that inform urban agendas and the policy instruments used. We examine city politics to understand which local groups are driving the process, which levels of government are most directly involved, and to what extent are decisions the result of transparent and participatory decision-making processes. We are also interested in social movements contesting megaprojects, and specifically in their use of spatial knowledge. This paper presents preliminary results from case studies in Delhi and Chennai in India, with comparisons from South Africa, Brazil and Peru. This research is part of an on-going project, Chance2Sustain, financed by the European Commission (FP7).

### Knowledge Construction and Exclusion in Realizing Spatial Justice

*Sridharan Nomperumal (School of Planning and Architecture)*

Strong juxtapositions are emerging in the context of urban development process in India (juxtaposition in terms of core and periphery, contrasting rich and the poor dominated areas in terms of service access, etc). Soja's (2010) concept of 'spatial injustice' is used along with the concepts of 'Second Capability' and 'Regulatory fractures' by Sassen (2006) to explain the phenomenon of spatial inequalities in an emerging metropolis in India (Hubli-Dharwad city in Karnataka State). The idea of 'formateurs' used by Congleton (2011) to explain the convergence of rent-seeking interest in attracting investment and spatially targeting it, is used in this paper to explain why certain areas were designed with a better infrastructure and attracted more investment than others, thereby creating 'spatial injustice'. Using the primary survey of elected representatives,



stakeholder and municipal officials interviews, this study analyses the spatial, infrastructure and budgetary inequalities in space due to lack of convergence between knowledge generated from the field and matching that knowledge through budgetary actions. In the end, the concept of 'spatial consciousness' propagated by Soja, is used to explain the importance of 74th Constitutional Amendment Act in achieving 'participatory forms of democratic politics' and social activism at the local level through 'local knowledge construction and its use in budget allocation'.

### Poverty mapping in Indian cities: Improving the index of multiple deprivations

*Karin Pfeffer (University of Amsterdam), Javier Martinez (University of Twente), Isa Baud (University of Amsterdam), Tara van Dijk (University of Amsterdam)*

Recent discussions of urban poverty recognize its multi-dimensionality, focusing on the range of deprivations with which poor households cope (Moser, 1998; Rakodi and Lloyd-Jones, 2002). In earlier research we developed an index of multiple deprivations, theoretically based on the asset-vulnerability framework (Moser, 1998), to map multiple deprivations and their spatial variations across electoral ward levels in Indian cities (Baud et al., 2008). This city-wide approach is a spatial representation of unequal conditions in urban areas which complements smaller surveys and qualitative research frequently carried out in poverty studies. It can be used as a strategic instrument in identifying poverty hotspots, and the different combinations of deprivations loading onto the index can be made visible. However, it has several limitations. To begin with, it is confined to the information given by the Indian census and its validity is reduced over the long time period between Censuses. Second, it is an administrative area-based index, providing an average measure of the diversity of deprivations actually present, while electoral wards in India hold unequal numbers of households and are not necessarily homogenous in terms of socio-economic characteristics. Third, it ignores the relational perspective, which indicates how households differ in their access to basic services as well as social networks, even when provision of services exists. The aim of the paper is to address some of the shortcomings of the original index of multiple deprivations and to develop a more integrated spatial representation of households' multiple deprivations in urban areas. The framework for improving the index is based on different sources of spatial data in four Indian medium-sized cities in two southern states. We make use of a mixed-methods approach that includes census data from the census 2001, geographic data where available, household surveys in selected

wards covering areas with varying degree of deprivations, e-grievance (complaints) data and qualitative interviews. Therefore, the approach combines geographical information analysis, statistical analysis and qualitative analysis to come up with a fine-tuned index for measuring multiple deprivations. We conclude the paper with recommendations on measuring and mapping multiple deprivations in urban areas and possible applications to other urban areas. Baud, I.S.A., Sridharan, N. and Pfeffer, K., 2008. Mapping urban poverty for local governance in an Indian mega-city: the case of Delhi. *Urban studies* 45, 1385-1412. Moser, C.O.N., 1998. The Asset Vulnerability Framework: Reassessing Urban Poverty Reduction Strategies. *World Development* 26, 1-19. Rakodi, C. and Lloyd-Jones, T., 2002. *Urban livelihoods. A people-centred approach to reducing poverty*, 1st., Earthscan, London.

## UDC 22-02 - Spatial justice in cities in the South: What can spatializing information tools contribute to urban governance networks? 2

*Chair: Isa Baud, Yola Georgiadou*

### Values and Ethics In VGI/CO platforms: An analytical framework set on participation imperatives and governance criteri

*Javier Martinez (University of Twente), Michael McCall (ITC), Gianluca Miscione (University of Twente)*

This paper develops a framework for assessing how VGI/CO systems and platforms perform with respect to measures and principles of participation and other good governance criteria. The framework is applied to representative VGI/CO examples from literature and the Web, and specific cases where the authors have participated. The aim of the framework and analysis is constructivist: towards appropriate matching of VGI/CO modalities with different purposes, actor categories, governance contexts, and application fields. Firstly, the range of VGI/CO platform systems and methodologies are categorized by characteristics, histories, intentions, and practices: 1. Platform modalities and methods (sometimes participatory) for generating and managing local spatial knowledge (LSK), e.g. : VGI, HSW, crowd sourcing, PGIS, participatory mapping; 2. Broader conceptualizations of alternative knowledge formation -: UGC, Citizen Science, CO (citizen observatories), citizen journalism; and 3. Specifically GIS and GI technologies: GIS/2, web GIS, geotagging, etc. Key distinctions are between Volunteered (known & activated) information, and Opportunistic (known-but-passive, or unknown & unpermitted) involvement; and between unidirectional gathering of citizens' information, and interactive flows, as feedback or dialogue flows. Second stage is analysis of platform systems in terms of participation practice. Who are the actors? Who designs the VGI/CO frameworks? Who tests, processes, and are final users? Who supplies and owns information? What intensities of participation? The framework is used to analyse the structure, behaviour and consequences of VGI/CO systems with respect to ethical criteria and good governance principles. Do systems enhance or detract from legitimacy and accountability potential empowerment, respect for rights, validation of local knowledge equity? The framework is further developed through application to CO, VGI, and citizen science platforms, including experiences with: (i) human sensor web for monitoring urban water

delivery, Zanzibar (ii) PGIS for REDD MRV in community carbon forestry initiatives (iii) e-grievance system in India. Without current consensus on an overarching term for the set of approaches, systems, methods , we use the combined term VGI/CO (volunteered geographical information / citizen observatories).

### Spatiality of urban informality: The process of (negotiated) urban transformation in Dhaka

*Shahadat Hossain (TU Dortmund), Kirsten Hackenbroch (TU Dortmund)*

In two recently completed research works we have investigated the negotiations of access to public space and water supply in Dhaka, Bangladesh. The research which predominantly took place in areas where access to public space and municipal services is commonly negotiated in an entanglement of statutory and informally operating actors has pointed at patterns of inclusion and exclusion and the resulting spatialities of justice on a local and city scale. Access to space and services is contested and continuously negotiated and rearranged in an environment based on patronage-like relations and hierarchies often based on charismatic local 'social' and 'political' leaders. These leaders, the local elite groups, tend to dominate decisions and negotiations. The experiences gathered in these two research works will be extended in this paper (based on continuing research work) to understand the patterns of inclusion and exclusion emerging with urban expansion and changes in the urban morphology in Dhaka. In a sphere characterised by informality as a mode of the production of space (Roy, AlSayyad 2004) the paper seeks to investigate how such spatialities of (in)justice (Soja 2010) are produced and by whom. This includes taking note of the contestations of interests in decision making on spatial expansion and distribution of public resources (e.g. land, housing, infrastructure, utilities). This paper then seeks to contribute to an understanding of how the negotiation processes leading to urban transformation can explain the persisting urban complexities and spatialities of (in)justice in Dhaka. The paper further seeks to suggest based on empirical materials which information may be used to advocate for a growing recognition and servicing of areas considered a 'socio-spatial periphery' in the eyes of urban planners and policy makers. The empirical evidence is based on qualitative and spatial data gathered from an expanding peripheral settlement of Dhaka. Different stages of development and inclusion/exclusion into the city by planning and services but also perception of inhabitants of the way they are integrated and able to access urban amenities are investigated. The relatively large and diverse settlement is investigated

following a transect axis. References Roy, Ananya; AlSayyad, Nezar (eds.) (2004): *Urban Informality - Transnational perspectives from the Middle East, Latin America, and South Asia*. Lanham, Maryland: Lexington Books. Soja, Edward W. (2010): *Seeking Spatial Justice*. Minneapolis, London: University of Minnesota Press.

### **Community Production of Spatial Knowledge: A comparison of the South Durban Community Environmental Alliance (SDCEA) GIS project in Durban, South Africa and the Transparent Chennai project in Chennai, India**

*Dianne Scott (School of Built Env. & Development Studies), Isa Baud (University of Amsterdam), Eric Denis (French Institute of Pondicherry), Karin Pfeffer (University of Amsterdam), Tuuli Ranta, Cathy Sutherland*

Urban communities in fast growing cities in the developing world are increasingly creating spatial community knowledges to both challenge and contribute to planning processes of large-scale urban development projects, countering neoliberal forms of development dominating the urban landscape. These can be conceptualised as forms of 'counter-knowledge', providing alternative visions of urban futures aiming at more resilient and sustainable futures. These types of knowledge are inserted into development processes through deliberative forums ('invited spaces'), activist spaces ('claimed spaces') or 'negotiated spaces'. This paper compares two forms of community knowledge production; their contexts; the processes of knowledge production; the types of knowledge produced; the strategies used to impart this knowledge (deliberative forums/activism); the politics of community knowledge production and the outcomes of these highly politicised processes of knowledge production, transmission and exchange in the urban development process. The first form relates to a case in South Durban, South Africa, where knowledge production was initiated by the South Durban Community Environmental Alliance (SDCEA). It is a civil society organisation which engages in both state-led deliberative forums, and activist protest challenging the state. In South Durban communities live adjacent to Africa's largest port surrounded by heavy industry and refineries. Since the state and industry refuse to accept lay knowledge as valid evidence of environmental impacts, SDCEA has a strategy to produce 'civic science' - community knowledge produced scientifically - by creating their own GIS maps. These display point sources of emissions in South Durban; complaints about pollution; and qualitative narratives of residents through the GIS memo function. In this way SDCEA uses GIS to challenge urban planning processes, documenting

environmental and social injustices of increasing industrialisation and development of South Durban. The second form of community knowledge production, referred to as Transparent Chennai (TC), is an initiative of a number of young professionals, mapping social issues in Chennai, India, through a website together with a network of people providing information on situations in Chennai which can be improved. The initiative includes a GIS-based web-interface, geographic information produced by residents, and negotiations by TC professionals with local officials in order to improve existing problem areas in Chennai. It represents a middle-class community initiative within a claimed space which is being transformed into a negotiating space. Both forms of knowledge production are bottom-up initiatives with a broad network of different actors democratizing the way information is produced, used and shared.

### **Spatial and temporal patterns of robbery and armed robbery in Minas Gerais, Brazil**

*Alexandre Diniz (PUC-Minas), Gustavo Costa (PUC-Minas), Vanessa Brandão*

In recent decades crime has represented a major cause of concern especially among the populations of large urban centers and underdeveloped countries. Several social, cultural, demographic, economic, and health related transformations are leveraged by the evolution of crime, calling the attention of numerous scientists. Given its undeniable importance as agent of spatial transformation, crime becomes a phenomenon inevitably attached to geography. This article seeks to understand the spatial and temporal dynamics of two criminal procedures among the municipalities of Minas Gerais State, Brazil, between 2001 and 2009 (robbery and armed robbery), identifying the mesoregions more prone to its manifestation. To this end, we use crime registration data gathered by the Military Police of Minas Gerais, Brazil. Using population data from the Brazilian 2010 census crude rates per 100,000 inhabitants were advanced for both crime offences. Seeking to smooth and adjust rates, accounting for discrepancies in population size among the 853 municipalities scrutinized, crude risk rates were submitted to a three-year moving average approach. Growth rates were produced in order to grasp the temporal evolution of the phenomenon. Standardized and growth rates were eventually mapped, and choropleth cartograms produced using municípios and meso-regions as spatial entities. Spatially, results indicate the existence of two primary focal regions for robbery and armed robbery in Minas Gerais State, namely Belo Horizonte metropolitan region and the mesoregion Triângulo Mineiro. Temporally, research data revealed that armed robbery experienced an



increase until 2004, after which the phenomenon began to decline steadily. The same behaviour was observed across robbery rates, which experienced an increase up to 2006, and a consistent decrease decrease since then. Despite the fact that the majority of municipalities were less plagued by robberies in 2009 than in 2001, one cannot deny the fact that rates are still relatively high in many cities, especially among the largest urban centers of Minas Gerais. Thus, is necessary to develop specific public policies aimed at preventing criminal activities among small and larger urban centers of the state. This research has been funded by FAPEMIG.

## UDC 23-01 - Strategic urban planning for sustainable development: Methods and experiences 1

*Chair: Jonathan Barton, Volker Stelzer*

### Strategic, integrated planning for sustainable metropolitan development: The case of Santiago de Chile

*Jürgen Kopfmüller (Karlsruhe Institut für Technologie), Jonathan Barton (Pontificia Universidad de Chile)*

As urbanization marks a key trend in global development, cities in general and megacities in particular play a crucial role in global change processes and thus for realizing (global) sustainability. Given the complexity and dynamics of megacities as socio-ecological and socio-technical systems as well as the complexity of the guiding vision of sustainable development, this calls for accordingly integrative research approaches, analytical tools, and governance concepts. In particular, this is the case in Latin America with its long lasting urbanization experience and several mature primate or mega-cities. In this presentation, key results of the German-Chilean 'Risk Habitat Megacity' research initiative (2007-2011) will be shown, which dealt with the Metropolitan Region of Santiago de Chile. In distinction from most previous research on megacities focusing on their global economic role or on particular sectoral issues, here an integrative research approach was applied considering both sustainability-related risks and opportunities. This approach will be outlined, consisting of analyses on several typical fields such as energy, water, transportation or land use, and an analytical framework built by the sustainability, risk and governance concepts. Selected results will be presented, related to the current and future sustainability performance based on scenarios for 2030. Against the background of key deficits and risks such as air pollution, water stress, transport gridlocks and socio-spatial polarization, institutional conditions and deficits as well as proposals for improved general and field specific governance approaches will be outlined. The presentation includes highlights of the initiative regarding the conceptual architecture, methodological considerations (for instance regarding the scenario tool), results of analyses, and governance-related recommendations. The basic objective is to show options for strategic urban planning in order to suitably implement an urban transition towards a more sustainable, equitable city. Among other tendencies, this type of transition would include a revision and reorganisation of strategies and policy

development across different levels and sectors of administration as well as a redistribution of national and local political and administrative responsibilities.

### Sustainable Futures – functional use of scenario technique to identify regional system potentials

*Timo von Wirth (ETH Zurich), Ulrike Wissen Hayek (ETH Zurich), Antje Kuntze (ETH Zurich), Noemi Neuenschwander (ETH Zurich), Roland W. Scholz (ETH Zurich)*

Urban regions as dense nodes of material and energy consumption are not by themselves sustainable. There is widespread consensus that progress towards sustainable urban development is essential for the reduction of future resource demand. However, there is considerable debate on how planner and decision-maker can successfully contribute to more sustainable city regions. The complexity of urban and regional systems, their ongoing pace of urbanization and the inherent uncertainties of spatial and societal development exceed the abilities of traditional planning methods. In order to facilitate urban transitions, knowledge about possible and plausible future pathways is fundamental. Though it is evident that future orientation is in the core substance of planning professions, formal methodologies have only recently gained deeper attention - particularly in the academic community. Scenario analysis has evolved as a tool for systematically examining an uncertain future and enabling learning processes for strategic decision-making. Though, it remains a challenge of scenario construction for urban regions to deal with coupled human and environmental impact factors that are causally related in a dynamic system. The paper at hand presents the application of Formative Scenario Analysis (FSA) in a regional urban development context. Our findings are based on first results from an applied research project carried out in the case region Limmattal, an agglomeration close to Zurich, Switzerland. The agglomeration Limmattal is characterized by a patchwork of land uses and can be called a typical suburban region in Western Europe. The research group comprises of scientists, planners and stakeholders from the public and private sector. We make use of intense science-practice collaboration. Our transdisciplinary process led to four relevant scenarios. In essence, we identify new formal ways of a functional science-practice collaboration within the scenario building process. We further show a methodological approach on how to analyse critical system feedback loops among the relevant impact factors. This reveals regional system dynamics already during the process of scenario building and gives better understanding for a systemic identification of major development drivers. In addition, we



introduce a format for the presentation and interpretation of scenario narratives with practice agents. This format integrates spatial functions, potentials and the dimensions 'Structure', 'Gestalt' and 'Form'. FSA proves to be a suitable approach for identifying systemic sources of regional urban development while integrating all relevant dimensions for sustainability analysis from the outset on. Our findings indicate further research potentials for integrative multi-scale scenarios and for the incorporation of disruptive events towards more robust urban strategies.

### **Future Urban Development Patterns in Myanmar**

*Than Than Thwe (Human Settlement and Housing Development)*

Future Urban Development Pattern in Myanmar: Geographic Setting, Economic Functions, Main Issues and Key Challenges Than Than Thwe, Myanmar This paper is organized into three parts. The first part describes 14 administrative units, 7 geographic zones and topography, demographic perspective, 24 development zones, the linkages of the largest urban centers and communication network. Then, the classification of urban centers and urbanization caused by number of different factors are clarified. By reason of the favorable geographic situation, urban extension areas, the advantages of transportation network and different modes of communication which generate more economic activities in the middle and coastal regions in addition the less development conditions of the eastern, western and northern hilly regions are explained. The vulnerable urban areas: especially the cyclone hit regions, earthquake areas and land slide areas within the urban and related regions have some constraints for the urban spatial development and limitation of road network are highlighted. The second part explains the main regional socio-economic activities which include trade with neighboring countries, establishment of industrial zones and services within the urban network which enforce for the urban area development and forms the development patterns. By integrating favorable conditions of geographic and economic activities can be seen by future urbanization patterns, trends, the large urban centers and their linkages. The third part identifies the main issues and key challenges on urban sustainable development regarding of social, economic and environment sectors. In this range, the urban developments are focused on opportunities and risks of the current activities and coming economic actions. Therefore, the required actions of balanced urban development patterns are discussed at the end. Key words: geographic setting, economic activities, urban development patterns, future trends, key challenges, balanced urban development pattern

### **Metropolitan sustainable development and public transportation challenges – comparing megacities In Latin America and Asia**

*Johannes Rehner (Pontificia Universidad Catolica de Chile), Pablo Lopez (Pontificia Universidad Catolica de Chile), Karen Martinez (Universidad Catolica de Chile)*

Sustainable Development is a strategic challenge that calls for information which is comprehensive, simple, transparent and updated as well. Likewise there is a need for comparable indicators and profound understanding of specific and complex situations as well. As complex system, metropolitan areas are always individual cases and are hardly comparable to other cities. In spite of these apparent contradictions, in order to develop academic proposals for decision making there is a need for comparison at least in order to learn from others experiences. With this purpose a set of metropolitan sustainability indicators for Latin America has been applied to Latin American Metropolis by UN ECLAC (Jordan et al. 2010), an approach which we consider useful for monitoring sustainability in Metropolitan Regions. Starting from the mentioned indicator set we present selected sustainability indicators in order to contextualize the specific cases of two megacities from Latin America (Santiago de Chile and Mexico City) and two asian metropolis (Mumbai and Shanghai). The mentioned cases focus the topic of land use planning (mainly large scale urban projects) and its link to urban (mainly public) transportation. We consider this field as particularly appropriate to discuss sustainable urban planning due to its linkages and feedback to urban growth, socio-spatial patterns, environmental policies and the direct involvement of public policy makers. It is highly relevant as decisions on large scale suburban projects as well as those on urban transportation have direct, important and long-term impacts on the metropolis. The discussed cases fulfill different purposes in order to discuss the challenges of strategic urban planning in a context of extremely fast growing pressure on transportation system (especially Shanghai); the design of suburban mega-projects and related transportation challenges (Mumbai and Shanghai); the multiple social relevance of access to transportation, slum location and social vulnerability (Mumbai); the linkages and co-benefits between urban transportation policies and climate change mitigation (Mexico City) and also conflicts related to the implementation of highly integrated public transportation system (Santiago de Chile). By the discussion of these cases we show from a academic perspective the relevance of combining different methodological approaches to the issue of strategic urban planning as well as - concerning public policy - the need for combining the



logics of projects, which is often prevailing in decision making, and a comprehensive and holistic long-term vision for sustainable development.

## UDC 23-02 - Strategic urban planning for sustainable development: Methods and experiences 2

*Chair: Jonathan Barton, Volker Stelzer*

### **Spatial equity in metropolitan areas: A measurement proposal based on access to public services. The case of the metropolitan area of Valencia (Spain)**

*Maria-Dolores Pitarch (University of Valencia)*

Spatial equity in complex spaces such as metropolitan areas is a very interesting subject for research, particularly in view of its enormous potential public policy applicability. Accessibility is a frequent basis for models and explanations that attempt to throw some light on the implications of the geographic distribution of public services. Along these lines, an approach to the subject based on the population's access to essential public services (education, healthcare and social services) is proposed. Geographic Information System (GIS) tools have made a powerful contribution to the ease with which both spatial and statistical data can be handled. The study covers the Metropolitan Area of Valencia, in Spain. It is based on the location of public facilities and the population's ability to move around by public transport (city buses and underground/tram network). The objective is to give an overview of the situation in this area and point to problem zones in the context of the metropolitan area with the aim of suggesting solutions to their problems that may help to improve their social and spatial sustainability and equity. This requires a complex modelling of urban mobility on the networks that carry it, an exercise for which TRANSCAD 6.0 transportation GIS software was employed. In order to achieve the nearest possible fit to reality, three types of networks were studied: the pedestrian network, the Valencia city bus network (EMT) and the Metrovalencia underground/tram network in the different municipalities it passes through. In all cases, the transport service frequencies and their operating speeds were considered for all the different lines. The journey time matrices obtained in this way were used to construct an accessibility index, the Spatial Separation Index. The main conclusion, from a strictly territorial point of view, is that the VMA is a space that presents considerable inequalities, some municipalities lack basic public transport and in some in the west and south of the area, access to all types of service is very poor. These zones include particularly troublesome neighbourhoods from a social point of view, some physically isolated, with many low-income families and little provision of public transport. The proposed model

makes it possible to detect black spots in which the inhabitants' quality of life is clearly affected. Additionally, access to the different types of public service is also very unequal. Given this context there is an evident risk of urban fragmentation and segmentation, which is reflected in social matters (and viceversa). The relationship between mobility and social exclusion in an advanced society is not caused by a lack of social opportunities but by the lack of access to them.

### **Contrasting demographic and land-use dynamics: The dichotomy of urban and suburban development in the Metropolitan Area of Santiago**

*Ellen Banzhaf (UFZ – Helmholtz Centre for Environmental Research), Annegret Kindler (UFZ-Helmholtz Centre for Environmental Research)*

The rapid population growth and urban expansion in Santiago puts enormous pressure on the environment: agricultural land is now gradually being transformed into built-up areas, while the share of green space dwindles. Suburban construction, e.g., in the Andean piedmont, and the clearing of avalanche forests in mountain regions produces long-term environmental impacts such as heightened imperviousness of land surfaces and their respective consequences. Demographic and land-use change are major drivers of urban growth and produce multi-faceted patterns. In this study the simultaneous spatial processes of increase in the suburbs and decline of population in the urban area, and the expansion of built-up land use into suburbia are investigated for the 34 municipalities of the Metropolitan Area of Santiago de Chile (MAS). The contrasting development is studied for the 22 central urban and the 12 suburban municipalities of the MAS. Identifying the principal features of land-use change is an important task and findings should in particular provide information on time, space and quantity. Land-use changes were calculated based on remotely sensed data for the time 1993 to 2009, and indicate urban growth through the transformation from agricultural use and other open spaces. It shows the amount of land changed into built-up areas and demonstrates the direction and pace of urban growth. The changes in the demographic dynamics of MAS will be analysed as the major drivers of environmental quality and therefore of quality of life. The environmental quality can be described by the complex multi-dimensional set of abiotic, biotic and human characteristics that are localised in place and time. Human beings highly influence the urban environment through constructions of various kinds modified and perceived as components of their daily surroundings which have impact on

their social and economic circumstances and their health and well-being. Demographic change leads to land-use change and urban growth. In order to investigate population change as a driving force for urban growth, use was made of urban and regional statistics taken from census data. Investigations of population dynamics made on two spatial levels comprise the MAS in total and the subdivision of the urban and suburban municipalities. A detailed analysis of population dynamics was made for the time period 1992-2009 to establish the spatial distribution of the population in the different municipalities and the changes over time, and to identify municipalities with a growing, declining or stagnating population in the MAS with respect to the spatial indicators of environmental quality. Selected source and performance indicators are analysed to assess the impact of human settlements on the ambient local and regional environmental conditions in relation to environmental health and well-being. They form the baseline for a status quo analysis and are the prerequisites for explorative scenarios.

### **Support of Strategic Urban Planning by Participatory Application of Spatial Information Technology**

*Silke Boos (Institute for Spatial Information and Surveying Technology (i3mainz)),  
Hartmut Müller (Institute for Spatial Information and Surveying Technology (i3mainz))*

Access to spatial information has become indispensable for numerous aspects of urban development, planning and management. The increasing importance of spatial information is reflected in recent strides in spatial information capture (especially satellite remote sensing and Global Navigation Satellite Systems), management (utilising Geographic Information Systems (GIS), database tools) and access (witness the growth in distributed web mapping services), as well as in the development of analytical techniques such as high resolution mapping of urban environments. For encompassing a more efficient management, access and use of spatial information many countries around the world have adopted spatial data infrastructures (SDI). The implementation of this concept for megacity management is also evolving and is reflected in a majority of the worlds existing mega cities using at least some elements of an SDI. Besides better urban planning capabilities the creation of megacity SDI and spatially enabled web services are providing new opportunities to more closely involve citizens in consultations and land administration functions. In the field of data capturing urban sensing techniques provide a promising mean to fill the current gaps in urban information needed to monitor growth and change across the megacity

and to forecast areas of risk. The new generation of urban sensors, including cellular phones, RFID tagged items, GIS related technologies, Web 2.0 and crowdsourcing have significant potential in providing the managers of megacities - and their citizens - with unparalleled access to a comprehensive range of current spatial and environmental information about the evolving workings of their megacities. Peoples' movements can be monitored; their use and modes of transport determined and people can voluntarily provide information about changes to their environment. This information is potentially much more up-to-date than equivalent information from official channels and can certainly provide change intelligence in a highly dynamic environment and in that way support more effective cross-jurisdictional and inter-agency decision-making in priority areas such as emergency management, disaster relief, natural resource management and water rights. This article presents the results of a study conducted by the FIG (International Federation of Surveyors) about the impact of collection, integration, management and sharing of reliable spatial information on megacity management. It highlights the current state of spatial information management in the world's megacities and recommends strategies for improving urban planning in large urban areas through the use of participatory data spatial data capturing techniques, spatial data infrastructures and a sustainable spatial information management.

### **Towards Sustainability and Resilience of Cities and Regions: Integrated Geodata as One Step along the Way**

*Julia Neuschmid (CEIT Alanova), Manfred Schrenk (CEIT Alanova)*

By 2050 two-thirds of the world's population will live in urban areas (UN Habitat 2006) and the urbanisation process is depleting the world's resources and the chief culprit behind climate change. Spatial planning aims at making cities and regions more sustainable and resilient, so that they can handle changes, grand challenges and can balance ecosystem and human functions on long-term. The practice is challenging because cities and regions are dynamic structures and spatial planning processes are very diverse across Europe and the world. However, in a context where environmental threats, vulnerability of cities and regions, biodiversity loss, excessive land use, energy supply, and climate change become more and more global, there is a need for integration of various sources of data and information at different scales. This is why planning has great hopes in the past year's development of Spatial Data Infrastructures (SDI). SDI gives access to geographic data that is stored and maintained by different data providers in different sources on international, national, regional and local level,



harmonised according to common standards, and shared across administrative and thematic borders. The past decade has been influenced by a change of paradigm regarding accessibility of geodata. Traditionally geographic data and information management has been characterised by semantic and structural heterogeneity, multiple storage, and lack of coordination which results in incompatible datasets. Today there are numerous European, national, regional and local initiatives that support the development from "information islands" to "information systems". INSPIRE - the European Directive for a Spatial Data Infrastructure - provides a robust framework. The EU-project HLANDATA contributes to the harmonisation process focusing on land use and land cover data across Europe and addressing several application areas such as the management of waste, and land monitoring. The HLANDATA geoportal provides one central access to decentralised data using web service technology so that users can visualise data from different sources together in one map with one common legend. Geographers, planners, GIS analysts, public administration, decision makers, researchers, the public, all these stakeholders and more require access to adequate and comprehensive data to achieve interdisciplinary and holistic approaches, transparency and participation in decision-making, efficient integrated data management, comparison of data, and monitoring of changes for a sustainable development. SDI can be a supportive element for spatial planning processes as it provides more harmonised data input than ever and helps to better understand and steer urban and regional dynamics.

## UDC 23-03 - Strategic urban planning for sustainable development: Methods and experiences 3

*Chair: Jonathan Barton, Volker Stelzer*

### Sustainable transport planning in Metropolitan Regions: The experiences of Catch\_MR

*Janez Nared (Scientific Research Centre of the Slovenian Academy of Sciences and Arts)*

Transport is a key factor in economic development, as economic growth requires ready access to resources and market. This applies in particular for Metropolitan Regions as engines of economic growth and as regions with very diverse functions. However, this need for mobility and economic growth has as side effect rising volumes of traffic and levels of congestions with significant impact on the environment. The ultimate goal is to have metropolitan regions where transport, and therefore economic growth has minimum impact on the environment (environment-friendly modes of transportation), thus achieving a sustainable transport system, and considering its environmental, technical and socio-economic dimensions. These aspects could not be assessed separately as they are strongly interdependent and consequently require an integrated approach. The above mentioned problems are comprehensively tackled within Catch-MR project, where cooperation between Metropolises and their surrounding functional regions is put to the fore in case of Berlin-Brandenburg, Budapest-Central Hungary, Gothenburg Region, Ljubljana Urban Region, Oslo-Akershus, Province of Rome, and Vienna-Lower Austria. In the paper the situation in the afore mentioned European Metropolitan Regions is described basing on the results of regular workshops attended by regional experts and organized to discuss urgent issues and to exchange experiences.

### Transportation, Land Use Change and the Sustainability in the Metropolitan Area of Santiago de Chile: Scenarios and the Policy Challenges until 2030

*Dirk Heinrichs (Institute of Transport Research), Andreas Justen (Institute of Transport Research)*

Transport defines accessibility of locations for residential and commercial use and is a powerful driver of land use change in cities and urban regions. Since transport development involves large investment in physical infrastructure, the

decisions on transport development are quite difficult to reverse and their implications particularly of long term character. However, long-term knowledge about a city's future development is hard to generate given short-term priorities of planning units and the uncertainties associated to demography, economy and political constellations. Nonetheless, long-term considerations of the transport system as well as their implications on land use change are a crucial prerequisite for urban planning and policy. The Metropolitan Area of Santiago de Chile (AMS) has experienced a dual development in terms of transport in the recent decades with significant and mixed implications on both mobility and land use change. On the one hand, the development of a tolled highway network and its expansion into the urban periphery has promoted private car use and enabled the development of new monofunctional residential and commercial areas well beyond the boundary of the consolidated city. In parallel, the implementation of the integrated public transport system Transantiago together with improvements in the accessibility of depopulated inner city areas has increased the potential demand for public transport modes and, as some observers claim, positively contributed to a return of residents to the central areas or the city. Departing from these recent developments in Santiago's urban public and private transport system and using forecasting modeling techniques, this contribution describes plausible transportation scenarios and their interrelation with land use change until the year 2030. We firstly project some of the main transportation trends for key indicators like motorization rate, current and expected congestion levels, modal split and accessibility levels. Assumptions regarding economic and demographic growth for the AMS, as well as infrastructural projects and operational improvements are considered. Secondly, we assess the likely associated changes in land use, in particular the location of households in the Metropolitan Region. Thirdly, we discuss the sustainability implications of the scenarios, which for example predict increasing travel demand and share in motorized individual travel, rising travel times in combination with further spatial expansion. Based on the differences between the scenarios, we conclude with a discussion on the future challenges and suggest strategic policy options for an integrated transport and land use policy in Santiago.

### Implications of an Underground Pedestrian System Strategy in Shanghai: Is It a Sustainable Development In Central Areas of Mega Cities?

*Jianqiang Cui (University of South Australia), Andrew Allan (University of South Australia), Dong Lin (University of South Australia)*

China is experiencing profound social reform. Decision-makers, developers and planners have had to confront problems arising from rapid population growth and urbanization associated with this period of rapid social reform, such as land shortages and environmental deterioration. Against this backdrop of tumultuous urban change, Shanghai has had an Underground Pedestrian Systems (UPS) strategy in place over the past three decades that integrates subway construction, combining commercial functions, employing underground spaces for denser, more compact cities and reshaping the city's image into an ultra-modern metropolis befitting the 21st century. During this period, the Strategy has led to a process of continuous development and incremental improvements, which has altered people's transport and shopping patterns, thus significantly affecting urban life. The advantages of UPS are their general convenience and public popularity but on the other hand, there has been criticism of their physical and functional short comings. This paper explored Shanghai's UPS strategy from two aspects: (1) as a pedestrianisation strategy reclaiming the pedestrian realm; and (2) as an underground space utilization strategy accommodating pedestrian, public and commercial usage. Data were collected from a review of government sourced documents and a field survey in Shanghai through observation, face to face questionnaires and interviews. Document analysis and a UPS usage survey in Shanghai revealed findings related to the planning, design and management of Shanghai's UPS, which provides wider policy, design and management implications for emerging UPS in China's other major metropolises.

### Urban Growth sustainability assessment based on spatial analysis of urbanization pressure in the landscape

*Carolina Rojas (University of Concepción), Joan Pino (Autonomous University)*

Sustainable urban growth in metropolitan areas of Latin America is a recent phenomenon, characterized by a rapid process of aggregation and occupancy of land for housing, industry and roads. This has completely transformed the natural landscape spaces previously occupied by pastures, agricultural areas and in some cases, sites with large areas of ecological value. In this study the

main goal is to analyse urbanization as a pressure upon the landscape coverage using spatial distribution model of this force and its relationship with five geographical spatial variables (distance to urban areas, distance to coastline, distance to the central bussiness district, height and slope) in the metropolitan area of Concepción, Chile (MAC). This pressure is considered a global forces and transformer of the landscape and is identifiable in very dynamic zones. The period of analysis is from 2000 to 2010 and also incorporates the future urbanization with the vision of urban planning for the next decade. The main results indicates that the built-up area grew from 10,861 ha (2000) to 17, 087 ha (2010), which represents almost 6% (> 17 000 ha) of the metropolitan territory, increasing a coverage by more than 6,000 hectares. Considering the future scenario, provided by the planning, the urbanized area will increase by more than 10 thousand hectares, i.e. 27,000 urbanized hectares, increasing the built-up area by more than 10%. From 2000 to 2010 the urbanized area increased by 57% with the cost of losses of bare soil (3569ha), prairies (1082 ha) and agricultural land (526 ha). In the future the increment in built-up area more than 10 000 hectares will be manifested mainly in terms of further losses to the scrubs (2,736 ha), bare soil (2714 ha) and forest plantations (2,680 ha). All coverages will be altered, including the most ecologically valuable zones such as native forest (200 ha) and wetlands (80 ha). Urbanization happens dynamically in the coastal lowlands in heights less than 300 meters and slopes less than 20%, near to urban zones (<10 km) scattered on the edges of zones that in the year 2000 were peripheral. In relation to the vulnerable spaces the urbanization in the first ten kilometers from the coastline grew with the cost of losses bare soil (55,2%), prairies (17,7%) and agricultural land (7,6%). These growing areas are affecting the naturality of wetlands, especially where they have a disturbed matrix within the urban zones. To sum up, urban sprawl is characterized by a complex agglomerated form, and also by a horizontal and peripheral increase, while one of the consequences of urbanization is the morphological fragmentation of the neighboring coverage, affecting in particular the connectivity of wetlands and their biodiversity.

## UDC 23-04 - Strategic urban planning for sustainable development: Methods and experiences 4

*Chair: Jonathan Barton, Volker Stelzer*

### Climate change and resource governance in Santiago de Chile: Integrating scale considerations for more sustainable development

*Jonathan Barton (Pontificia Universidad de Chile), Jürgen Kopfmüller (Karlsruhe Institut für Technologie), Helmut Lehn (Karlsruhe Institute of Technology), Volker Stelzer (Karlsruhe Institute of Technology)*

Increasingly there is pressure for a localization of decision-making in order to promote more sustainable development options in local and regional contexts. This is one of the key messages that emerge from the Brundtland report of 1987 and Agenda 21 of 1992. With Rio +20 on the horizon in 2012, the question emerges about how effective shifts to local and regional resource management have been over the last twenty years. This article takes the case of the Santiago Metropolitan Region and how the resources of energy and water are being planned and managed in order to establish whether the localization of decision-making regarding resource use has taken place in accordance with the goals of sustainable development. This is particularly important in view of the challenges of climate change forecast for the coming century. For this reason, the resources of energy and water provide the focal points for this research. Since the Santiago Metropolitan Region, centred on the Santiago Metropolitan Area of 34 municipalities, imposes a considerable burden on national resource supply given its concentration of over 40% of the national population, it provides a strong example of the challenges of resource management and how governance systems are able to match resource demands and resource supply in dynamic, panarchic systems. Climate change offers an interesting set of external constraints with which to explore the limitations of existing governance regimes and reveals the need for new governance regimes that are able to 'draw down' decision-making about resource management to local and regional levels where major decisions have to be taken regarding innovation, efficiency, pricing and other factors. With expected reductions in water availability of 40% based on current levels (CAS, 2011) in an A2 climate change scenario by 2070, and rising per capita energy needs according to current demand trajectories, significant changes are required in the current resource management model. Not only will supply need to increase but demand will have to be controlled more effectively. Current national resource management structures would appear to be

inadequate for generating more sustainable local and regional development since they are relatively rigid and the market mechanism provides a weak response to changing resource availability, as expected in climate change projections. The article argues that decision-making for resource management must be shared across panarchic socio-ecological systems, from national to regional and local levels in order for appropriate decisions to be taken at appropriate levels. This follows the logic of subsidiarity and 'acting locally, thinking globally' on resource management.

### Land use change and sustainable local settlement development. Target values for spatial planning in municipalities.

*Alexander Mayr (ILS - Institut für Landes- und Stadtentwicklungsforschung)*

Countering land use change is a target all over the world. It is attended by the reduction of urban sprawl and soil sealing. The kinds of reactions and concepts are very different. In some countries there is just a scientific or political discussion, other countries have concrete maximum target values of land consumption. Germany's target is to reduce the daily land use change for human settlement and transport from more than 100 hectares in 2002 to 30 hectares in 2020. In the years 2008 to 2010 the land consumption was between 75 and 95 hectares per day. To achieve these objectives, in Germany many instruments were developed and initiatives were established. Land use became a widely discussed topic. Recent model calculations, however, predict that the target set for 2020 will be missed. A major obstacle is seen in the fact that this target was formulated at federal level. In contrast to this, the settlement development is decisively decided at the local and regional level. But what does the 30-hectare target mean for the individual municipality? How many hectares can still be developed without endangering the achievement of the objective? The questions remain completely open. There is a lack of concrete target values at the local level. However, these target values will be required during the decision-making and planning processes if land use change is an important factor in the weighing of interests, in order to support sustainability in urban development. A new approach is the certification system 'Meilenstein 2012' (engl.: milestone) for soil-saving municipalities, funded by the Ministry for Climate Protection, Environment, Agriculture, Nature Conservation and Consumer Protection of the German State of North Rhine-Westphalia. The certificate, which will be reviewed regularly, should be used initially for city marketing. It is intended by the federal state to stimulate the reduction of land use change in municipalities. Thereby it was necessary to define the indicators of a soil-saving



municipality, also with reference to the 30 hectare target. For an appropriate acceptance among the concerned local actors, the consideration of the specific local conditions as well as the transparency of the scoring system are of great importance. At the same time, these were the main challenges in developing the evaluation process. The various used qualitative and quantitative criteria address both policy and planning. At the conference the developed instrument, especially the used criteria, shall be presented and discussed. In principle, it can be applied to other spatial levels and other states. The presentation focuses on the quantitative criteria and the used valuation standard. For instance the specific target values for the criteria 'land use change' were set by using a multiple regression analysis. First application experiences and reactions of local spatial planning actors can be shown.

### **Regional Effects of Urban Planning – an informal instrument to support sustainable strategic planning**

*Anja Brauckmann (Research Institute for Regional and Urban Development)*

Sustainability needs long range strategies. Consequent sustainable planning can't just focus on a few years. But in practice diverse and near-term interests dominate planning. A common example in Germany is that municipalities continue to develop new residential areas or business parks in spite of the fact that they are suffering from population decline. The focus lies in the objective target of gaining positive effects, for instance from the fiscal point of view. But regional competition, high operation costs for future generations, irreversible environmental damage or social exclusion are possible consequences which decision makers often can't evaluate because of their complex interdependencies like the municipal fiscal equalisation scheme or ecological mechanisms of action. In recent years, some innovative instruments had been developed in geo and space science in order to illustrate long-term, especially fiscal effects of settlement development. Policymakers can see the consequences of their decisions. These instruments were tested successfully, but some potentials for further development were collected. A new instrument called RegioProjectCheck resulting from these experiences is currently in development. The instrument deals with residential and business areas on the regional level and presents their long-term effects. It does not only look at fiscal effects, it also integrates ecological and social effects resulting from settlement development such as CO<sub>2</sub>-Emissions, land use and ecological value that are modeled as well as accessibility and social exclusion. The diverse dimensions of sustainability are reminded to policymakers and planners on the local and

regional level. It should be used in an early stage of planning to offer the possibility to discuss alternative locations for projects. The instrument is currently in the test and development phase in cooperation with German regions. One trial deals with a regional development plan and prospective housing areas. At the conference fiscal effects will be compared with ecological effects for this case study as an example for possible results. Location comparisons and regional development strategies are part of this example. The question of how different effects are evaluated will be discussed with the focus on negotiation processes. Summing up, this input discusses the surplus of these kinds of instruments and if they are able to raise awareness for all dimensions of sustainability and encourage these actors to decide from a (more) comprehensive sustainable point of view.

### **Green spaces in the city- Vital elements for urban sustainable development. Case of study Cluj Napoca city.**

*Florina Cozea (Babes Bolyai University)*

The urban sustainable development involves the execution of urban equipment, planning the land and spaces, taking social measures that will lead to people's physical and psychological and to rule a rational development and planning of the urban agglomerations. For each urban settlement the needs are characteristic and the measures taken by the authorities for the sustainable development need to suite to local necessities. However there are 6 measures for an urban sustainable development applicable in general for all urban areas such as: urban sprawl, redeveloping industrial sites, regenerating brownfield sites, sustainable constructions, green spaces and regenerating distressed neighborhoods. The green spaces have numerous functions when situated in the city: landscape and aesthetics, sanitary, utilitarian, economical, protection, educational and scientific and last but not least: social. It is required a special attention in order to increase the allocate space, to planning and exploitation in a more efficient way. It has been established an average value of green space per citizen in the cities: 24 m<sup>2</sup> (European cities). In case of Cluj Napoca, this value is 18 m<sup>2</sup>/ citizen, calculated for a population of 319000, without taking into account the students who are enrolled here and whose number is over 100000, in this case the value lowers to 16 m<sup>2</sup> / inhabitant. This indicator evidence a lot of negative issues in Cluj Napoca such as: increased pollution, chaotic urban planning, people don't have places to go out and socialize, to play sports or to relax their body and mind. The most important function of green space in the city is sanitary through which the microclimate is improved by tempering the



temperature, the moisture and the air currents, the atmosphere is purified by reducing the pollutants; the green space also warns and heals the psychological pollution. Some of the measures that can be taken for the improvement of this aspect of the green spaces in Cluj Napoca are: transformation of the degraded urban spaces in green areas by planting vegetation and shrubs hence, the economical value of this spaces will increase, every new building is to respect the law in terms of green space and playground for children, in many cases this green space is being replaced by a parking for cars, to implement the green belts around the city and to stop the constructions in the forests outside the city area that are also declared natural sites, making spaces for outdoor sports surrounded by green areas, educate the citizens and especially the children so they understand the importance to protect the green area from the city. Key words: green space, planning, urbanism, sustainable development, settlement

## UDC 24-01 - Sustainable urban environments for the future 1: Modeling of sustainable urban environment

*Chair: Martin Sauerwein, Juergen Breuste*

### Transit Oriented Development: An Alternative to Suburban Development in Post-Socialist Metropolis?

*Josef Mares (Charles University Prague)*

Despite North American and Western European long-term experiences with negative impacts of suburbanization and numerous efforts to regulate suburbanization, post-socialist suburban development appears to enjoy many problems associated with rapid unregulated suburban growth. One of the most prominent strategies aimed at reduction of negative impacts of suburbanization is Transit Oriented Development (TOD), employed throughout both North America and Western Europe. Since there is historically dense rail network in the Czech metropolitan areas recently enjoying significant improvements and there is abundance of rail brownfields, TOD might be a good solution for suburban development issues as well as for ensuring efficiency of public money spent on rail transit infrastructure and operation. The paper assesses the potential of TOD to reduce negative impacts of suburbanization by comparing suburban development at four rapidly developing model areas in the Prague metropolitan area representing: 1. traditional suburban centre with rail connection (Ricany), 2. suburban village with rail connection (Zelenec), 3. emerging suburban centre with no rail connection (Jesenice), 4. villages with no rail connection. The model areas are compared by: 1. land use analysis, 2. accessibility of services analysis, 3. transportation analysis. The first two model areas (Ricany, Zelenec) represent possible results of minimalist TOD implementation (since it developed around rail stations), while the other two represent typical sprawl-like suburbs emerging with low linkage to public infrastructure. The research question is whether rail suburbs show more sustainable and citizen-friendly characteristics than sprawl-like suburbs. The paper will conclude by discussion of development needs of studied areas and possible tools for encouraging TOD and in general more sustainable forms of suburban development in post-socialist metropolis.

### How sustainable are the Private Cities of Chennai and its Environs? A Case of Gated Cities of the OMR and the IT Corridors

*Divya Rajeswari Swaminathan, Jayanthi Swaminathan, Vasanthakumaran Thangavelu*

**Introduction:** Since early 1980s, the developmental goals of global South have become increasingly tied to the neoliberal agenda of private investment in urban spaces. The governments are progressively leaving the task of 'conceptualization and execution' of urban development to private players. In neoliberal policy framework, segregated and gated private cities are being developed for private consumption and production and are being located near the major urban centres and in pristine natural environments. These private cities are being built in public-private partnership, where public sector provides high speed mobility corridors, electricity and water, the private groups govern the cities and decide who will live in these cities, what will be their occupations, what will they consume and produce, and how much one would pay for living in these cities. **Study Area:** Chennai is one of the megaurban centres of India with a population of around 5 million (Census 2011). The East Coast Road and the Old Mahabalipuram Road, which is the IT Corridor of the megacity Chennai, were the pioneers in providing gated communities to the residents of Chennai. **Research Questions** Do private cities celebrate equality of opportunities for all segments of society wishing to live in private cities? How deeply inclusive are the private cities? How do relationships between public authorities and gated communities affect segregation patterns? **Objectives** To assess the environmental sustainability and economic viability of people living in the private cities. To examine, focus and assess the role of local governments in the context of Public-Private Partnership in gated communities and how effective are they in making the private cities 'inclusive'. **Methodology** A participatory appraisal and a questionnaire survey are the methods of study. The two approaches would help to ascertain the sustainability of the urban environments created by the private cities. A direct observation method is also employed to assess the conditions of the people living in the private cities. A community mapping exercise has been used in this regard as well and in respect of citizenship and sense of belonging. **Conclusion:** This presentation looks critically at the 'city making' and 'eco-city planning' processes and reflects upon the claims of ecological sustainability, economic viability, and amicable relationships with peripheries, in regard to Chennai's OMR and IT Corridors. It reflects also upon the displacement of farmers/village communities and their encounters with hypermodernity of the

private cities and issues of citizenship and belonging, and democratic accountability of these cities.

### **MGUS Design of a Sustainable Urban Management Model**

*Vergara Adrián (Universidad del Norte)*

The proportion of urban population is increasing day by day worldwide. The same phenomenon occurs in Colombia, where it now represents 72% of the total population and continuous increase has been predicted. This overcrowding increases the possibility of environment deterioration, especially when urban growth takes place in a chaotic way and is mainly formed by marginal population and the receptor territory lacks the tools to manage these growths or the arguments to stop or reorient settlements. All this generates a diminished authority lacking the strength to enforce the Territorial Ordinance and a vicious cycle is conformed to a corresponding decrease in the quality of life of the population and a negative message for the opening of development opportunities. The main environmental damages accompanying urban concentrations are on natural resources especially on the people whose environment stops being healthy and their socio-economical conditions force them to overcrowding. This research results from the above mentioned situation and it aims at designing tools which take into account the variables susceptible to be intervened to attain benefits for the population, which have an incidence in sustainable urban development (social, economical, environmental) and that could anticipate the effects of any measure. They will also assure the quantification of not only the economical resources in order to implement them, but also their availability for public examination and additionally that the intervention measures be transparent, concerted, public, accepted, respected, enforced and executed. The main tool is an analysis model for sustainable urban management, measured based on quality of life and human development indicators. This model will be validated in Barranquilla and its metropolitan area. It will be located in the 60's of last century and the following decades up to the present time. Once validated, it will be used to simulate future.

### **A Geographical Analysis of Solid Waste Management in Delhi, India**

*Subhash Anand (University of Delhi)*

Delhi, being the most urbanized, polluted and having highest density of population, is facing numerous civic in infrastructural problems. The problems of waste disposal are compounding everyday as amount of garbage is increasing and area available for dumping is shrinking. Management of municipal solid

waste is a hot and crucial problem in Delhi and lacking in sustainable and scientific collection, transportation and disposal. Municipal waste of study area is highly bio-degradable in nature which has higher moisture content and low calorific value that is why it is more suitable for composting purposes than incineration. It was found that there was no clearcut standard for the placement of waste receptacles. People of Delhi were not using different coloured bins as per their purpose. The spatial analysis of the number of dustbins, garbage carrying trucks and sanitary workers reveals that their availability gradually declines from core to periphery Municipal Corporation of Delhi (MCD) zones. Karol Bagh, Sadar Paharganj and Shahdara (S) zones are identified as highly served zones (HSZ) whereas Nazafgarh and Narela are characterized as least served zones (LSZ). About 95 per cent waste is dumping at three landfills and about 5 per cent is going for composting. 46 per cent people were not satisfied by providing MCD services and suggest for fixing the accountability of MCD staff. Around 0.1 million rag pickers including children and women are working in extremely unhygienic, unsafe and vulnerable environment. They are contributing immense role in Solid Waste Management (SWM) sector but their services go unthankful and unaddressed.

## UDC 24-02 - Sustainable urban environments for the future 2: Urban ecosystem services: Processes, pattern and planning

*Chair: Martin Sauerwein, Jürgen Breuste*

### Urban Ecosystem services on the local level – Urban green spaces as providers of urban ecosystem service

*Juergen Breuste (Salzburg University)*

Ecosystem services are provided on different scales. The local level is the basic unit for ecosystem services. These are landscape elements or basic ecosystems differing from their neighborhood by structure and functions. In urban areas the concept of urban (ecological) structural units (USU) has been approved to differentiate micro-climatic, biotic, soil and hydrological. These USU can be used as basic concept of providers of urban ecosystem service. The USU dominated by biotic elements, the urban green spaces are investigated in their ability to provide these services in different qualities and quantities. The different urban green structure types like lawns, bushes, different tree covered areas etc. are effective to use for a semi-quantitative evaluation of its services instead of extreme resource consuming measurements. The study is based on general available knowledge on urban green functions and on example studies especially in Central Europe, but also in Latin America and China. This allows qualifying different urban green space types by its internal structure of vegetation, size, shape and location in relation to at least a semi-quantitative scaling of its urban ecosystem services under different cultural circumstances. The evaluated urban green spaces are street trees, neighborhood parks, district parks, city parks, urban forests and allotment gardens. The assessed urban ecosystem services are provisioning, regulating, supporting and cultural services. The URGE-manual, a tool developed by an inter-, transdisciplinary and international team to which the author belonged, is tested for its adaptability to the task of evaluation of urban ecosystem services on the local level for urban green spaces. The actual urban challenges, land use change, adaptation to climate change, demographic change and cultural diversity demand a systematic evaluation of urban ecosystem services with constant monitoring. A new planning paradigm related to urban ecosystem services is urgently needed to develop and to implement.

### Impact of Urbanization on Agricultural System: A Study of Regional Imbalances around Big Cities

*Suman Singh (Banaras Hindu University)*

India faces the most acute pressure on agricultural land. Today every million hectares of land supports 7.27 million people. Forty three percent of the land is under cultivation, one of the highest in the world, with these few evidences and its relation with rapidly growing urbanization. Over the past fifty years, while India's total population increased by about 3 times, the total area of land under cultivation increased by only 20.27 percent from 118.75 million hectares in 1951 to 142.82 million hectares in 2001 while land for non-agricultural uses as housing, industry and others, were increased from 9.36 million hectares to 22.97 million hectares in 1951 to 2001. The impacts of the urbanization especially around the few big cities are undesirable both from point of view of balanced regional development and from the viewpoint on the serious negative impact on agricultural system and neighboring rural economies. The present paper analyses the phenomenon of transformation of agricultural land into urban uses and its adverse impact on agricultural system in and around big cities of Eastern Uttar Pradesh.

### The Value of Bicycle and Pedestrian Paths: Measuring Social and Environmental Benefits of Investments along the River Neckar

*Jost Wilker (ILS- Institute for Regional and Urban Development), Karsten Rusche (ILS - Research Institute for Regional and Urban Development), Christine Ryma-Fitschen (ILS - Research Institute for Regional and Urban Development)*

High quality environments play an important role in building competitive cities and regions. They are contributing strongly to quality of life for communities and employees. Therefore, Green Infrastructure, defined as a network of multifunctional open spaces, parks, trees and woodlands, is a valuable part of the urban economy. It is a certain type of regional amenity delivering various benefits for inhabitants such as recreation, ambient air quality and biodiversity. Within Green Infrastructure networks, cycle and pedestrian paths link green and open spaces with each other, improve their accessibility and help users to experience nature. Accordingly, they can be seen as the essential connecting element of regional Green Infrastructure. This makes paths crucial multipliers of green benefits. But due to shortages in public finances and the competition with other land uses, investments in green infrastructure need to be justified by economic evidence. In the field of ecological economics a huge body of

literature analyses the use and non-use values of certain functions of ecosystems. Herein a broad range of ecosystem types - from urban wetlands to rainforests - have been analysed and valued with the help of different methods like replacement costs, contingent valuation or hedonic pricing. Conversely, research so far only deals with the value of cycle and pedestrian paths in very few cases. Consequently, the approach presented closes this research gap by focusing on the economic value of cycle and pedestrian paths as a relevant part of Green Infrastructure. This issue is explored by applying the contingent valuation method for a newly designed bicycle and pedestrian path along the river Neckar in the city of Esslingen in Germany. Before its redesign, featuring a new layout along the renaturalized riverbanks of the Neckar providing sojourn areas and a better track surface, the path was directed on a major road. Against this background, a user survey has been conducted to identify the importance of the track for its visitors and local citizens. A representative sample (N=972) reveals the respondents' use preferences, opinions and possible willingness to pay for several improvements within the regional cycle network 'Neckartalradweg'. We found that approximately 40% of the respondents are willing to pay in general and that average willingness to pay among all respondents is 19.91 Euro per year. Several determinants that affect these figures are investigated further in statistical and econometric approaches. Here, detailed information on the factors that enforce general and absolute willingness to pay is highlighted. Finally, based on a user count, the total annual value to support improvements in Green Infrastructure in the Neckar region on the part of users is estimated. By this means, economic values of green infrastructure that help strategic planning and decision-making in the long run, are measured.

### Urban greenery as a key to sustainable cities: Assessing an urban tree program in a Latin American megacity

*Sonia Reyes-Paecke (Pontificia Universidad Católica de Chile), Ulrike Weiland (University of Leipzig)*

Urban trees enhance the cityscape and add to balancing urban air temperature thus contributing to improving urban environmental and living conditions and to building sustainable cities. These regulating and cultural ecosystem services are relevant especially for heavily transformed megacity environments. For this reason several cities have implemented urban tree programs. However, patterns of urban tree cover are determined by complex interactions between human decisions and ecological processes, which also take on various distinctive forms in differing geographical and political contexts. In Santiago (Chile) an urban tree

program has been implemented with the target mark of seven million trees in four years. Although the number of trees has increased, and the program includes funding for the coming years, it should incorporate ecological and social goals to ensure long term sustainability. In order to contribute to optimizing the further program implementation, in this research we are interested in the impact of the urban tree planting program on (i) the species composition and (ii) the share of native trees. The objective of this research is to analyze and assess the decision making process while implementing the urban tree program in Santiago (Chile) by interviewing stakeholders involved in this process on various scales. The decision-making process involved in the selection of urban vegetation represents a key factor for explaining its structure and composition. The main criteria for the selection of urban trees were low water needs, mix of evergreen and deciduous trees, available space, low susceptibility to parasites or pests, and root characteristics of the adult tree. The implementation of the urban tree program in Santiago faces some difficulties due to several interacting factors: the need to increase the number of nurseries to reach the program goals; the fact that to increase native tree production requires seeds to be collected in the wild instead of the city, which implies a change in current practices; funding for planting and maintenance requires multiple sources, which involves coordination and cooperation between public and private institutions; more efficient use of water for irrigation is essential to ensure long-term maintenance; and the need to involve communities in planting and maintaining urban trees implies new procedures for local administrations. The research highlights some common structural issues that will likely face other megacities in developing their own programs.

## UDC 24-03 - Sustainable urban environments for the future 3: Sustainable urban environment in different urban cultures

*Chair: Martin Sauerwein, Jürgen Breuste*

### Slum upgrading 2.0: Effects of relocating Nairobi slum dwellers into a new settlement in its semi-rural hinterland

*Tara Boekhout (Radboud University Nijmegen)*

Slum upgrading 2.0: Effects of relocating Nairobi slum dwellers into a new settlement in its semi-rural hinterland Urbanisation, i.e., the process of absolute and relative growth of the urban population mainly takes place in developing countries. In this part of the world urbanisation is foremost uncontrolled and generates serious problems. For example, most of the immigrant urban population is absorbed in the slums and informal settlements. Living conditions are challenging. Nairobi, the capital city of Kenya, is one of the fastest growing cities in Africa. The city is confronted with an enormous housing problem. There are not enough suitable houses available for the poor population. Besides the local authorities other players have recently entered the field of addressing housing problems. For example, Jamii Bora, the largest microfinance institute in Kenya, has been focusing on helping the poor and marginalised in the country since 1999. After years of experience assisting slum dwellers Jamii Bora concluded that they needed to start a housing project for their members. The project included the building of a new town outside of Nairobi. Some 60 kilometers to the south-east of Nairobi in semi-arid land which is mainly inhabited by Maasai pastoralists, Jamii Bora found land to build their town. The project was presented as a model for socially and ecologically sound low-income housing development. However, the building of this new town in the outskirts of Nairobi creates pressures on the fragile environment and the natural resources like water and land. As a result, original inhabitants felt threatened and aired resistance towards the project. The local community argues that the project puts pressure on natural resources especially water. They also fear the rise of insecurity and political marginalisation as the influx of outsiders with different ethnicities and slum background increases. They fear the negative influence of the project on their pastoralists culture. In addition, the wildlife conservation community states that the project threatens the wildlife in the area and will block the wildlife migration corridor from Nairobi National Park. The resistance towards

the project developed itself into a legal struggle which was won by Jamii Bora. Hence, at the end of January 2008 the construction of 2,000 houses was embarked upon. So far two neighbourhoods of 250 units each have been completed and another is under construction. The fears of the opponents are still alive, as the issues raised have not been solved. Moreover, Jamii Bora has hardly fulfilled the memorandum of understanding they composed with the local Maasai community. This paper aims to provide insights and discusses the effects of this unique process of nuclear urbanisation and slum upgrading project. The conducted research is part of the CoCooN project which is a research program on Conflict and Cooperation over Natural Resources in Developing Countries.

### The place of small towns in the balanced rural development

*Reihaneh Soltani Moqadas (Pyram Noor University)*

The place of small towns in the balanced rural development In macro planning, the creation and expansion of small towns is one of the strategies to develop rural areas. Considering the theory of rural-urban joints that can foster development, the hierarchy of rural settlements in various spatial and temporal dimensions influence the type and the direction of urban-rural relationship. An increase in the economic self-sufficiency of rural settlements can lead to a more balanced and moderated relationship with the city. In this regard, small towns will have a mediating role that can reduce the polar effects of metropolis. It is due to the fact that these towns are based on the regional socioeconomic features, possessing all structures and functions compatible with the rural areas and can provide optimal and efficient services. The functions of these towns will encourage the rural economics and reduce the visits of the rural settlers to the city. These towns can also play a preventive role in rural-urban migrations if they undertake their role efficiently and be able to influence their regional management and planning. However, the lack of attention to the knowledge and required skills at managing levels will hinder the effective performance of these towns and metropolis will continue to have their special role due to their concentration of various functions and production management.

### **Meeting the urban challenge? Urban agriculture and food security in post-conflict Freetown, Sierra Leone.**

*Tony Binns (Otago University), Kenneth Lynch (University of Gloucestershire), Roy Maconachie (University of Bath), Paul Tengbe (Fourah Bay College)*

Sierra Leone is emerging from a long period of political instability and is ranked among the world's poorest countries. During the civil war of the 1990s, widespread forced outmigration left much of the countryside abandoned, as residents fled to the safety of the capital city, Freetown. Consequently, food production became severely dislocated and the agricultural sector is a major concern to governmental and non-governmental development agencies. This paper examines urban and peri-urban agriculture (UPA), at a crucial point in Sierra Leone's post-conflict reconstruction. Drawing on recent field-based data, the paper contributes to the growing debate about how urban planning and development can promote an 'enabling environment' for UPA. The paper argues that a detailed evaluation of UPA is needed to determine how agricultural activities can fit in with urban structure, urban problems and the livelihoods of a wide range of actors in and around the city. The paper concludes that UPA is a vital element of household food security. It could potentially play a fundamental role in safeguarding the urban food continuum and promoting sustainable urbanization in the post-conflict period and beyond.

### **Sustainable development of urbanized territories of Ukraine**

*Artem Mozgovyi (Institute of Geography of the National Academy of Sciences of Ukraine)*

Based on human geographical analysis of possible sustainable development of urbanized territories of Ukraine was established the necessity of inculcate of policy on new base to keep resources and urgency of measures concerning preserving, resumption and protection of all kinds of resources and improvement of city environment and surrounding. The investigation has been carried out within the concepts of human geography. On the basis of the factual material of the national and foreign scientists the author determines the way of achieving the sustainable development of urbanized territories as the model of the future destiny of mankind. Scientific-methodical bases of the urban geographical decision of city environmental problems, the regional ecology specifications regulating quality of environment and stability of development of urbanized territories are elaborated. These territories are considered as a basis and as an element of the settlements systems. Action of the mechanism of self-control in

development of the urbanized territories is analyzed, ecological essence of process of urbanization and sustainable development is opened. Principles of a policy on new base to keep resources and urgency of measures concerning preserving, resumption and protection of all kinds of resources and improvement of city environment and surrounding are determined. The new type of object of urban geography - urbanized territories within the limits of which maintenance of conditions of ecological balance



## UDC 25-01 - The 'migration & development-hype' and its implications for geographical research

*Chair: Martin Geiger, Yvonne Riaño*

### Migration, development, and no hype in sight

*Stephan Duennwald (ISCTE-IUL)*

The ambitious debate about a migration and development nexus is quite high up in the sky, seen from the perspective of a remote African town. Explorations in two Malian regions with high outmigration rates reveal that a migration and development nexus is more than ambivalent on the ground. Examples show that both fields of (external) intervention do not seem to be connected too closely. Traditional development aid is reluctant to enter the field of migration, and new organisations explicitly addressing migration and development often lack experience. Donors, agents and target groups differ, and only the project ideas, given a limited choice within smaller scale rural development, seem to be the same. It can be further questioned in how far mutual effects (migration triggering or hampering development / development slowing down or accelerating migration) can be predicted. These rough causal relations seem to be less adequate in a context where development is defined differently among local and external actors, and migration is a process designed by a multitude of factors. Different migration traditions, based on regional and ethnic divides, inform needs and views of migrants and their families back home. Out of an anthropological perspective, the findings are used to develop a model of place/flow dynamics, taking development assistance and migration / migrants' remittances as two bundles of flows interacting with each other, and rather creating turbulences than synergies.

### Globalized realities of Sri Lankans in Muscat (Oman). Towards a relational geographical development research in the context of migration studies.

*Veronika Deffner (RWTH Aachen)*

In hardly any other region in the world are labour migration and modernisation processes so closely linked together than in the Gulf. Since the 1970ies this area has needed a large cheap work force - and a comparatively lesser number of highly skilled expatriates - to make the modernisation boom possible. The geographic proximity and cultural similarity as well as the dependence on each

other to continue developing have paved the way for an 'economy of migration'. Thus oil-producing Gulf States and South Asia are connected through complex and asymmetrical interdependences. Development as such has several meanings if seen from different angles such as the social or individual point of view or even within discursive terms. On the one side it e.g. ranges from ensuring ones livelihood in the short to medium run, reducing ones individual vulnerability, but also signifies the growing dependence of nation states on remittances from abroad. On the other hand it can imply the strategic and long term development of infrastructure or the building of global superlatives. The social and economic transformations taking place on both sides have to be observed through reciprocal connections and outcomes. Therefore, a critical approach with a relational perspective is recommended. Subsequently, the complex migration system of Asian nationals to the Gulf States has to be analysed using a variety of perspectives. Different interests, dependences, relations and strategies of power as well as resources, constraints and different significances of capital should be considered. While researching the situation of Sri Lankans in Oman, the following perspectives have to be an essential part of the empirical analysis: The recruitment policies as well as cultural and political hegemonial claims of the Omani society; the recruitment policies and governmental dependencies of Sri Lanka; the local, yet global (everyday life) realities of the Sri Lankan migrants in Oman and the subjectivities of the migrants and their family members back in Sri Lanka. Bourdieu's Theory of Practice enables such a relational perspective. Individual social practice has to be studied while keeping their mutually influential and structural social settings (of power) in mind. To understand the trans-local significance for and the mechanisms of the construction of different realities from migrants in the native as well as in the country of destination, it is fruitful to integrate concepts of remigration and Diaspora research into such a perspective. Hence if the geographical development research leans towards a praxeological focus it would contribute hugely to the postulation for a relational approach as Bourdieu's theory entails the critical self-reflection of the researcher's own normative settings and ideas (e.g. development).

### Rethinking the migration and development nexus from a translocal perspective. The case of the Wakhi of Gojal, Northern Pakistan.

*Andreas Benz (FU Berlin)*

Most approaches directed towards the migration-development nexus are concerned with the question, how migration can contribute to the development

in a certain sending region. Implicitly, these approaches are based on the assumption that a certain community is attached to a certain area. They are based on a container-like conception of space and tend to presuppose a congruence of a group of people and the area where they live. This kind of container-like and essentialist thinking leads to raising the wrong questions on the migration-development nexus. Communities and regions hardly ever formed homogeneous and persistent 'natural' units, and in times of increased mobility and migration in a globalizing world they do less than ever. Continued migration and mobility have led to the spatial dispersion of people belonging to one basic social unit, e.g. households and families. Between the different places in these migration networks, a translocal social space has emerged, which connects the people in various distant geographical sites, and enables the households to pursue translocal livelihood strategies. People circulate between the different geographical sites in these translocal livelihood networks and are often not clearly localizable in one place. The congruence between community and region is no longer given in times of globalization, and therefore the question for the migration-development nexus has to be asked in completely new way: It is no longer the question for effects of migration on development in a defined sending region, but rather the question for the effects on the translocal community to which the migrants belong. Correspondingly, the notion of development has to be freed from its spatial container: to talk of 'regional' development doesn't make much sense from a translocal perspective. Applying a human-centered notion of development, as e.g. the capabilities approach suggests, development is not attached to a certain spatial segment, but rather to people. Since the basic social units of these people have become translocalized, development no longer takes place in a certain region or spatial container, but in translocal networks. Based on results from extensive fieldwork in Pakistan in 2011, the presentation will exemplify the above outlined theoretical considerations with regard to the case of the Wakhi community in Gojal, Gilgit-Baltistan. After decades of far-reaching mobility and migration processes, the Wakhi community has turned into a translocal community, spread over many places within and outside Pakistan, but well-connected by intensive exchange networks and united by a joint identity. Through mobility and migration, the Wakhi community underwent a parallel process of rapid socio-economic development and increasing translocalization. Development in the Wakhi community therefore cannot be grasped in terms of regional development, but rather by relational development in translocal networks.

## Migration, development and the 'Rising Powers' – theoretical challenges

*Parvati Raghuram (The Open University)*

The relative resilience of countries like China and India to the global economic downturn has led to renewed speculation about what the global economic map will look like in decades to come. In a world of binary terminologies - North-South, West-East, developed-developing - each predicated on locating growth in particular parts of the world, what would we call these countries now? Academics and policy makers are beginning to engage with these issues but the fundamental challenge that spatial shifts in the sites of economic and demographic growth pose to theories of migration and development are yet to be fully assessed. The burgeoning literature on migrants as agents of development too often takes a familiar North-South optic with regard to the direction of migration and the places that need developing. The continued, even expanding, economic growth in countries like India and China has been accompanied by shifts in migration patterns. These countries have seen the termination of some old patterns of migration, intensification of others, and emergence of new migration streams. The constituents of such migration include return migrants (due to recession in the global North), those returning due to increased job opportunities in these countries, entering through waged work or as entrepreneurs, family migrants and students. This paper offers a reading of the existing conceptual map for analysing migration and development and some possible ways forward. It also outlines some conceptual and methodological challenges involved in reformatting our thinking on migration and development globally.

## UDC 26-01 - The Mobility of Human Capital and Knowledge

*Chair: Harald Bauder; Stefanie Föbker*

### **“If my family integrates, I may stay a few more years” – the role of the family for the migration of highly skilled professionals**

*Daniela Temme (Universität Bonn), Stefanie Föbker (Universität Bonn)*

International mobility is often seen as a precondition and key element for the career of highly qualified professionals. Highly skilled migrants are perceived as flexible labour following attractive job offers. However, it is often disregarded that these international professionals also have a family. The family is affected by the migration decision and influences it at the same time. Our paper explores the role of the family for the decision to migrate, the settling-in process and future migration plans. Our paper is based on an empirical study in three German university cities, focussing on the migration of foreign researchers. It is intended to supplement these results with additional findings from a new research project concentrating on other groups of highly qualified professionals (managers, journalists). Our results emphasize the significant role of families in terms of settling in a new locale. Foreign researchers living with their partners or children in Germany have more diverse access to social networks. At the same time, the family situation can result in rapid emigration from Germany or in abandoning the intention to migrate right from the start.

### **What moves? An Inquiry into the moveability of capital and knowledge along Chinese-German academic mobility trajectories.**

*Maggi W.H. Leung (Utrecht University)*

International movements of scientists and researchers have become more common in the increasingly inter-connected global knowledge economy. Geographic mobility is often perceived as a key to academic excellence and career advancement by scholars especially in advanced economies. In China where international geographical mobility is a newly-gained privilege after the advent Open Door Policy in 1978, academics belong to one of the most mobile subsets of the population. These 'mobile brains' are considered as embodiments of knowledge, skills and other forms of human capital. Their movements across space are hence perceived as a (direct and mostly unquestioned) indicator of these embodied resources. Beyond celebrating the

numerical growth of academic mobility (in terms of the number of scholars on exchange, programmes and partner universities etc.), the experiential impact on the scholars is little understood. Drawing upon recent findings from 64 in-depth interviews with Chinese scholars of postdoctoral or above level who have had exchange/work experiences in Germany and six key informants, together with a postal survey (123 Chinese scholars with mobility biography to Germany), this paper unbundles 'academic mobility' and examines the moveability of human capital and knowledge along Chinese-German academic mobility trajectories. Key questions asked include: (i) Whose and what capital and knowledge (and hence who) is considered worthwhile to be (made) mobile? (ii) How do the transfers work (also in terms of spatiality and temporality)? (iii) What is the impact of these transfers in creating/reinforcing/challenging knowledge structures and hierarchies across different spatialities? Interview materials illustrate the differentiated transferability of knowledge, academic credential/recognition and capital (after Pierre Bourdieu) across space, which can be accounted for by an array of factors ranging from discipline, gender, age, academic position and the (perceived) global hierarchy of knowledge and expertise. The paper will also demonstrate how Chinese and German scholars and administrators manage (define/defend/demolish) uneven knowledge interfaces in the transnational/translocal academic fields.

### **Reconceptualizing the German academic diaspora: From homeland to home culture**

*Heike Jöns (Loughborough University), Elizabeth Mavroudi (Loughborough University), Mike Heffernan (University of Nottingham)*

Geographers have recently become interested in the economic, social, and cultural benefits of diasporic networks that have shaped the emergence of a global knowledge economy and are increasingly mobilized by governments across the world as an important transnational resource (e.g., Mohan 2006; Blunt 2007; Larner 2007). Little research, however, has been done on how these transnational assets have impacted on knowledge production in science and higher education, and on the role that biographical relations have played for academic mobility and the formation of transnational knowledge networks (Fahey and Kenway 2010; Robertson 2010). In this paper, we are using the concept of academic diaspora to examine how researchers, who worked at U.S. universities when taking at least one period of research leave in Germany from 1954 to 2000, participated in networks of cultural and academic exchange between the United States and Germany. Our prime interest lies in the extent



and nature of biographical ties to Germany among this transnationally mobile group of U.S. researchers in order to compare how those with and those without such linkages engaged in further interactions after their research leave in this country. Our findings reveal a wide range of biographical ties to the host country that go far beyond those established through birth and ancestry but also motivated researchers with such linkages to be more likely involved in the construction of lasting US-German knowledge networks than colleagues without such connections. In particular, US-German academic relations were significantly shaped by biographical ties based on cultural knowledge, language skills, educational and work experience, relatives, partners and friendships. Therefore, we suggest to expand the notion of diaspora towards an elective concept that substitutes the defining criterion of ethno-territorial linkages to a homeland with emotional ties to a culture in which one feels at home. Germany can thus capitalize not only on skilled emigrants and their descendants but on all those abroad who share a sense of belonging to German language and culture or to family and friends living there.

### **Transnational Mobility of Academic Labour in Canada and Germany**

*Harald Bauder (Ryerson University)*

International migrants often segment into the low-skill sector of the labour market of a receiving country. When academics migrate, however, this devaluation of skills does not always occur. In fact, transnational mobility is often associated with the accumulation of cultural, social, and other forms of capital that can propel academic careers. In this presentation I explore the circumstances under which transnational mobility raises the value of academic labour. In particular, I am presenting the preliminary results of a qualitative analysis of data obtained from interviews with internationally mobile early- and mid-career academics in Canada and Germany. These results are interpreted in light of the forms of capital academics accumulate through mobility, the rationale for moving to a different country, and the structural contexts in which mobility occurs and is strategized.

## UDC 27-01 - The socio-spatial reconfiguration in Gulf Arab cities

*Chair: Belgacem Mokhtar, Montasser Abdelghani*

### Neoliberal Urban Planning in GCC Cities – The Issue of Governance

*Jonas Margraff (Johannes Gutenberg-University Mainz)*

Neoliberal Urban Planning in GCC Cities - The Issue of Governance In the last 10 years the cities in the GCC have been undergoing huge re-structuring and re-planning processes based mainly on a new alliance between a 'New Economic Policy (NEP)' and 'New Urban Policy (NUP)' that is reflected in a new type of urban planning based on 'Large-Scale Urban Development Projects (LSUDP)'. The main aim of such urban planning is to generate rent from real estate developments and to decouple the urban planning from social urban development. Especially, but not exclusively, the cities in the UAE (Dubai 2015 and Abu Dhabi 2030) have been showing new alliances between local political decision makers, investors, urban planners and international consultants. Other cities in the region were for all practical purposes copying the pioneer experience of Dubai; Doha, Jedda, Muscat, Riyadh, Kuwait and Manama have all adopted - either new comprehensive or partially modified - the already existing urban development plans. The economic crisis in the real estate market has affected the implementation schemes of these plans in scale, shape and time. Nevertheless, the already implemented parts of plans have by all means changed the urban spaces. This paper is part of a long-term study on neoliberal urbanization processes in the GCC region. The aims of this paper are: First, on the governance level we map out how the process of decision making in urban planning in the GCC countries functions. Second, by exemplifying some of the modifications done in the urban development plans in the region, we give a primary reading of the influxes of the economic crisis on the governance processes in urban planning and in the LSUDP in the region.

### Qatar off and running – construction and competition challenging Qatar for the FIFA World Cup 2022

*Nadine Scharfenort (Johannes Gutenberg-Universität Mainz)*

### Globalisation and Urban Development of a Container Port City: The Case of Salalah (Oman)

*Steffen Wippel (Zentrum Moderner Orient (ZMO))*

Salalah, for a long time an unspectacular town in today's southern Oman, appeared on the economic world map when its container port was built over a decade ago. As a central transshipment hub near the world's main East-West trade route, the port is now among the world's top transshipment terminals and has been complemented by additional infrastructural and urban projects. This paper examines the current urban reconfiguration of Salalah under the impact of boosted globalisation in a theoretically informed manner, referring to characteristics of contemporary port cities. The current wave of globalisation has seriously affected trade logistics and port development, with container terminals becoming pronounced nodal points in the network of global flows. The development of port cities is often described using a sequential model of several historical phases of port/city interaction. Thus, in the past, inner-city harbours were integral parts of the city's economy and society, but technological changes have resulted in the increasing functional and spatial separation of the port and the city. Yet, authors point to the high diversity of trajectories. Particularly in eastern parts of Asia, containerisation contributed to a specific model of port-cum-city evolution, where ports and cities still keep developing more contiguously. In this context, integration into the global economy has important consequences for the physical landscape. Characteristically, the port area is only one example of the newly established sites in Salalah that are fenced and gated, thus contributing to the fragmentation of the wider agglomeration. Consequently, the paper tries to trace common and specific features of Salalah's development into a port city compared with models worldwide as well as with other Gulf cities.

### Reconfiguration of Retail Trade in Gulf Arab Cities – case study Muscat, Sultanate of Oman

*Montasser Abdelghani (Sultan Qaboos University)*

In recent decades, the cities in the Gulf Arab countries have been experiencing substantial social and economic changes, which are caused by internal and

external factors: An important factor is the strong boom in the region as a result of high oil prices. The availability of capital and business, in these cities, made them a popular destination for global investors, internal migration and for a large number of immigrants from other regions of the world, especially the surrounding areas. Another factor that led to changes in the cities of this region is the will of the states to diversify their economic bases to reduce their dependence on oil. Here, the factor of economic globalization should be mentioned, which has opened new opportunities for the region with free movement of goods, ideas and people. One of the most affected sectors, with above mentioned factors, is the retail trade, which is experiencing considerable changes. The forms, structures, functions and importance of retail trade, in cities of Gulf region, have clearly changed during the past two decades. Retail trade has come to play a more important role in the economies of states and the economies of the cities. The changing and restructuring of retail trade is, in quality and quantity, an international phenomenon found in all the world's cities. The extent of restricting retail trade depends closely on the city's size, demography, its political and administrative status, and its local, regional and international importance. The Arab Gulf cities have witnessed a change in the function of retail trade and seen new components added to it, e.g. the emergence of giant hypermarkets and the online electronic trade. In addition to improvements in goods and commodities and styles of supply and demand, the changing of the retail trade, in these cities, has produced significant changes in redistributing land use because some retail trade areas have assumed great importance, unlike their situation in the past. In fact, the commercial value of what used to be the central city locations has begun to decrease and has seen a reduction in patrons, while some suburban areas have attracted new customers. These changes pose many questions such as whether the city center area will still attract internal and external tourism. Many studies have been conducted on this topic and applied to the conditions of American and European cities. Although the Arab cities are witnessing the same phenomenon, (reconfiguration of retail trade), it has not received enough scholarly attention and examination from Arab geographers till now. Consequently, a scientific study is needed to direct the theories, already applied to foreign cities, to Arab ones. Muscat, in this regard is a suitable choice as a typical Arab city in the region. The results of the proposed study will help Arab geographers to obtain a better understanding of this urban phenomenon and will be of great significance both theoretically and practically

## UDC 28-01 - Towards a new centrality of world society: Future faces and functions of urban centres in the 21st Century

*Chair: Ilse Helbrecht, Peter Dirksmeier*

### Global city formation, new urban centres and the transnationalization of urban policies

*Christof Parnreiter (Inst. f. Geographie)*

Departing from the commonsensical idea that global cities are amongst the most characteristic features of the new spatial formation of world society, the presentation takes the notion of 'centre-building' literally and argues that global city formation is frequently accompanied by a deep restructuring of the built environment. This restructuring is caused by quantitative and qualitative changes in the office market, because the growing presence of producer service firms has spurred not only the demand for office spaces in general, but for prime office spaces in particular. Because this demand is neither quantitatively nor qualitatively met by vacancies in the traditional CBDs, global city formation is, as Sassen (2001, 334) argues, usually characterized by '(t)he rapid building of one high-rise office complex after another'. The presentation backs this claim with a detailed analysis of the making of a new CBD in Mexico City since the 1990s. I maintain that with Santa Fe, built at a former dump in Western parts of the city, a clearly delimitably global city space has emerged: It is there where most of the construction of prime offices spaces has taken place, and it is there where most of the foreign and FIRE-sector firms operating in Mexico have relocated their regional headquarters. Yet, the restructuring of the built environment goes beyond the construction of New Downtowns and / or the expansion of traditional CBDs. Rather, the governance of the production of urban spaces has shifted to entrepreneurial planning. Cities around the world have replaced Master through Strategic Planning, which is far from pure planning methodology. It is often linked to specific contents, namely the implementation of urban mega-projects, which are often related to global city formation, and to public-private partnerships, which have become primary vehicles with which to promote, organize, and finance urban development. Understanding the channels, institutions, and the 'industry' involved in the spread of strategic plans helps to understand that Strategic Planning has emerged as a transnational standard of urban policies, which is oriented toward the project of creating hospitability for

global firms (Parnreiter 2011). To exemplify this conceptual argument, the presentation analysis shifts in urban planning in Mexico City which have been instrumental in governing the production of global city spaces.

### Contesting centrality in Jakarta Metropolitan Area: Have new towns promoted deconcentration?

*Delik Hudalah (University of Groningen), Johan Woltjer (University of Groningen), Tommy Firman (Institute of Technology Bandung), Haryo Winarso (Institute of Technology Bandung/ Ministry of Foreign Affairs of Republic of Indonesia)*

Following Soeharto's market-oriented development policies, new town development has been rapidly applied as an urban deconcentration strategy in Indonesia. As the result, since the late 1980s, new towns and industrial estates, which were mostly initiated by private developers, have dominated land development projects in Jakarta Metropolitan Area (JMA). The paper investigates the extent to which these new towns have effectively reduced suburban functional dependence on the main city of Jakarta. First, the paper indicates that major town builders in the suburb have shifted their activities from property development towards town management. In the early stage of suburbanisation, their core business was focused on selling houses and building local facilities. However, due to tighter competition, many of them have changed their paradigms to attract industrial investment and regional facilities such as high-class shopping malls, star hotels, universities, and theme parks. The new towns have promoted not just population deconcentration but also decentralisation of jobs and wider urban lifestyles. They have played a key role in changing the spatial structure of JMA towards a polycentric form whereby specialised regional centres begin to flourish in the suburb. Consequently, the centrality of Jakarta as the long-standing regional growth centre is now being contested. It is found that the emerging private-driven spatial structure has reinforced social division, caused spatial fragmentation, and encouraged inconsistent planning policies. Making urban deconcentration strategy more sustainable, we suggest an integrated approach in new town development planning. First, there is a need to carefully include the private parties on the current government-centred regional governance structure. Under Indonesia's decentralisation policy, it is also important to build the institutional capacity of the suburban governments in order to meet the challenge of rapidly restructuring region. key words: deconcentration; new town; urban structure; suburbanisation; Jakarta



### Everyday activities of residents in New Downtowns. A case study of Hamburg HafenCity.

*Flemming Giesel (German Aerospace Center (DLR)), Julia Jarass (German Aerospace Center (DLR))*

Urban planning has to face new challenges at the beginning of the 21st century. Depending on economic, demographic and social factors different processes of urban transition can be observed. While some cities or districts are shrinking, other urban areas are experiencing the phenomenon of re-urbanization. From the perspective of urban planning this "renaissance" of the city bears great potential and challenges at the same time. The rising demand for housing in inner city areas strengthens the city's position and its functions. Therefore, one attempt to promote the development of the inner city is the construction of new urban centers, so called New Downtowns. In contrast to the historically developed Central Business Districts these areas represent a new and different centrality. Equipped with modern architecture, cultural mega-projects and leisure facilities these urban spaces express a new representativeness of cities. In this context the question arises how those people choosing to live in New Downtowns can be characterized. To what extent do they make use of their residential environment in terms of leisure activities, place of work and local amenities? What kind of travel behavior do households in New Downtowns have and how do they assess their residential neighborhood? What are the demands of residents living in New Downtowns regarding neighborhood characteristics and are they satisfied with the existing urban structures? It is possible to analyze the issues set forth above using existing data. In 2009, the research project "DC Noise" (Demographic Change: New Opportunities in Shrinking Europe, INTERREG IVB, 2008-2010) assessed Hamburg HafenCity among four other areas in Hamburg with regard to everyday life activities, travel behavior and the living environment. For this session of IGC 2012 we intend to apply an empirical approach to the issue of New Downtowns. Analyzing the socio-demographic structure of the research areas, it was found that people living in Hamburg HafenCity are substantially different from the respondents in the other four research areas: They earn almost twice as much as the residents of the other four survey areas in Hamburg and live mainly in one or two-person-households. This specific and homogeneous household structure demonstrates that people self-select themselves to some extent by choosing Hamburg HafenCity as a residence. Regarding their living environment, the results show that "proximity to the city-center", "cultural facilities" and "evening activities" are the most important factors for the residents of Hamburg HafenCity. In this session we

want to provide a closer look on how the residents of Hamburg HafenCity conduct their everyday life. Based on the analysis of action spaces our focus will be on demonstrating where working and leisure activities take place and how the residents there evaluate their residential environment.

### Beyond the global city concept

*Richard Smith (Swansea University)*

This paper prepares the ground to move the theoretical and empirical agenda of global urban studies beyond its dominant neo-Marxist tradition towards a broadly conceived poststructuralist approach to include research in actor-network theory, cultural-economy, social studies of finance, and post-continental philosophy. First, a previously unacknowledged account of the neo-Marxist back-story to the global city concept is explicated to foreground how Sassen's concept presides over a common epistemological tradition in urban studies that envisions capitalism as a totalizing structure to assume it is commanded and controlled through strategic urban loci. Second, Taylor's interlocking network model is interrogated to reveal how it not only contradicts Sassen, but is a structuralism bedevilled by a sorites paradox problem where cities are indistinguishable from, and therefore totally reducible to, structures. Finally, the paper moves beyond the global city through recourse to a broadly poststructuralist literature that is construed to foreground an attentiveness to the limits of capitalist control - viz., the global city - and the necessity for a conceptualization of cities as multiple, eventful, socio-material assemblages, that are never quite in control because as multiplicities they are alive with that which is not yet fully actual.



## UDC 29-01 - Towards a process-based understanding of spatiality: New perspectives on dissolving the rural-urban divide 1

*Chair: Annett Steinführer, Thilo Lang*

### From 'Carpet' to Patchwork': City-regions, 'corridor of connectivity' and the production of marginalities ?

*Tassilo Herrschel (University of Westminster)*

The challenges of peripherality have been a recurring theme in discussions and policies aimed at regional (economic) development and inequalities. Peripherality is generally geographically defined as "edges" of a territory, based on distance from a centrally positioned "core". and "periphery". Yet, this paper argues, such "edginess" is not the only form of peripherality and need not be merely a passive condition. Indeed, it may be actively produced. Peripherality may take on different, rather fuzzy forms, and embrace different scales. This makes conventional simplistic divisions into (urban) "core" and (rural) periphery rather more difficult and conceptually less convincing. Much of the recent discussions about governance and territoriality have argued for "new" forms of territoriality and associated forms and practices of governance vis-à-vis growing economic change: open, flexible, non-territorially defined, network based, and informal. Fixed territories with associated qualities are increasingly being replaced by more selective, linear spaces based on actual or perceived connectivities. The result is an effective dissection of 'conventional', contiguous territoriality into linear spaces of preferred connectivity between which new de facto peripherality are produced as "in between-ness" rather than conventional "edginess". Conventionally, such peripherality includes a close association with rurality, sparseness of population and remoteness. Yet this need not be so. Marginalisations through absence of connectivity may also exist within 'core regions', including city regions, and embrace different forms - suburban, ex-urban, Zwischenstadt, rural. Territoriality, and the belonging to it, is thus becoming less important than connectivity between actors with shared interests and purpose; being part of a network matters, rather than mere embeddedness in a region as fixed territory. Geography matters, but linkages, interrelations, connectivities and accessibility matter even more so, especially as they project perceived distances as either "beyond reach" or relative proximity. Policies aimed at peripherality need to keep this in mind. Belonging to a city region has

become a key political agenda for projecting positive development prospects and thus appeal to other core areas. And this serves the attempt to become part of a 'network of success'. Not belonging to any such network is thus rapidly becoming an increasingly urgent policy challenge. Changes to actual and perceived peripherality need to be achieved through targeted, imaginative policies addressing emerging fragmented spatialities, and overcoming the "territorial trap". The Oresund region offers an interesting example.

### Urban-rural partnerships in Europe and Germany

*Rupert Kawka (Bundesinstitut für Bau-, Stadt- und Raumforschung)*

Although there is still a clear-cut distinction between an urban and a rural policy in the EU and the individual member states, the Territorial Agenda 2020 stresses - again - the goal of territorial cohesion also on the meso level, i.e. between urban and rural regions. Also the new regulations for the structural funds focus more on this aspect, thus showing both a new and a continuous interest in these functional regions. Why 'new and continuous'? On the one hand, the topic came into the European discussion in the middle of the 1990s with the ESDP, on the other hand, the idea was somehow dormant and hardly brought into action. But the debate on metropolitan regions and the question about the position of rural counties within these regions demand a discussion about territorial cohesion and about urban-rural partnerships. Another aspect has to be discussed in this respect: Is there a need for a new compromise between a balancing and growth policy - against the background of the ongoing financial crisis, overwhelming public debts, increasingly difficult public borrowing and a perhaps future shrinking economic output in those regions generating money for balancing policy? Can large-scale co-operations between urban and rural as well as economically strong and weak regions contribute to this compromise? There are only few examples of really integrated (i.e. not sectoral) joint urban-rural development approaches within Europe. The German demonstration project (MORO) 'Supraregional partnerships' is a very extensive approach in Europe - in terms of the variety of projects, the spatial size and the analysis. The project has provided many hints about relevant topics in dependence of the distance between urban and rural regions, the management of initiatives to strengthen the relations between the different types of regions, the overall governance and the question about the spatial extent of such a partnership. This touches the aspect about the stakeholders, their regional and sectoral backgrounds, their varying understanding of time horizons, goals and approaches - and about individual and shared regional visions. This

demonstration projects also showed central success factors to build urban-rural partnerships and to overcome the urban-rural divide for mutual benefit. 'Supraregional partnerships' has strongly contributed to the European debate about urban-rural partnerships, because it stressed neither merely urban nor only rural areas, but the connections between the two types (rather three, because the suburban areas should not be neglected) and the management of the relations to improve the regional situation. The project has shown that co-operation leads to a surplus value for all - or at least many - places within such a partnership and that the traditional understanding of rural or urban can be overcome with good initiatives.

### Urban-Rural Relationships – analysing and reflecting linkages and flows

*Annegret Repp (Leibniz Centre for Agricultural Landscape Research), Thomas Weith (Leibniz Centre for Agricultural Landscape Research)*

Industrialisation and globalisation have caused massive changes in land use and in interrelations between different types of space. New forms of labour, increasing mobility and new information technology modified complex flows of goods and people. The dichotomy between rural and urban started dissolving and transitions amongst the two categories increased, including the creation of new types like peri-urban areas. Unlike this in analytical as well as political concepts the defined dichotomy between urban and rural persists up to now. One reason is the indifferent and simplified use of indicators like land use, settlement structures or economic productivity for creating types and classifications. One other reason is the missing reflection and integration of flows and interrelations between subspaces according to concept of space of flows defining space as a product of interrelations (Massey 2005). In consequence the relationships and flows in between have rarely been analysed and discussed. A review of scientific literature indicated lack of comparative data on flows between urban and rural areas until today (SPESP 2000). Best known are some physical flows like water and migration of people, analysis about flows of information and knowledge are mainly missing. Politics of interrelations like between programmes for rural areas and programmes for the urban areas are still exceptional. The full paper and the presentation will focus this analytical gap and connected governance deficits, based on an overview on concepts and models reflecting urban-rural relationships, including analytical concepts such as urban metabolism or regional governance. The aim is to provide a basis for the discussion in relation to the following questions: In which way reflect the existing

analytical and governance concepts spatial flows? What are conceptional consequences reflecting spatial interrelations? Which gaps between the current regional and political challenges and these concepts can be identified? And what are consequences for regional governance? Answers to these questions will give also indications for redefining spatial categories. The presented discussions and results are part of a project funded by the German Federal Ministry of Education and Research (BMBF) within the funding measure Sustainable Land Management. The funding measure has been designed to generate basic knowledge and to provide relevant strategies for action which are needed for sustainable land management decisions (BMBF 2008). References: BMBF Federal Ministry of Education and Research (2008): Announcement of regulations for the Sustainable land management funding measure, 24th of October 2008 Massey, D. (2005): For Space. London. Sage SPESP (2000): Study Programme on European Spatial Planning. Final Report. Stockholm. Nordregio.

### "Rurality" as Experience. Reconstruction-centered methodologies as a way to investigate spatial categories within everyday life experiences.

*Henrik Gasmus (Technische Universität Chemnitz), Sabine Scharfe (Leibniz Institut für ökologische Raumentwicklung)*

When talking about the "urban" and the "rural", discussion should start with open concepts. In this perspective investigating and dissolving the urban-rural divide deals not necessarily above all with theoretical problems, but also with empirical findings and methods of conducting and analysing data. One opportunity to approach the distinction respectively its involved dualities is to ask for leib-based and experience-driven phenomena of "what it is" to inhabit and--- moreover---to live in a place. That's why the paper will focus on people who consciously decided to leave metropolitan surroundings and to live auf dem Land. They are regarded as sensitive persons concerning social and cultural aspects of possible (and then as existing presupposed) differences between urban living and everyday life within non-"urban" circumstances. So these people, sociologically investigated due to their assumed "pioneer"-role in peripheralised "rural" contexts, can also be understood to be experts of insignificant everyday details that mark---if this is the case---a unique, hybrid or contradictory otherness with regard to the places where they lived before. With a focus on "experiences" in a strict empirical sense we want to stress different traditional reconstruction-oriented methods of qualitative sociological research,



as phenomenological and hermeneutical ones: for instance example-based hermeneutic procedures (Hahn, 1994) and objective hermeneutic (Oevermann, 2000). They represent a wide set of approaches to get involved with experiences in a deeper, today often called "constructivist" way in order to investigate a person's latent Deutungsmuster and Lebenspraxis. Arguing this, we will introduce firstly the basic methodological concepts of the mentioned reconstruction-centered methods. In a second part, we would like to portray and analyse cases of persons who moved from somewhere else in half timbered houses (Umgebindehäuser) in the German part of Upper Lusatia, where the population is declining since almost 1990. Nevertheless we can find there a range of biographical patterns connected with reconstructing old houses and forming a "rural" landscape aiming at a good life and keeping individual habitation experiences in mind. Making sense of these examples and the life-world category auf dem Land will guide directly to our conclusion suggesting qualitative approaches to handle the urban-rural divide methodologically.

## UDC 29-02 - Towards a process-based understanding of spatiality: New perspectives on dissolving the rural-urban divide 2

*Chair: Annett Steinführer, Thilo Lang*

### Fuzzy vs. fixed boundaries: The governance of migration and translocality in transit cities

*Eva Dick (Technical University of Dortmund), Thorsten Heitkamp (Technical University of Dortmund)*

During decades urban and rural development were considered separately. Predominant explanatory models provided a rather static view on rural-urban mobility according to which rural areas were seen as starting points and urban areas as destination areas of migration. Individuals and households seeking a better life by migrating to the urban labour markets were assumed to be leaving their hometowns and villages for good. This generic view is also nurtured by global statistics indicating the progressive urbanization process. And in cities delimited by fixed administrative boundaries weak urban governments often seek to mould public regulation into static and predictable forms, thereby neglecting the specific needs of their mobile populations. Contrary to conventional views on rural-urban migration, in many developing countries temporary circular or seasonal migration between rural and urban areas has proved to be the dominant type of mobility. In the context of translocal householding and networking, many temporary migrants retain strong links with their rural home areas; other rural-urban migrants use cities as a mere stepping stone before moving further onwards, sometimes internationally. Therefore we argue that urban areas in developing countries increasingly convert into places of transit as opposed to places of destination. This calls for alternative forms of governance which accommodate increasingly complex and fluid patterns of mobility, not least fostered by neoliberal globalisation. As yet urban policies and planning only unsatisfactorily respond to non-permanent migration processes and their role in sustaining people's livelihoods. This is in part due to a lack of mobility-related data, but - in our view - even more to a lack of intimate experience with the situation on the ground and therefore specific expertise being distilled into adequate planning practice. National and local governments and administrations are often ill-informed about e.g. housing, (informal) employment, infrastructure and service requirements of their mobile and often

transitory populations. Development analyses and strategies in these fields tend to be delimited by deterministic thinking thereby neglecting people's translocal livelihoods, engagement and networks that cut across fuzzy urban-rural boundaries, forming new soft spaces with their very own development requirements. Based on commencing case studies in Ghana and South Africa, the presentation will place emphasis on the need for incorporating new and more flexible forms of formal and informal urban governance into the spatial regulation of transit cities, thereby addressing the complexity of current migration processes and translocal livelihoods.

### Between Village and City: Rural-Urban Linkages in the Broader Region of Hyderabad

*Angela Jain (nexus Institut for Cooperation Management and Interdisciplinary Research), Alva Bonaker (nexus Institut for Cooperation Management and Interdisciplinary Research)*

The enormous growth of the South Indian metropolis of Hyderabad is a result of constant rural-urban migration. In fact, around 30 per cent of the population are migrants. Regarding the huge scale of the phenomenon some questions subsequently arise: (how) can these people be integrated into the city? Do they actually become an integral part of the city or do they rather keep their lives centred around their places of origin? How do they influence the living in the city? Such questions emphasise the crucial importance of the social aspects of rural-urban migration and linkages for sustainable mega city development. The study on rural-urban linkages in the region of Hyderabad is part of research within the Indo-German project 'Sustainable Hyderabad'. The interdisciplinary research, including literature review as well as empirical research (interviews with migrants of different groups and local experts in Hyderabad), was conducted as part of two dissertations and an ongoing social study. Considering that phenomena such as circular migration and community networks exist disconnected from spatial boundaries, as Steinbrink (2009) suggests in his concept of translocal livelihood strategies, we focus on translocality rather than merely on migration. Going beyond conventional migration studies that analyse the moving of people from one place to another, we also take into account that many people are part of the city and the place of origin at the same time. Analysing the motivations for migration, patterns of migration and the livelihood strategies of the people/communities involved we are presenting a typology for the region of Greater Hyderabad. With the help of these types it is possible to identify societal structures such as close personal linkages and vivid exchange

systems between rural and urban areas. As a result, social developments and potential changes in this context are mainly observable in form of social mobility (within the caste hierarchy) and differences between the generations regarding the emotional bonds to the place of origin. In the case of Hyderabad these linkages are very intense, but varying in form according to the socio-economic position of the people involved. Though they constitute a big share, not only poor agricultural labours or small farmers migrate in search for securing their survival, but different kind of people move to the city searching for education, work, marriage or driven by other motivations. The different backgrounds they come from shape their lifestyles and social networks which ultimately form a part of the city society. The central finding of the study is that migration is not a single action beginning at a certain point of time and ending at a certain point of time. The rural-urban linkages rather influence the lives of many citizens constantly. This has an impact on life in the villages as well as on cohabitation in the city where life is partly influenced by rural lifestyles.

#### **Overcoming the rural-urban divide – livelihoods and food security along the rural-urban continuum**

*Axel Drescher (Freiburg University), Johannes Schlesinger (University of Freiburg), David Iaquina (Nebraska Wesleyan University)*

Urbanisation is a complex process of social transformation. It is arguably the most significant demographic trend to emerge over the twentieth and twenty-first centuries, and it has deeply affected the entire landscape of human endeavour. However, it is not sufficient to characterise urbanisation and its effects as the simple distinction between two categories, 'rural' and 'urban'. Rather it is dialectic in geographic space which creates a complex patchwork of transformed and transforming 'in between' areas. This patchwork includes diverse combinations of urban functions embedded in spaces traditionally dominated by agricultural production. Commonly referred to as the periurban, this interface is highly dynamic and often overlooked by scientists, town planners and policy makers. Much of this oversight is due to two factors: the inherent complexity and 'messiness' of the areas and the oversimplification of the periurban itself in the form of a single entity. Building on previous work which identified a more articulated vision of the periurban, called the periurban typology, this paper presents the results of an innovative transect approach, clarifying the varied patterns of spatial and temporal changes along the rural-urban continuum. The results are based on research in six medium-sized towns in five African countries. In each town a standard questionnaire and GIS

approach was used to assess various facets of agricultural production along a continuum from the town centre through the periurban zones outwards into the surrounding rural areas. Using various indicators of food security, the focus of this research is on natural resource use and its importance for the livelihoods at different locations along the continuum. Typically, both subsistence and market agriculture play a significant role in the local livelihoods of rural people in sub-Saharan Africa. Increasing evidence also points to their importance in many urban and periurban households. Yet there is limited understanding of how the relative contribution of agriculture to local livelihoods changes along dynamic urbanising gradients. The results demonstrate the insufficiencies of simple rural-urban distinctions and provide support for the continuous yet irregular nature of dynamic urbanising gradients which we have elsewhere termed a 'lumpy continuum'. Further, these results move the periurban typology out of the conceptual arena and into the practical. Together, this work has important implications for town planning and land-use zoning, and both local and large-scale programmes and policies aimed at reducing livelihood vulnerability, enhancing access to land and alleviating food insecurity.

#### **“Urban” or “rural”? “urban” and “rural”: Perceptions of quality of life in French and Polish small towns**

*Helene Mainet (Université Blaise Pascal- CERAMAC), Agnieszka Kwiatek-Soltys (Pedagogical University of Cracow)*

In the paper authors focus on the perceptions of quality of life in small towns in France and Poland and the use of urban and rural references in the urban marketing and inhabitant's appreciations. Small towns are a good way to question the construction of territorial models and modes of spatiality as they make over 75% of all cities and are inhabited by over 21% of all urban population in Poland and similarly in France (89% of urban units and 22,4% of the urban population). 'Small' towns are small in size (from 2000 to 20 000 inhabitants according to official and academic references in France and below 20 000 inhabitants in Poland), but they are playing a key role in the attractiveness of urban spaces and their surrounding areas. Depending on their spatial location, they can be in the direct influence of bigger towns or situated in more isolate context (peripheral small towns). The issue of mobility is also important, due to more extended commuting distances. People can live in a small town, in a 'rural' environment, and work in bigger cities. The identification of the motives of settlement in small towns in both countries became the important element of the paper. Very often, local stakeholders are using urban



and rural references to promote their territory, leading to commonplace pictures ('city where life is good', 'human sized towns'). Representations of rurality and urbanity, and their clichés, are widely used. Positive aspects of both are mobilised (equipments and services, urban dynamism on the one side; friendliness, solidarities and inter-acquaintance on the other) and negative sides are often minimized. Is this mixing of urban and rural promotion a pertinent one or does it tend to blur references and identifications? Furthermore, in a context of social demand for a better quality of life, linked with increasing impacts of sustainable development criteria, what are the perceptions of small towns' inhabitants? Do they identify themselves as living in 'urban', 'rural' or 'in-between' places? Is this urban-rural spatiality important for their choice of residence and everyday practices? Does the rural or urban lifestyle can still and to what extent be treated as the element of space identification? Those elements will be illustrated by empirical fieldworks conducted in French and Polish small towns, in a Polonium Research Program, in 2011 and 2012. Issues of comparison will be exposed but also elements of more general and systemic analysis on the urban-rural divide through small towns perspectives.

## UDC 30-01 - Un pont sur le fossé ? Le rôle des villes moyennes comme intermédiaire entre déprise rurale et mégapoles

*Chair: Andreas Obersteg, Christophe Demazière*

### Le rôle des villes moyennes dans les systèmes spatiaux : Nommer et évaluer l'intermédiaire

*Helene Mainet (Université Blaise Pascal- CERAMAC), Jean-Charles Edouard (Université Blaise Pascal)*

La question des relations entretenues entre les villes secondaires et les territoires est récurrente dans les travaux portant sur l'organisation des systèmes spatiaux et des réseaux urbains, tant aux échelles nationales que régionales. Les fonctions territoriales qu'elles assurent sont variées et complémentaires comme en témoigne la diversité des appellations. Si certains auteurs insistent sur la taille et donc principalement sur leur positionnement dans la hiérarchie urbaine (ville "moyenne", "secondaire", "d'équilibre"), nombreux sont ceux qui valorisent la logique fonctionnelle ("Market towns", "District towns", "pôles de croissance", "Secondary Growth Poles"). Tous mettent l'accent sur les interactions et articulations jouées par ces villes "charnières", "intermédiaires", "médiannes" ou "de transition" à travers les fonctions d'appui, de distribution et de réseautage, d'intermédiation, variables selon les échelles d'analyse et les contextes territoriaux. Face à des campagnes en évolution, parfois dépeuplées, parfois plus dynamiques, faut-il toujours considérer les villes secondaires comme des "centres", comme des "relais" ou comme des "pôles" - Que reste-t-il de dynamiques relationnelles parfois héritées à l'heure de l'augmentation des mobilités et des communications, dans des contextes démographiques parfois fragiles, au moment où on ferme le tribunal, l'hôpital local, en attendant la gendarmerie et le collège - Dans d'autres cas, les mobilités favorisent le recours direct aux niveaux supérieurs de la hiérarchie urbaine et les effets de court-circuitage des niveaux intermédiaires sont visibles. Sans prétendre à l'exhaustivité, nous souhaitons apporter, à travers une analyse comparative de l'abondante littérature scientifique anglophone et francophone portant sur les relations urbain-rural et sur les réseaux urbains, des éléments de compréhension et de comparaison à la dimension intermédiaire des villes moyennes, variable selon les contextes territoriaux (européens, africains, etc.) et remise en question par les évolutions sociopolitiques récentes. L'analyse comparative nous

permettra également d'interroger le sens même des termes "intermédiaires", "secondaires", "moyens", dans des contextes socioculturels et économiques parfois très différents, et selon les échelles qu'ils mobilisent (locale, régionale, nationale, internationale).

### Spatial evolution of one of the oldest Transylvanian settlements, Turda, Cluj county

*Puscasu Adina Maria (Babes-Bolyai University), Bruckner Leonard (Babes-Bolyai University), Vasile Surd (Babes-Bolyai University)*

As one of the oldest settlements in Transylvania, Turda is an important element in this region. The town lies on the foundations of an ancient Geto-Dacian site, Turidava. From the second to the fifth century AD, Turda was also preceded by an important Roman citadel, Potaissa, a name which in time changed to its present form, Turda. Whereas in the Middle Ages it would become the summer residence of Transylvania's princes, as well as one of the main political centres of Transylvania, and a vital hub for commerce in the surrounding area. Due considerably to its geographical location, it became possible for this community to develop strong economic functions up to this time in history. The exploitation of all its resources, be it salt and stone for the chemical and construction industry, the fertile agricultural land or the rich forests, the strategic position of the site, all this led to the emergence and continuous growth of this town. The modernization process that swept the Habsburg Empire, including Transylvania, around the middle of the 19th century had the consequence of bringing urban life to the forefront. The years 1850-1851 mark the first steps in urbanization, the beginning of a shift of the center of gravity of economic life from the village towards the city. The nationalization process that started in 1948 not only erased the previous establishment, but defined the economic development of the area. The policies of the ruling communist party, which aim to increase the national industrial capacity, lead to the development of Turda, in two complementary directions: the establishment of large scale, brand new industrial sites and the enlargement of existing production facilities. Turda gradually became the most important location of the building materials industry on a national scale. The expansion of urban areas, the nationwide migration of a large part of the population towards towns and cities and the rapid urbanization of the second half of the twentieth century were the results of the Five-Year Plan to turn Romania into an industrial powerhouse. Starting from 1944, Turda expanded especially towards the south and east, where the bordering village of Poiana is incorporated in the city limits and a new district of blocks of flats is

built. After 1970, as the population keeps leaving for the urban areas where employment is easily attained, rural population numbers start to decline and Romanian village life alters significantly. The impact of industrial development would ultimately be catastrophic to all rural settlements within the isochronous limit of 45', especially for those located within the 30' isochronous limit. Starting with 1990, we see not only the economic transition from state owned to private economy, with the consequent rise in the unemployment rate, but also the emergence of a unique phenomenon in Europe: the migration of city dwellers towards rural areas and a slight increase in the share of rural population.

### Les problèmes socio-économiques choisis des villes transfrontalières sur la frontière polonaise

*Roman Matykowski (Adam Mickiewicz University), Elzbieta Bilaska-Wodecka (Jagiellonian University), Katarzyna Kulczynska (Adam Mickiewicz University), Katarzyna Kulczynska (Adam Mickiewicz University)*

Avec la fin de la Première Guerre mondiale, plusieurs pays européens ont trouvé leur renaissance, entre autres la Pologne. Le tracé de certaines frontières y compris une partie de la frontière entre la Pologne et la Tchécoslovaquie a été fixé à la suite des décisions internationales, celles-ci prises par le Conseil des Ambassadeurs de certains pays de l'Entente (1920). C'est ainsi que la ville de Cieszyn homogène jusqu'à cette époque a été divisée en deux organismes urbains séparés. C'était pareil après la Deuxième Guerre mondiale; à la suite de la Conférence de Potsdam (1945) la nouvelle frontière polono-allemande reposait sur les fleuves de l'Odra et de la Nysa (Oder et Neisse) et les villes telles que Görlitz, Guben, Frankfurt-Oder et Küstrin ont été divisées. De telles villes fonctionnent dans la littérature spécialisée en tant que villes partagées ou villes-doublons. De sept villes partagées (dont six sur la frontière polono-allemande et une sur la frontière polono-tchèque) quatorze entités urbaines ont été créées où le critère d'une ville moyenne (nombre de population dépassant 20 mille habitants) est rempli par sept villes: 'eský T'in, Cieszyn, Görlitz, Zgorzelec, Frankfurt-Oder, Guben, Forst/Lausitz et aucun ensemble de deux villes ne dépasse au total 100 000 habitants. Le présent article a pour but de démontrer les ressemblances et les différences dans le développement des villes partagées après la fin de la Deuxième Guerre mondiale, ainsi que les causes de cet état. Une remarque particulière sera portée sur les changements subis dans la structure démographique, dans l'économie et le secteur des services. La localisation transfrontalière et les limitations résultant des directives étatiques en ce qui concernait entre autres le déplacement de la population dans la zone

frontalière ont troublé le développement des centres municipaux nouvellement créés. Zgorzelec, S'ubice, Guben et 'eský T'in privés de leur centre historique avec les infrastructures: commerciale, des services et bien souvent celle du transport en commun ont été forcés de planifier et de créer non seulement un nouveau centre-ville dans le tissu urbain déjà existant mais également des composants séparés de la structure spatiale (par ex.: les centres commerciaux).

### Les problèmes socio-économiques choisis des villes transfrontalières sur la frontière polonaise

*Katarzyna Kulczynska (Adam Mickiewicz University), Roman Matykowski (Adam Mickiewicz University), Elzbieta Bilaska-Wodecka (Jagiellonian University)*

Avec la fin de la Première Guerre mondiale, plusieurs pays européens ont trouvé leur renaissance, entre autres la Pologne. Le tracé de certaines frontières y compris une partie de la frontière entre la Pologne et la Tchécoslovaquie a été fixé à la suite des décisions internationales, celles-ci prises par le Conseil des Ambassadeurs de certains pays de l'Entente (1920). C'est ainsi que la ville de Cieszyn homogène jusqu'à cette époque a été divisée en deux organismes urbains séparés. C'était pareil après la Deuxième Guerre mondiale; à la suite de la Conférence de Potsdam (1945) la nouvelle frontière polono-allemande reposait sur les fleuves de l'Odra et de la Nysa (Oder et Neisse) et les villes telles que Görlitz, Guben, Frankfurt-Oder et Küstrin ont été divisées. De telles villes fonctionnent dans la littérature spécialisée en tant que villes partagées ou villes-doublons. De sept villes partagées (dont six sur la frontière polono-allemande et une sur la frontière polono-tchèque) quatorze entités urbaines ont été créées où le critère d'une ville moyenne (nombre de population dépassant 20 mille habitants) est rempli par sept villes: Český Tesin, Cieszyn, Görlitz, Zgorzelec, Frankfurt-Oder, Guben, Forst/Lausitz et aucun ensemble de deux villes ne dépasse au total 100 000 habitants. Le présent article a pour but de démontrer les ressemblances et les différences dans le développement des villes partagées après la fin de la Deuxième Guerre mondiale, ainsi que les causes de cet état. Une remarque particulière sera portée sur les changements subis dans la structure démographique, dans l'économie et le secteur des services. La localisation transfrontalière et les limitations résultant des directives étatiques en ce qui concernait entre autres le déplacement de la population dans la zone frontalière ont troublé le développement des centres municipaux nouvellement créés. Zgorzelec, S'ubice, Guben et Český Tesin privés de leur centre historique avec les infrastructures: commerciale, des services et bien souvent celle du transport en commun ont été forcés de planifier et de créer non seulement un





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## UDC 31-01 - Uneven geography of power: The production of 'dominant spaces' in urban environments 1

*Chair: Kirsten Hackenbroch, Shahadat Hossain*

### **Housing policy paradigm shifts and actors' relations: Multilevel governance in the Global South, The case of Nairobi, Kenya**

*Joseph Kedogo Masilwa (ITT-Cologne University of Applied Sciences),  
Johannes Hamhaber (Cologne University of Applied Sciences)*

Currently the world is rapidly urbanising with the urban areas of the Global South accounting for over 90% of the world urban population growth. This rapid urbanisation in the Global South coupled with insufficient or missing urban policies and governance structures, economic growth and other socio-economic processes is giving rise to serious urban problems, such as the proliferation of slums and social fragmentation. Moreover, the urban arena in the South has become very complex and fragmented, involving heterogeneous actors at various scales, with disparities in their powers, roles, interests and perspectives - a continuous source for conflict potential. Furthermore, these actors possibly have different paradigmatic stands which prevents the attainment of common ground and effective cooperation, thereby severely undermining attempts toward 'good urban governance'. The current dominant paradigm of 'good urban governance' calls for an appropriate and well functioning multi-level and multi-actor urban governance system that integrates all actors, permitting effective negotiations and bargaining amongst the actors from the local to global levels, thus creating a more socially sustainable arena. As such, understanding and enhancing the actors' relationships becomes *condicio sine qua non* for attaining sustainable and inclusive urbanisation. This paper, based on an ongoing PhD project, therefore deals with the question of how the changing paradigms of housing and urban policies have evolved and - instead of being subsequently replaced - are still concurrently prevailing and competing with each other. Based on a multilevel stakeholder analysis of the urban arena in Nairobi's informal settlements, it examines the actors at different scales (international, national, city wide and the local grassroots levels), and from the different sectors (state, market and civil society, also including informal to illegal actors). In this way, the actors may be mapped according to the paradigmatic views they subscribe to. Based on the fundamental incompatibility of their paradigmatic stands and interests, the paper postulates that the profound lack of common ground and mutual understanding not only undermines effective

cooperation, but also jeopardizes the potential success of the latest paradigm of good governance in dealing with the increasing urban challenges in the Global South

### **Politics of (im)mobility-the case of rickshaw ban in Bangladesh**

*Musleh Uddin Hasan (University College London), Julio D Davila (University College London)*

In a mobile world cities are increasingly being planned for mobility. Cities in developing countries are no longer interested to lag behind the race and are vigorously pushing for motorization friendly infrastructure and policies including regulating non-motorized vehicles. However, as these cities are featured by differential access of their population to income, opportunities, differences in age, ability, (perceived and practised) gender role and interest distribution of new or increased mobility is a highly political or politicized decision which increases the mobility of one group only at the cost of reduced, if close not nil, mobility of the other. In the name of increasing mobility in the urban roads in Bangladesh popular and extensively used non-motorized vehicle rickshaw (a tri-cycle) is gradually being shifted out and banned from different roads in large cities. Taking the case of rickshaw ban in Dhaka, Capital of Bangladesh, this study would seek to identify the primary losers and beneficiaries in different daily and occasional activities involving mobility. It will also try to identify the hidden or indirect stakeholders of the decision as the decision is said to affect either negatively or positively the livelihood of the rickshaw-wallahs (rickshaw-peddlers), business of several other interest groups including car and real estate enterprises. Finally it will also throw light on the decision making process and investigate how, if at all, the voice of the less vocal and powerful are heard or not.

### **How Sports Change the Geography of Power in Urban Environments**

*Christina West (Universität Mannheim)*

Analysing uneven geography of power in urban environments means not only localizing unevenness in cities and describing different practices and processes of the production of spaces, but rather understanding how collectives as well as individuals produce and reproduce unevenness. This process-related view allows one to address the matters of practice and positioning in social, spatial, normative, and communicative contexts - the basics for social and cultural affiliation, whereby individual and collective identity is constructed. The basics for

the identity-construction, which is fixed in the collective memory, are common implicit and explicit knowledge, recollection and memory. The development of the we-identity coincides with the emergence of distance, or distinction, from the 'other'. After defining a theoretical framework for the complex relation between identity and 'othering' and the connection of collective memory and (re)-production of unevenness, the paper shows how streetfootball changes identity construction of socially insufficient integrated young people in South America, Europe, Africa, and Middle East. Mostly, their former identity and memory construction is affected by experience of direct and structural violence. Social positions and roles in their every day life which is inseparably linked to the uneven geography of power are passed to and fixed in the communicative memory since generations. By playing streetfootball, according to the 'Medelliner Ansatz' of the international social-profit-organisation streetfootballworld, identity changes through the basic principles fair play, tolerance, and communication. The players are able to integrate the perspective of the 'others' so that their collective memory will be broadened, a reconstruction of their former identity will be possible, they are able to create innovative solutions for social, spatial and individual challenges, and the perception of different urban spaces (mostly public) will be redefined. First time in their life they are able to produce space and to influence the urban geography of their cities. Capoeira, as a traditional Brazilian martial art, today has a similar function, re-creating 'dominant spaces'. By 'playing' Capoeira, space is claimed against the power holders, herewith strengthening self-consciousness and creating a we-identity. In contrary to streetfootball, Capoeira has a low organisation level. Instead, fair-play is guaranteed by a strong power hierarchy. Thus, meaningful group-specific realities with their spatial relation and the connected communication are constituted in the collective memory, as there the subjective-mental, the social-cultural and the physical-material reality are associated. Therefore streetfootball as well as Capoeira are media to cope with dominant spaces and to change them into ephemeral dominated spaces (counter-spaces).

### Islamisation and Urban Growth in Java, Indonesia : A Geopolitical Economic Perspective

*Hafid Setiadi (University of Indonesia)*

Discussion of Islamisation is not only associated with the spread of religious values, but also related to the activity of trade and the opening of the new lands. In Java, all three of these themes had occurred simultaneously and then experienced a rapid development since the 15th century. In the period of 15th

century until the 16th, many Islamic kingdoms raised and fell by turns with any ideology and their economic and political motives. As a result, Java experienced an complex of territorialisation. By a spatial-historical approach, this paper shows how that territorialization have an effect on the fashion of emergence and collapse of the cities in Java. Spatial dynamics of urban growth reflected changes of mode production of political space which run by each the Islamic regime. The city played an important as a symbol as well as an identity of political power of dominant regime. Key words: islamisation, urban growth, territorialisation, Islamic regime, political space

## UDC 31-02 - Uneven geography of power: The production of 'dominant spaces' in urban environments 2

*Chair: Kirsten Hackenbroch, Shahadat Hossain*

### Defining Urban Space – The Changing Governance in Dhaka's Transport Sector

*Elvira Graner (South Asia Institute), Mahboob Elahi Akhter (Institute of Governance Studies, BRAC University Dhaka)*

For defining urban space, the transport sector needs to be attributed a quintessential role, and even more so in (mega)cities. While in many urban agglomerations in Asia there has been a dramatic increase in motorised urban transport there has often also remained a bizarre mosaic of different modes of transport. These seem to cater to different strata of the urban population and from this vantage point, the transport sector can also be seen as a crucial proxy for social change. At the same time, we conceptualise cities as a site (or 'arena') of contested space, where the elite and middle class aim at re-defining the allocations of space according to their

### What lies behind the Sea and Sun? Analyzing the geographies of power in the tourist city

*Ismael Yrigoy (University of the Balearic Islands), Sònia Vives (University of the Balearic Islands)*

What lies behind the Sea and Sun? : analyzing the geographies of power in the tourist city Ismael Yrigoy Cadena and Sònia Vives Miró Since the 50s, the European Union project has created mechanisms to guarantee the process of capital accumulation. These mechanisms have been led by public institutions (ranging from global actors to nation-states administrations), but also by private actors. Both agents have assured a particular role for these spaces in the global circuits of capital and have also taken an active role in setting a particular pro-growth elite specialized in touristic and building sectors. This paper attempts to analyze the power relations that have shaped the coastal 'pleasure peripheries' as one of the solutions to the overaccumulation process of the main European's economies. In these sense, the first aim of the paper is to identify the different players that have been related to the production of space in Palma (Mallorca, Spain) since the Franco dictatorship until nowadays, focusing on the current

crisis. The second goal is to analyze the different spatial strategies developed by those actors, ranging from the global policies to the local strategies.

### Rural area as a product of contemporary economic-geographic development in Bosnia and Herzegovina

*Rahman Nurkovic (Faculty of Natural Sciences)*

The paper deals with an issue of the image that contemporary economic-geographic development of Bosnia and Herzegovina shows. In Bosnia and Herzegovina, as in other ex real-socialist countries in Europe, rural area has had a quite different development in last fifty years. However, part of 'image' is close to image in economically most developed capitalist countries: number of agricultural population reduces on their level, and different interests considerably affect, here and there, the creation of new perceptions of rural development in Bosnia and Herzegovina. Simultaneously, it is an attempt of response to increasing need for empirical researches on the new meanings that are attached to rural areas and their 'new' identities. In contemporary period of economic-geographic development in rural areas in Bosnia and Herzegovina there is around 30 % of agricultural population, and majority of this area today has characteristics of distinct lagging behind in development, which indicates to clear negativity of all demographic, socio-cultural and spatial-planned indicators. Only 12 % of these areas are within the balanced development or expansion. With a change of socio-economic system into market economy, rural areas of Bosnia and Herzegovina are facing new challenges. One of them is, certainly, a development of contemporary economic activities. Therefore, from a broader context of rural change and for the needs of this article, we are going to focus on agrarian production as elements that have been deemed compatible functions of rural areas for a long time. At the same time, it should be emphasized that agricultural products should be observed as a result and a factor of other changes in rural area of Bosnia and Herzegovina.

## UDC 32-01 - Urban informality as post-socialist routine?

*Chair: Daniel Göler, Bernhard Köppen*

### **Communities rooted in place: A reality in post-soviet cities? The case of Riga.**

*Maija Uša (University of Latvia)*

The development of the 'compact' city in the Socialism period created a large concentration of residents (by restriction of the size of one's house and its diversity), disregarding the needs of families or lifestyle. The values of Soviet urban space were based on satisfaction of basic needs. There were specific features characterizing Soviet urban planning: standardization of individual apartments, lack of private property and semi-private space, lack of individuals' responsibility about common space. Neighbours' help-out and support were more a necessity than a desire. After the collapse of Soviet Union the political, economic and social structures in formerly centrally planned societies significantly changed. Therefore the formation of communities rooted in place, that are mostly based on informal contacts, initiatives and communication, in Post-soviet space is both actual, but insufficiently explored question. E.g., in the case of Riga, the idea about communities rooted in place and neighborhoods has become popular only in the last few years. During this period a few significant researches regarding historical urban structure and economical geographic questions as well as tendencies of real estate have been done. At the same time there are not many researches regarding neighbouring, informal communication and formation processes of territorial communities in Post-soviet neighborhoods not only in Riga, but also in other Post-soviet cities. Therefore in this research the author is probing into three different neighbourhoods in Riga. The research is based on residents' point of view about their neighborhood and their explanations and expectations about territorial community development in it. The data is gathered by using semi structured in-depth interviews with residents of the specific neighborhoods and representatives of formal/informal neighbourhood initiatives (e.g. NGOs) as well as unstructured observations done by the author of the research. The data is analysed by using principles of grounded theory and analytical induction. The results show and allow to make judgements about factors that influence the formation processes of communities rooted in place in a post soviet city. Key-words: community rooted in place, neighbourhood, Post - soviet city.

### **Urban informality in post-socialist Albania: The case of the peri-urban area of Shkoder city**

*Dritan Rustja (University of Shkodra)*

This paper analyzes the development of urban informality in post-socialist Albania, based on a concrete case-study. Firstly, it makes a general consideration on this issue in a national level, discovering its causes, evolution and consequences. After that, the paper turns its attention to the spatial transformations that occurred in the peri-urban area of Shkodra city after 1990, positively in "Rrethinat" commune, which has experienced the most dramatic social, economic and land use transformations in Shkodra region during this period, along with Shkodra city itself. This is the first study undertaken for this area and it aims to examine the causes, the dynamics and the impact of these transformations over the community and land use. Using a diverse range of geographical research methods, the study finds out that the most immediate problems that need to be addressed are: the lack of an administrative identity for this area, the high degree of economic, demographic and settlement informality and the lack of an adequate public infrastructure. It concludes on emphasizing the necessity to develop and carry out a general regulatory plan for this territory as the final solution to all the above mentioned problems and as a way to achieve sustainable development. Key words: spatial transformation, peri-urban area, Shkodra city, informality, regulatory plan

### **Informal Housing in Post-Socialist Croatia – Trends and Perspectives**

*Dubravka Spevec (University of Zagreb), Sanja Klempic Bogadi (Institute for Migration and Ethnic Studies)*

This paper analyses urban development and housing policy in post-socialist Croatia, with the emphases on informal housing. During socialist period a serious housing shortage in Croatian cities was caused by the inflow of migrants from rural areas, induced by intensive industrialisation. Former Yugoslavia implemented a housing policy based on the dominance and control of the state, which organised, built and allocated large housing estates in the cities, and at the same time did not restrict individual housing construction. Significant part of this individual housing construction was informal, especially on the outskirts of large cities, without proper planning permit and without essential infrastructure services. This have become a serious problem since the state wasn't able to fulfill all housing demands; informal housing was seen as one of the ways to deal with housing shortage for low-income households. This trend continued during

post-socialist period; it intensified especially during 1990s, as a result of lack of public investment in housing, and large inflow of refugees and internally displaced persons. Due to the fact that Croatia has no housing policy, and the rental sector is unorganised (the public rental sector barely exists and rents in the private rental sector are very high), and that the state did not sanctioned illegal housing construction, the legalisation of the informal housing has been seen as a solution. Informal housing first appeared and today is mostly present in larger Croatian cities. With tourism development and building of second houses in settlements on the Croatian coast, informal housing has become a big problem for planning and sustainable development in this part of Croatia.

### **Re-Organizing the urban system in Mongolia: Impacts of political, economic and demographic trends**

*Eva Maria Gardemann (Albert Ludwigs Universität Freiburg)*

Throughout the last hundred years, and in particular since the 1950s, Mongolia has experienced a process of urbanization on an unparalleled scale and speed: from a very low percentage of the population living in cities in the 1920s to 70% in 2010. In post-socialist Mongolia, new migration processes promoted economic and demographic concentration in the primate city Ulaanbaatar, while other urban agglomerations witnessed severe population losses and decline in their urban functions. It is assumed that these dynamics will continue in the coming decades as future trends are more likely to be driven by demographic and global economic trends than by national development policies. Against this background the presentation analyzes the major changes which contribute to the continued transformation of the Mongolian urban system: the clustering of growth in a few large urban centers on one hand and the decline of many smaller urban areas on the other. The guiding question is: How will modifications that affect Mongolia's policy, economy and demography reshape the urban system over the next decades? Research is based on both qualitative and quantitative methodological approaches by combining statistical information with the results from interviews with leading players and stakeholders in the ongoing processes of urban development. Mongolia's urban system goes back to two major phases of urban settlement: the 'pre-revolutionary' phase, extending from the 17th century to 1921, accounts for settlement-patterns that are consistent with a nomadic society. The second, the 'socialist' phase shaped a nationwide hierarchical urban system with a rapidly growing industrialized core and vast regions where development remained far slower and more dispersed. Since 1990, transformation and internal migration have led to even higher socio-

economic rural-urban disparities. Today, plans to exploit the enormous mineral resources in the peripheral south-east Gobi accompanied by the global demand for commodities point to a possible shift of the north-south disparities; which means that the resource-rich South would grow faster than the industrialized core with its outdated production facilities. However, increasing service-sector orientation could also foster the concentration of growth in the existing large urban centers. Furthermore demographic trends are expected to be a major contribution to Mongolia's city development by causing enormous migration flows. A process that takes place beyond official urban development patterns is the emergence of various informal settlements especially in the context of small-scale artisanal mining. Even though it is hard to predict which development scenario will prevail, it is likely that changes affecting economy, policy and demography will result in a highly polarized urban system with a few large urban of high growth rates and numerous smaller centers, trapped in a vicious circle of decline.

## UDC 33-01 - Urban poverty – Conceptions of everyday life under persistent conditions of inequality

*Chair: Ulrike Gerhard, Eberhard Rothfuss*

### Self organization in the context of urban Food Security using the example of Street Food Vendors.

*Lea Jenkner (University Bonn), Divya Rajeswari Swaminathan*

In rapidly growing megacities like Chennai the issue of assuring food security for all inhabitants, especially the urban poor is a key factor for sustainable urban development. Street food vendors play an important role for the lower- and middleclass to meet their daily dietary needs. They provide cheap and ready-to-eat meals around the city at convenient places for their customers. The aspect of self-organisation is especially important in the 'urban age'. Not only are (mega)cities growing faster than ever, they are also beginning to exist in the whole world. Urban problems are thus increasingly global challenges. The number of people who are employed in the informal sector is especially growing in megacities. This leads to the question how these self organised workers can be included in city planning rather than excluded.

### Socio-spatial Impact of affordable housing for urban poverty in China: The case of Nanjing

*Dongqi Sun (Nanjing University)*

Along with the housing marketisation reform, affordable housing for urban poverty program has been implemented for more than ten years in China. It remedies the emergent weaknesses in the housing sector marketisation process, but critically it also brings new social and spatial inequalities to the household living in the affordable housing area. This research uses a longitudinal data set of commuting behavior of household in poverty that are forced to live in the affordable housing to test the nature and strength of the association between residential change and employment location. Do households in poverty expend commuting distances when they live in affordable housing area and what are the differences for pre- and post relocation for them? The analysis utilizes descriptive measures of distance and time to work for pre- and post-residential relocations. The results show that household in poverty resettled in the affordable housing area have poorer access to employment than before and they suffer spatial mismatch.

### Towards the Social Sustainability of Low Cost Housing in South Africa: The Role of Social Capital and Sense of Place in Zanemvula, Port Elizabeth

*Leizel Williams-Bruinders (Nelson Mandela Metropolitan University), Anton de Wit (Nelson Mandela Metropolitan University)*

The idea of sustainable development has attracted considerable debate since its introduction. However, of the basic elements of sustainability, the economic and environmental dimensions have traditionally attracted the bulk of academic and other attention. Consideration of the much-overlooked area of social sustainability and its general concern for the maintenance and/or improvement of human well-being is a more recent phenomenon in sustainable development discourse (Maloutas, 2003). Wide-spread awareness of the sustainability of development has brought with it an increased concern amongst communities, governments and others over the means to assess progress (sustainability) towards sustainable development. The conceptualisation of social sustainability has however narrowed its operational focus down to the useful implication of the concept of social capital (Bhuiyan, 2011; Goodland, 2001; Dubois et al., 2002). The benefits of strong social capital are well researched and are often positively connected to the stability of society in general. Where social capital is not maintained, or where it lacks in strength, deficiencies usually result in social breakdown. An important ingredient of social capital, in addition to that referred to by Putnam (1996), is what is generally known as the sense of place. This term, although variously defined, is often used in relation to the characteristics that make a place special or unique, and/or encourage a feeling of human attachment and belonging. A strong sense of place is therefore associated, in a reciprocal fashion, with strong social capital; which, in turn, is an important determinant of community stability and human well-being. Much of the socio-spatial behaviour of people is voluntary and adds to a particular sense of place. However, it can occasionally be 'forced' on them. This in a post-Apartheid South Africa is often the consequence of the large-scale movement of people to low cost (social) housing estates where they have little or no choice in their eventual place of settlement. Whereas the provision of formal low cost housing in South Africa is no doubt an essential factor in the social well-being of the urban poor, the resettlement of people and communities is probably one of the key contributing factors in upsetting community social capital and people's sense of place (Herbert, et al., 1997). This holds an unintended human well-being paradox for the provision of low cost housing in South Africa, as many societies, in problems such as crime, violence, conflict and social instability, display ample



evidence of what happens when community social capital and the sense of place are disturbed. This research aims to explore the determining role of social capital and the sense of place of the inhabitants of the Zanemvula neighbourhood. These findings will be used to debate current housing policy with regard to sustainable human settlements in South Africa.

### **Enactment of citizenship by creative activism in an immigration neighborhood of Madrid**

*Eva Youkhana (Interdisziplinäres Lateinamerikazentrum), Christian Sebaly (University of Bonn), Christian Sebaly (University of Bonn)*

Madrid is undergoing an urban transformation process. Economic growth primarily backed by the real estate and service sectors has introduced the city as an international hub for business and commerce. To demonstrate the new centrality neoliberal urban governance strategies such as revaluation and progressive tertiarisation transform the historic city center to an arena for consumption, urban spectacle and tourism. At the same time demographic pressure and segregation reconfigure the dynamics of the socio-spatial urban fabric. The socially marginal working class neighborhood Lavapiés is one case in point. The construction of cultural institutions, rehabilitation projects, redesign of the public space and control of communal places foster the image of Lavapiés as a cultural destination and provoke changes in social tenancy, as well as gentrification and displacement of low endowed people such as immigrant groups. As a consequence the replacement of traditional structures and conventions provoke resistant spatial practices and make Lavapiés a highly contested space. To counteract rehabilitation programs to commercialize and control the city and thus repel heterogeneous urban livelihoods street and action art is increasingly used to symbolically re-appropriate the urban space and thus articulate urban citizenship from below. As such, street and action art is a strategy to for those who are widely excluded from hegemonic social, political, cultural and economic participation. Alternative cultural expressions are nowadays synonyms for the countervailing power of the subalterns. This was nicely documented at the example of the symbolic re-appropriation of North American cities since the late 1960s through Graffiti. While Graffiti has been used mainly by young artists to allow for the articulation of political and other forms of self-manifestations, there is a variety of street and action art used by activists and migrant groups to escape from voicelessness, to articulate exclusion and the lack of rights and access to resources. By this emancipatory activism the current politics of place undergo radical changes from a capitalistic

appropriation towards new forms of urban belonging beyond normative categorisations of social difference.



## UDC 34-01 - Urban utopias and heterotopias: Theorizing, analyzing, and evaluating urban spaces 1

*Chair: Christina West, Thomas Doerfler*

### Capital Flows and Captive Animals: Rural-Urban Intersections in Delhi, India

*Pratyusha Basu (University of South Florida)*

As the showcase of India's claim to being a rising economic power, the capital city of Delhi has also become the site of governmental and middle-class anxieties related to the continuing presence of rural migrants and informal economies. A key aspect of these informal economies are small-scale dairy farmers who have proved especially resistant to removal from the city. More recently, the attention has shifted from dairy farmers to stray cattle associated with them, so that it is not just rural-urban boundaries that are sought to be policed but also human-animal intersections. How does the removal of animals become connected to the production of urban space? Is India merely replicating Western forms of the disciplining of nature through urbanization, or is this a contextual production of urban utopias via the suppression of rural others? This paper examines how urban dairy farming becomes represented as an interruption to the scale and speed of urbanization demanded by the global economy. In the process, it seeks to map the rural-urban intersections that constitute Delhi, highlighting the role of villages as internal others, leaving persistent traces and hence inserting doubts about the ability of urbanization to erase rural pasts, and as external others, marking the boundaries of urban space and hence enabling urbanization to become visible. Drawing on Lefebvre and Foucault, this paper discusses how planning for urban utopias leads to the production of more-than-urban heterotopias. In the process, it reflects on the irony of marginalization being central to urban identity formation. The paper also considers how the notion of the 'right to the city' requires a consideration of the right to frame urban nature as a site for the production of small-scale livelihoods rather than primarily as site for consumption of recreational and therapeutic values. This paper contributes to studies being conducted on processes of class-based segregation in Asian megacities. It also seeks to analyze the extent to which the notion of 'desakota,' while eminently useful in the context of the coupled urban-rural systems that characterize Asia, may become complicated by the desires of state officials and middle-class citizens for a more purified and disciplined urban space.

### Shrinkage Utopias in the Urban Rustbelt

*Alessandro Coppola*

Most inner-cities in the Midwest and Northeast of the United States have been declining for over 50 years: extensive abandonment, fall in real estate values, poverty concentration, decline in income and economic activity are some of the problems currently stressing already distressed local administrations. After decades of neoliberal hegemony, the failure of traditional urban renewal programs has created a receptive environment for new planning strategies aimed at smart-shrinking the city, introducing urban agriculture, returning unused land to nature and relocalizing part of the economy. The formulation and implementation of these strategies tend to form a new narrative presenting interesting references to past urban and planning utopias, re-actualized in the context of global environmental and economic crisis and change

### Nouvelles stratégies d'attractivité urbaine : conséquences sur l'identité des lieux et la territorialité des habitants à partir de l'exemple berlinois

*Elisabeth Dury-Czekaj (Université de Reims)*

L'attractivité est l'une des particularités de l'espace urbain parmi les plus difficiles à expliciter, et a fortiori à évaluer, notamment parce qu'elle est immédiatement sensible à l'individu. Or, il est aisé d'envisager l'espace urbain comme un ensemble hétérogène où s'articulent lieux de forte attractivité et lieux de faible attractivité. Dans cette perspective, les enjeux liés à l'image envisagée comme vecteur d'attractivité et de dynamisation locale sont au cœur des préoccupations des aménageurs. Ainsi, les projets de restructuration de la région métropolitaine berlinoise se succédant depuis 1990 n'ont eu pour autre but que de réorganiser l'espace urbain en statuant aussi sur la vocation de certains lieux. L'examen du dernier en date (IBA 2020) révèle que l'époque du primat de l'économique dans les problématiques d'attractivité est révolue. Les effets induits des attributs métropolitains classiques font désormais consensus. Mais en même temps, on constate un abandon progressif des réalisations de prestige en tant que leitmotiv exclusif des stratégies de valorisation urbaine. Plus encore, ils sont quasi systématiquement couplés à un usage plus prosaïque de l'espace urbain, posant alors la question de la finalité de la production de lieux attractifs. A Berlin, la tension est constante entre nécessité de rehausser qualité de vie des habitants et maintien en parallèle d'une participation à la compétition internationale. L'objectif de cette

communication est donc d'évaluer les conséquences territoriales (pratiques, représentations, production) à l'échelle individuelle et collective des stratégies d'attractivité conçues comme valorisation et mise en concurrence des lieux urbains. A partir d'un travail d'enquête réalisé à Berlin (9 lieux), trois axes seront développés : identifier l'adéquation entre le sens qu'un habitant confère à un lieu et les projets de valorisation dont ce lieu fait ou a fait l'objet ; analyser en retour, comment est reçue la matérialisation concrète de l'identité urbaine proposée ; montrer comment cette diversité peut être intégrée dans la construction d'une identité collective demeurant in fine l'objectif des aménageurs.

### **Public Space Invaders : A collaborative research on collective urban activism**

*Romain Minod (Quatorze), Jon Richter (Quatorze)*

key topics : Public Space Invaders, collaborative research, collective urban activism, Paris, Madrid, Berlin, network processes, self-organization, heterotopoleis The work of interdisciplinary collectives, built at the margins of european metropolitan cities, is an empirical and diverse phenomena. Finding their roots in the early sixties - with radical american groups like 'Antfarm' or european avant-garde groups like 'Archigramm' - those collectives work on an unexpressed heterotopian paradigm with similar methods, mostly based on activism. This input presents early results of an ongoing collaborative research about the so-called Public Space Invaders. How do they organize? What are their methods? What is their contribution to the broad public? In a first step ( demography ) collecting the raw data from Paris, Madrid and Berlin, the overview of the questionnaires allows us to describe a network topology between people, projects and collectives. An interactive online visualization helps to understand their intertwinability. In a second step ( chronography ) analyzing the inner formation of projects, the results track down the tempo-spatial conditions by which activated resources ( people, institutions, ideas, abilities ) transpose their environment. As the entire range of research findings on Public Space Invaders cannot be publicized yet, this input focuses on a peculiar question : how does the political engagement of those self-organized civil society collectives - in terms of project actor's commitment to public institutions, private sponsorships or users - structures the methods, the networking processes and sometimes even the collectives themselves? One relevant collective of each chosen playground will be taken as a case-study in regard to this issue : Recetas Urbanas in Madrid, Exyzt in Paris and Raumlabor in Berlin. In a third and last step ( theorization ) the analysis of these three collectives,

understood by the prism of the different projects they've been building for almost fourteen years, will be an attempt to sketch the concept of heterotopoleis.

## UDC 34-02 - Urban utopias and heterotopias: Theorizing, analyzing, and evaluating urban spaces 2

*Chair: Christina West, Thomas Doerfler*

### What's real about real utopias in different urban spaces?

*Andre Carmo (University of Lisbon), Isabel Andre (University of Lisbon - CEG)*

Oscar Wilde once said 'a map of the world that does not include Utopias is not worth even glancing at, for it leaves out the country at which Humanity is always landing. And when Humanity lands there, it looks out, and, seeing a better country, sets sail. Progress is the realization of Utopias'. This remarkably vivid description captures the underlying spirit of a currently ongoing project - Real Utopias in Socially Creative Spaces (RucSaS). Its main goal is to explore and understand, through the study of different spaces (i.e. abandoned industrial sites and portuary zones, multi-ethnic neighbourhoods, decadent bohemian areas, small rural cities), the configuration and development of a number of socially creative places that from our perspective configure real utopias, as they are able to reconcile economic development, social inclusion and territorial cohesion. Obviously this paradoxical understanding involves a tension between dreams, hopes and praxis, meaning that although anchored in the real, therefore, having to deal with a wide array of obstacles and limitations, somehow, these spaces seem to give us clues and possibly inform the navigation towards a more just and egalitarian society. Real utopias exist within a wider context characterized by the existence of an ever growing mobility of people, information and capital, an increasing uncertainty associated to a reflexive risk society, an intensification of the role played by knowledge as generator of power and wealth, and a neoliberal agenda that still manages to strive, despite its obvious contradictions, thus continuing to dismantle welfare states and brutally attack societies throughout the developed western world. This context has a twofold character as it seems to generate adversities, threats and risks but also various kinds of opportunities for social innovation. Arguably, real utopias correspond to the places/communities that are able to minimize the

and critical thinking. This paper focus urban creativity in Lisbon and discusses the links between culture and creativity and the role of different city centre spaces in stimulating urban creativity, e.g. the production of new and renewed places. Nowadays the linkage between culture and creativity - especially through arts - is a necessary condition to urban development. Heritage is an important amenity but its real added value doesn't depend only on its rarity and aesthetics but especially on its social appropriation. Urban spaces such as monasteries, palaces or ancient ethnic quarters reach special relevance if they assume a creative function. To conciliate the old and the new, conservation and transgression is a real challenge and a permanent tension for urban agents. One of the most important levers to stimulate urban creative activities is the need to regenerate old industrial and port areas. These ruin spaces seem to have a special capacity to attract artists. Some conditions are obvious such as the availability of space, the architectural features or the location. But other appeals are not so easy to detect such as the ambiance, i.e. distinctive and cherished features. A second lever of urban creativity is the restructuring of old bohemian districts where former demand decreases leaving many free spaces being progressively appropriated by creative people and businesses. The third stimulus to urban creativity is cultural mixing, namely popular old districts where ancient residents coexist with immigrants from different cultural origins. Over the last few years, public authorities and grassroots' movements have been really engaged to stimulate urban creativity in Lisbon and nowadays very interesting experiences can be witnessed. The initiatives are focused on competitiveness, e.g. cultural tourism and creative industries, others on social cohesion and citizenship strengthening. Curiously, with different goals there is convergence somehow as far as actions are concerned. This paper will present 3 illustrative cases where social tensions coming from diverse interests seem to be overcome through the mobilization of cultural resources and artistic initiatives. These cases focus: (i) the challenges faced by abandoned industrial areas where the real estate crisis has forced to substitute luxury housing by studios for young artists and creative projects with precarious leases (LxFactory) (ii) the merging between post modern cultures and life styles in a bohemian ancient neighbourhood from the 16th century (Bairro Alto); (iii) the emergence of artistic grassroots? movements in a multiethnic area in the city centre (Mouraria).

### Creative Lisbon: Tensions between memories and desired futures

*Isabel Andre (University of Lisbon), Mario Vale (University of Lisbon)*

Creativity is neither a historical inheritance nor just a vision of the future. Nevertheless to stimulate novelty memories are important as well as intuitions

### **Lifestyle markets in Cape Town: Urban consumption utopias and the construction of identity**

*Bradley Rink*

In the past several years, the city of Cape Town has witnessed a proliferation of consumer spaces that identify as 'markets' -- encompassing farmer's markets, organic markets, community markets, and lifestyle markets. With roots in traditional farm-to-table consumer practices, the range of market environments in Cape Town create opportunities for buying and living a 'local' lifestyle. This paper argues that the recent growth of such markets is a phenomenon situated at the intersection of consumption, urban regeneration, food pathways, identity and lifestyle. This paper attempts to identify, categorise and unpack these various retail typologies as lifestyle 'market' environments. Lifestyle markets are shaped around the production and consumption of foodstuffs and craft, but also serve as sites for creating and performing multiple urban identities. While attempting to reassert the connections between food and craft producers and the consumers they serve, lifestyle markets are embedded in complex negotiations of urban space and identities. This research attempts to locate and define the lifestyle market as a retail typology as well as to begin to interrogate how such markets locate themselves within an unstable discourse of 'the local' that is central to lifestyle market identities, while resting on more complex connections within global scales of consumption and the production of urban space.

### **Kelowna, British Columbia, Canada: A neoliberal utopia of unlimited exploitation?**

*Tina IL Marten (University of British Columbia Okanagan)*

In the early millennium, the Canadian mid-sized city Kelowna, located in British Columbia's Okanagan Valley, experienced an economic boom of unprecedented proportions. Highrises were built in select downtown areas, accompanied by discourses of gentrification and rejuvenation. At the same time there were adjacent areas that were actively deprived of economic intervention. The result was a gentrified area, but devoid of people, and a derelict urban area inhabited by a marginal and transient population. Whereas some heralded this building boom as a great transformation and successful economic development, I argue this makeover benefited only a select few. I further challenge the resulting urban reconfiguration did not rejuvenate Kelowna's downtown, but instead exacerbated existing spaces of inequality and poverty. For this research, I

examined the role of local elites in neoliberal urban redevelopment. I demonstrate that Kelowna's boom and transformation have not been coincidental, but rather carefully concerted efforts by Kelowna's economic and political elites at economic development for their sake of profit accumulation. Creating neoliberal opportunities for growth and development take effort and political will. Neoliberal agents of change, members of economic and political elites, purposefully orchestrate situations into which neoliberal policies can be inserted. Thus, they do not only manipulate economic, political, and social realms in preparation for neoliberal assault, but simultaneously foster a neoliberal hegemonic discourse that supports their goals. I explain, using re-developments in Kelowna's downtown as a case study, how this city's agents of change created and used neoliberal power networks. I analyzed the involvement of five key agencies, Kelowna's Economic Development Commission, Chamber of Commerce, Downtown Kelowna Association, Urban Development Institute, and the City itself. Through my qualitative investigative empirical research, I uncovered that the executives and members of these agencies are connected in a far-reaching powerful network, linking local capital to global capital. My work demonstrates that Kelowna's neoliberal agents acted as a united front, unified in their endless pursuits of profit and capital accumulation. Aided by neoliberal discourses and policies, they pushed for fundamental change to the local governing body. During the neoliberalization of the City of Kelowna, they sometimes collaborated and at other times competed. And, as I further demonstrate by uncovering the connections and mechanism of their neoliberal growth machine, they continually strived to create possibilities and conditions of never-ending economic development. My case study reveals that in Kelowna only a select few benefited from the neoliberal urban redevelopment, and that inequality and poverty are indeed accompanying outcomes of this kind of urban reconfiguration.

## UDC 34-03 - Urban utopias and heterotopias: Theorizing, analyzing, and evaluating urban spaces 3

*Chair: Christina West, Thomas Doerfler*

### Post-apartheid Racial Integration in Grahamstown: A Time-geographical Perspective

*Philippa Irvine (Rhodes University), Roddy Fox (Rhodes University)*

This research is situated within the context of the post-apartheid era in South Africa, which includes the dominant ideologies and policies that have shaped the urban landscape of the past and present. It investigates the extent and patterns of integration that exist twenty years after the country's political transition and it uses Grahamstown, a small education and cultural centre in the Eastern Cape Province, as its case study. The investigation incorporates the traditional geographical focus of residential and educational integration, using conventional means of investigation such as segregation indices, dissimilarity indices and maps. However, in identifying the broader nature of 'segregation' and 'integration', the study moves beyond these narrow foci and approaches. It also adopts the time-geographical framework to reveal the dynamic use of urban space that reflects the lived space of selected individuals from the white community of Grahamstown: the extent and patterns of their behavioural integration or spatial linkages. Together, these approaches reveal that Grahamstown is still a city divided by race and, now, class. Schools and residential areas remain tied to the apartheid divisions of race and the white community exists almost entirely within the bounds of apartheid's blueprint of urban space. Rhodes University, which is located within Grahamstown, has experienced admirable levels of integration within the student body and within the staff as a whole, but not within the staff's different levels. In essence, where integration has occurred it has been unidirectional with the black community moving into the spaces and institutions formerly reserved for whites. The white community have retained the positions in space, society and the economy they enjoyed before the political transition and have little contact with the spaces and educational institutions formerly reserved for other race groups during both their weekday and the weekend activities. The limited behavioural integration or spatial linkages are shown to be tied to city structure and the perceptions of 'otherness' held by the individuals interviewed. The study argues that the slow pace of change is related to the nature of South Africa's democratic transition

and it's attending political and economic policies. Key words: Grahamstown, integration, segregation, race, South Africa, time-geography

### Township of To-Morrow? Cosmo City and inclusive visions for post-apartheid urban futures

*Christoph Haferburg (Universität Erlangen-Nürnberg)*

20 years after the scrapping of the Group Areas Act, African urbanity in South Africa is no longer confined to the townships of the past. Still, a major challenge in urban development lies in the persistent fragmentation of the cities. While urban integration was prominent in planning and research in the 1990s, this discourse has almost ceased to exist in the past couple of years. Bond (2000), Pieterse (2006) and Pillay (2008) have been sceptical on the possibility of bridging the divide between the various residents and the different "communities" under current urban conditions. Polls have shown distrust and little interaction between the various groups in South African society. This lack of social cohesion is reproduced in the neighbourhoods, where the separation of rich and poor has become the new principle of fragmentation. Against this background (and based on fieldwork and as well as on a critical reflection of recent publications) the proposed paper will highlight and discuss two new approaches towards South African urban development. Both approaches have discursive and practical elements, and both levels will be addressed. The first approach has been centered on "Cosmo Cities". These developments are supposed to fight the housing backlog by public-private partnerships, while promoting at the same time integration by offering low-cost and middle class housing within a single suburb. The second approach is the discourse on seeing South African cities as African cities (Swilling et al. 2003, Simone 2004) – including the attempt to re-think the latter. To a certain extent, planning initiatives that create specific types of urban space respond to this discourse (Wafer 2010). On a more conceptual perspective, the paper will assess the potential of socio-spatial integration in a "multi-cultural" society through the synopsis of both concepts.

### Globalization and the Blurring of Gendered Spaces: Rhetoric or Reality

*Tanusree Paul (Jawaharlal Nehru University)*

The Indian cities have been undergoing remarkable socio-cultural transformations alongside major economic shifts leading to reconfiguration of the

spatial contours and the emergence of a 'new' urban middle class, the 'newness' of whose identity is defined by global aspirations, white-collar jobs and a new culture of consumption. In this context, the location of women posit interesting field of enquiry primarily because women have been fervently projected as epitomizing this new found modernity. This new 'iconic' women have been envisaged as having access to technical and higher education, professional corporate jobs, greater autonomy etc and portrayed as privileged signifiers and transmitters of new India. However, such an avant-garde envisioning of women needs to be explored with scepticism. Located in this context, this paper tries to explore how gendered spaces are implicated in the new urban spaces upwelled by globalization, reflecting on Kolkata, which posits an intriguing case study since in this city spatialization of gender marked an important locus of the formation of cultural identity of the Bengalee community and socio-political consciousness since colonial era. Spatiality of gender became inherent in the ways domesticity was organized around the binaries of space, the public and the private, of which women came to embody the private and the home. This paper attempts to understand to what extent the spatial transformations in Kolkata, with coming up of new spaces viz. vivacious consumption spaces, specialized economic enclaves etc. have been able to flout the andro-centrism embedded in the existential connotations of space. The study is based on a semi-structured questionnaire survey of about 360 working women in various sectors of the reconfigured urban economy and participant observation by simply hanging around in the city to understand the processes instrumental in the engendering of the public spaces. The study reveals that the interplay between liberalization and female subjectivity is underlain by nuanced subtexts. Although women have gained access to liberating spaces and opportunities through spatial transformations consequent upon globalization, their cultural identities as women have not been deconstructed. Women still seem to be essentialized around their sexualities and reproductive roles and their access to and engagement with the public space still continues to be shaped by notions of respectability; which, in fact, is the constitutive element of symbolically authorized 'middle classness'. Moreover, since it is through these endeavours towards such productions of respectability, that the direct physical control over women gets manoeuvred through tacit exclusionary spatial control, the avant-garde depiction of new urban developments as erasure of social differences and cultural estrangements appear to be some sort of an utopia.

**From the “Gay Village” to the “(Euro)Pride Park”: heterotopical spaces in Rome and a new urban governance against the “homophobic emergence”**

*Cesare Di Feliciano (Sapienza- Università di Roma- Dipartimento MEMOTEF)*

This paper analyzes the spatial evolution of the two most important symbols of the LGBT mainstream community in Rome: the 'Gay Village' and the 'Gay Street', referring to the Foucaultian concept of 'heterotopias'. It attempts to show the manner in which, at the very beginning, the conception of these spaces presented the same features identified by Foucault when theorizing 'heterotopias'. The analysis of their spatial evolution needs a specific focus on the parallel change in the urban governance of (other) sexualities, centered on the 'homophobic emergence'. Based on interviews with the main 'creators' and 'users' of these spaces, the paper demonstrates how, although responding to the material needs of the urban LGBT community, their construction was used by local institutions to promote an urban governance model based on the idea of 'danger', 'safety' and the privatization of spaces. This double process joined the top with the 2011 Europride, when a new (temporary) and deeply heterotopical space was opened (the Pride Park) and local institutions promoted the image of 'Rome- Capital of welcome and tolerance', in an attempt to dismiss the 'homophobic emergence' that had featured on the media discourse in recent years.

## UDC 34-04 - Urban utopias and heterotopias: Theorizing, analyzing, and evaluating urban spaces 4

*Chair: Christina West, Thomas Doerfler*

### **the undetermined space. how urban overall concepts – manifestos of architectural modernism – are transformed in the everyday life**

*Markus Vogl (Akademie der bildenden Künste Wien)*

Within the debate of the architectural Avant-garde in late 1950ies, architects started to challenge the attributes of modernism - i.e. rationalism, functionalism, neutrality and universality - to offer alternatives to the modernist paradigm, that was promoted by the CIAM (Congrès International de l'Architecture moderne). But a new Charta for Housing in continuation of the Charta of Athens was never implemented in the architectural debate. In fact this younger generation scratched only the modernist surface and merely changed the form of architecture and urbanism. The presentation will focus on the developments of large housing estates that were built in the last 50 years, which seem to disregard genius loci and local traditions and are often perceived as big, ugly, overwhelming, generic and soulless. The trans-disciplinary analysis of three housing estates in Berlin and Budapest, designed and built in three different political systems will help to understand the particularity of these in relation to social, political and economical circumstances and aesthetic debates. The focus on transformation processes from the urban vision till the completion of the housing estate and the actual life situation within the estate will create a characteristic biography for each neighbourhood, that is always related to two overall concepts: the overall concept of habitat, which is based on cultural, economical and social developments in the specific society, and the urban overall concept of architectural modernism, based on cultural, technological and social ideas of an avant-garde in the 1920ies. Yet a close look to the everyday life in these neighbourhoods with qualitative studies proves that the lack of defining the intermediate housing scale asked for new and different tactics from the inhabitants to appropriate the built environment.

### **The discursive construction of the city, the urban and the planner in planning education**

*Moa Tunström (Royal Institute of Technology (KTH))*

What is the city, what is its function today and what meanings are attached to 'urban planning'? The city and the urban are today contested and dissolving both spatially and conceptually through phenomena such as urban sprawl, city marketing and the spreading of an 'urban lifestyle' to the countryside. Urbanity is often defined by elusive concepts such as pluralism, dynamism, density, intensity etc. and the 'good city' is sustainable, attractive, compact, lively etc. These elusive concepts are of course normative and political; however, this is seldom brought up in planning discussion (see e.g. Gunder 2004 and Tunström 2009). Often the discourse is instead unquestioned, and key concepts such as sustainability, urbanity or compact city are used without questioning in constructing the images and stories of urban development that are central planning tools. Planning education is also an arena where images and stories of the city and the urban is constructed and reconstructed, and where the planning practitioner is shaped. The purpose of this paper which is based on an ongoing research project, is to discuss what ideals, norms and values regarding the city, the urban and urban planning that are constructed in urban planning education in Sweden and the UK, and how they are negotiated among students. This means investigating the discursive constructions of urban planning problems and solutions, as well as the constructions of the professional role of the planner. What urban planning issues engage the students, and what urban planning issues are presented to them in the education? The empirical material consists primarily of group interviews with urban planning students in Sweden and the UK. A more elaborated understanding of the shaping of the city and the urban through discourses can indicate both the importance of norms and values in urban planning, and ways to handle them in practice (see e.g. Plöger 2001, Throgmorton 1993 and Tunström 2009). It also relates to possibilities of a planning education and practice encouraging the 'reflective practitioner' instead of one that risk underestimating the role of norms and values (Schön 1983, see also Poxon 2001, Richardson 2002, Sandercock 1998).





# Postersession

Global Change and  
Globalisation /  
Urbanisation &  
Demographic Change



## Postersession Global Change and Globalisation / Urbanisation & Demographic Change

*Chair: Helmut Brückner*

### GCG01 - Land cover and land use changes in Studinet catchment (Eastern Romania)

*Iacob Ana-Maria (Alexandru Ioan Cuza University)*

The present research aims at a local comprehensive analysis of the changes that have occurred over the years on land use, based on a case study in Eastern Romania: Studinet catchment (9669 hectares). In this area, the components of both the natural system and of the anthropic one have stimulated accentuated erosion, especially during the last two centuries. The general monocline structure accounts for the development of the cuesta relief, implicitly for the morphologic, morpho-dynamic and land use asymmetries. From a bio-pedologic viewpoint, two aspects are important: the reduced percentage of forested surfaces and the high percentage of eroded soils. The agricultural economy of the area is characterized by a faulty land use, with an 'atomization' of the agricultural exploitations and the frequently farming up and down-hill. In order to obtain the information necessary to shape the profile of the research area we made use of the diachronic or comparative analysis of different categories of land. Therefore, we analyzed three distinct aspects: evolution and present share of the forest area; weight and fragmentation of the arable land; expansion of xerothermophile shrubs. Arable lands were analyzed at the maximum details level of orthophotoplans (0.5x0.5 meters), in order to highlight the subsistent farming system in small plots, improperly oriented on slopes. Also, to highlight the changes that have occurred on land use, an estimation was performed of the natural expansion of forests compared to the evolution of population and forest dynamics area between 1772 and 2010. To emphasize the need for reforestation, we carefully analyzed all the morphographic components and their influence on the use of land. The exploitation of GIS techniques and the use of aerial photos allow the diachronic analysis of large land surfaces. This analysis allows comparing the current land use with the natural land cover and emphasizing the existing discrepancies and the potential imbalances. Any change in the size of an environmental component or in its functions generates imbalances that may lead to a degradation or disorganization of natural systems. The impact of human activities is the most appropriate example. The society initially evolved in equilibrium with the nature, creating its own habitat,

appropriate to the needs of each stage of development, but the human pressure progressively increased, forcing the relationship with the natural environment. The perspective of globalization creates a more complicated context, but it is easy to estimate that after thousands of years of struggle for knowledge and mastery of natural forces, the society is obliged nowadays to fight against problems whose responsibility belongs to the humanity itself.

### GCG02 - Villes et ports méditerranéens dans la globalisation

*Sebastien Antoine (Université de Bourgogne)*

"La position de la ville portuaire dans les différentes chaînes et réseaux de production, ainsi que la manière dont ces derniers s'inscrivent dans la "ville globale", comprise, suivant Peter Taylor, comme un ensemble de villes inter-reliées par des firmes de services avancés aux entreprises, n'est pas bien connu. Si les villes portuaires cherchent, en général, à développer des services avancés reliés au transport maritime, du point de vue de la ville globale, les services avancés de très haut niveau sont associés à une économie d'urbanisation et non pas de spécialisation. Autrement dit, une grande ville a vocation à être reliée à une autre grande ville plutôt qu'à un port ou une industrie particulière. Ce travail propose d'évaluer la diversité, ou, au contraire, la spécialisation dans le transport et la logistique, du secteur des services avancés aux entreprises dans différentes villes portuaires méditerranéennes, en considérant cette dernière région en voie d'intégration dans la globalisation. Une méthode, développée par le laboratoire GaWC, basée sur la localisation des transactions entre les producteurs de services avancés et les industries clientes de ces services, permet d'articuler les échanges internationaux (commerce, industrie, transport) à la ville globale, et de cartographier des réseaux de villes à différentes échelles (régionale, nationale, européenne et mondiale).

### GCG03 - Future Climate Changes under Representative Concentration Pathways using HadGEM2-AO Climate Model

*Hee-Jeong Baek (National Institute of Meteorological Research/KMA), Johan Lee (National Institute of Meteorological Research/KMA), Hyoshin Lee (National Institute of Meteorological Research/KMA), Da-Hee Choi (National Institute of Meteorological Research/KMA), ChunHo Cho (National Institute of Meteorological Research)*

NIMR/KMA is participating in CMIP5 long term experiments jointly with Met Office Hadley Centre using HadGEM2-AO, which comprises an atmospheric GCM at N96 and L38 horizontal and vertical resolution, and an ocean GCM with a 1-degree horizontal resolution (increasing to 1/3 degree at the equator) and 40 vertical levels. A pre-industrial control simulation with fixed CO<sub>2</sub> concentration of pre-industrial value of 286.3 ppm and 1860 land cover has been run for 1000 years to serve as the initial conditions for historical runs. A historical (1860-2005) simulation is initialized at 500 year from the pre-industrial control and performed using the historical record of anthropogenic changes such as GHGs, aerosols, land cover and natural forcing such as solar and volcanic changes. Then model state at 2005 is used as the initial condition for 4 future RCP simulations for the period 2006-2099. The HadGEM2-AO simulation for of global and annual mean surface air temperature (SAT) well captures the observed multi-decadal variation throughout the whole simulation period, although the simulated SAT is about 0.2° warmer than observations for the period 1860- 2005. The simulated SAT increase over the historical 1860-2005 period is 0.54° which compares the observational based estimate of 0.66° using HadCRUT3. Projected changes during the 21st century are shown as differences from the baseline period (1980-1999) for global surface temperature, precipitation and Arctic sea-ice cover, indices of climate extremes, etc. The RCP2.6/ 4.5 /6.0/ 8.5 scenarios respectively yield global averaged warming of 1.3/2.6/2.7/4.2° and precipitation change of + 2.4/4.3/3.5/4.8% for the period 2080-2099. Future climate changes over East Asia (100-150°E, 20-50°N) are also analyzed. 4 RCPs scenarios show East Asian temperature and precipitation in the 21st century will increase with larger amplitude than global mean. Surface soil moisture over East Asia is projected to decrease in most parts of the region because evaporation will increase with rising temperatures.

### GCG04 - The effects of urbanization on the nature of thunderstorms, observations from Southeastern US cities.

*Mace Bentley (Northern Illinois University), J. (Tony) Stallins (University of Kentucky), Walker Ashley (Northern Illinois University)*

This study examines how urbanization augments warm-season convection among a range of cities in the Southeastern U.S. By visualizing convective development via high-resolution, radar reflectivity and lightning data, we illustrate that demographic and land-use changes feed back to local atmospheric processes and promote local environments conducive to thunderstorm formation. Composite radar data for a 10-year, June-August period are stratified according to specific 'medium' and 'high' reflectivity thresholds. As surrogates for potentially strong (medium reflectivity) and severe (high reflectivity) thunderstorms, these radar climatologies can be used to determine if cities are inducing more intense events. Results demonstrate positive urban amplification of thunderstorm frequency and intensity for major cities. Mid-sized cities investigated had more subtle urban effects, suggesting that the urban influences on thunderstorm development and strength are muted by land cover and climatological controls. The investigation determined that the degree of urban thunderstorm augmentation corresponds to the geometry of the urban footprint.

### GCG05 - Promoting Complementary Currencies for Sustainable Local Economies in Ecuador

*Erick Brenes (University of Calabria), Javier Felix (Pachamama Foundation)*

In 2008, the people of Ecuador established a new constitution that linked economy to the principles of "efficiency, solidarity, sustainability and quality." The longest chapter of the new Constitution, and at its beginning it declares *sumak kawsay* (Quechua for "well being") as the sole aim of the regime of development. Not only are the benefits of development to be distributed, but the means of production as well. This new legal framework has created and outstanding setting for the creation and implementation of complementary currency (CC) projects in the country. Beside this legal opportunity, Ecuador has an excellent country wide network of grassroots organizations that promotes financial inclusion and popular financial methods like credits, savings and solidarity among others. Based on the successful experiences of the Social Trade Organization (STRO) in the Latin American region and with their support, Pachamama Foundation has been supporting (CC) methods and projects to promote sustainable local economies in the country. Along with Pachamama

Foundation one of the regional networks known as REFLA (for the acronym in Spanish for Red de Estructuras Financieras Locales Alternativas) has promoted the implementation of two complementary currency projects in order to stimulate local resilience. The local monetary approach In a first stage, a Pachamama advisor evaluated the financial and administrative capacity of the implementing organization to back and administer the CC. Next, and considering the 'three-dimensional model' developed by the ICLEI for the Agenda 21 Global Policy, developed the feasibility study. Based on the information compiled in the feasibility study, a project proposal was written and socialized among stakeholders. At this point, it was of crucial importance to write the project proposal taking into consideration the local knowledge of the economic, social and environmental stakeholders. This is done in a participatory way with the local partner, assuring full understanding of the scope and limitations of the future project. The approach consists of local applications and combinations of the three methods detailed in table 1. A major feature in almost every project is the transversal use of the CC printed or virtual to re-design local social, economical and environmental relations, where possible in a more sustainable way. While trying to achieve this objective, the local economy will become more stable (resilient) while at least, maintaining production and reducing environmental degradation.

#### **GCG06 - Relationships Between Chironomid Taxa and Lake Depth in Bosten Lake, Xinjiang, China: Results from an In-lake Dataset**

*Jianhui Chen (Lanzhou University), Fahu Chen (Lanzhou University)*

Significant relationship between chironomid distribution and water depth has been recognized for a long time. However, few studies have been done on this topic in arid region - where chironomid community is usually mainly controlled by water salinity. Located in arid NW China, Bosten Lake, the nation's largest inland freshwater lake (1000 km<sup>2</sup>), gives us a unique opportunity to investigate the chironomid taxa - water depth relationships in arid region. Totally, 41 surface sediment samples from different part of the lake have been retrieved for chironomid analysis, 37 of which contain enough headcapules (?50). The range of water depth is from 4 m to 17 m. 12 taxa with an average abundance of more than 1% are used for further analysis. From visual observation on the percentage-versus-water depth diagram, it is evident that when water becomes deeper, the abundance of 4 individual taxa (chironomus sp1, microchironomus, cryptochironomus and stictochironomus) increases, 4 (Tanytarsus, Polypedilum nubifer, Cricotopus, Psectrocladius sordidellus) decreases and 4 unaltered. PCA

analysis demonstrated that the first axis can explain 76.8% variance of chironomid community. And significant relationship was revealed by correlation analysis of PCA-1 scores and water depths ( $R^2 = 0.8495$ ). For the validation purpose, we have compared the chironomid-based lake level reconstruction to diatom-based water salinity reconstruction. Given that both the lake level and salinity are effective moisture proxies in arid region, the overall agreement of these two reconstructions during the recent past gave confidence about our ecological interpretation. Furthermore, the 4 deep-water taxa and 4 shallow-water taxa found in this study were also labeled as profundal and littoral taxa, respectively, in relevant literature from Europe and North America.

#### **GCG07 - Innovations vs. regional polarisation of Poland's socio-economic growth**

*Pawel CHURSKI (Adam Mickiewicz University), Joanna Dominiak (Adam Mickiewicz University in Poznan)*

Pawel Churski Joanna Dominiak Institute of Socio-Economic Geography and Spatial Management Adam Mickiewicz University Innovations vs. regional polarisation of Poland's socio-economic growth The process of social and economic growth is naturally accompanied by spatial and structural diversity. Lack of uniformity and the numerous accompanying aspects are commonly recognised as the process? characteristics and, on the other hand, the reason for limitations of developmental processes. However, the very fact that the level of growth is diversified in space is not an impediment to the growth. Development is hampered by too large differences in the growth level which may result from the aggravating polarisation; it boosts the growth areas, at the same time stagnating peripheral areas. Similarly, the numerous aspects themselves do not limit developmental processes. Such limitations may stem from too advanced growth diversity with respect to specific aspects or deficits thereof: such deficits in a specific aspect limit opportunities to achieve optimum growth effects in the remaining aspects and the overall growth process. Innovations are among the aspects affecting contemporary diversity in economic growth. Innovations tend to be among the most important factors contributing to the growth of the modern knowledge economy. Economic innovations are a source of regions? competitive advantage and significantly condition the regional diversity in socio-economic growth. The goal of the analysis is to evaluate the importance of innovations in the emergence of growth and stagnation regions in Poland. The research process consists of two stages: Polish administrative units (voivodeships) arranged as economically weak or strong following a cluster

analysis based on the following aspects of socio-economic growth: (1) population and settlement, (2) structure of the economy and the labour market, (3) the technical infrastructure and spatial accessibility, (4) the financial situation and the level of affluence. Stage two consists in identifying the relations between the regional diversification of innovations and the distribution of growth and stagnation regions in Poland. This is achieved by means of canonical correlation. The level of innovations in Polish regions is identified in compliance with the Oslo Manual in the following arrangement: (1) R&D activity, (2) activity for the benefit of innovations and (3) results of innovative activities. The poster is an element of stage one of a research project conducted by the National Science Centre (NN306791940): Socio-economic growth vs. development of economic growth and stagnation areas carried out by a Team including the authors.

#### GCG08 - Evolution of Romanian Geopolitical Thinking

*Dragos Frasineanu (Spiru Haret University), Mihaela Frasineanu (Spiru Haret University), Liliana Guran-Nica (Spiru Haret University)*

Evolution of Romanian Geopolitical Thinking Even though not very largely visible on the international scene, because few works have been translated, the Romanian geopolitical thinking may contribute to the development of the field by a whole ensemble of theoretical and applied writings. From a historiographer's perspective, the Romanian geopolitics has passed, during its evolution from a domain of knowledge with quite a limited sphere of interests to a largely opened scientific field, through three stages. The first of these stages began between the First and the Second World Wars and ended in 1945 and was marked by the emergence of the first ideas, concepts and theories, the structuring of first geopolitical research nuclei and crystallizing of what later came into a science; it was a period of accumulation and clarifications. Otherwise said, this first stage can be considered as classical. The marking stones of the Romanian geopolitical thinking during this first stage were in agreement with time specific requirements, the orientation of the studies being purely defensive. Consequently, the main directions aimed to the defense of the newly acquired status of national and unitary state. The response to external threats was given by studies that focused on the continuity of the Romanian people across the Carpatho-Danubian and Pontic territory. The so-called "expansionist" policy of Romania was reflected in geopolitical studies as a wish to identify a position that could be recognized on both regional and continental scales. As compared to other geopolitical schools, that were trying to demonstrate the status of great power of the generating countries or their superiority, The Romanian Geopolitics

was insisting on the defending of the national values. The development of the newly constituted academic discipline during the first half of the 20th century was brutally stopped at the end of the WW II. The political changes Romania suffered after 1945, materialized by a communist regime and the engulfing of the country in the Soviet sphere of influence, have determined the total banning of geopolitics. The veil of "academic total silence" and a deadly "anathema" thrown by the communist regime covered the Romanian geopolitics for a long period of time. The third stage of the Romanian geopolitics development can be considered its "rebirth" and started at the beginning of the 1990s as a consequence of the dissolution of the communist system, recording a strong connotation in the political debates of the time that has finally moved back into the academic field. Nowadays, as like as during its first stage of development, the Romanian Geopolitics can be defined by its national character, since it identifies its priorities in the large number of problems Romania is facing to.

#### GCG09 - Phenotypical variation in *Leucocytherella sinensis*, Huang, 1982 (Ostracoda) – a proxy for water chemistry in Tibetan lakes?

*Sascha Fürstenberg (Friedrich-Schiller-Universität, Jena), Peter Frenzel (Institut für Geowissenschaften), Ping Peng (Institute of Tibetan Plateau Research), Claudia Wrožyna (Karl-Franzens-Universität Graz)*

*Leucocytherella sinensis* is an ubiquitous ostracod endemic to the Tibetan Plateau. Ostracod sampling in about a dozen of lakes in southern Tibet showed this species to be the most abundant one, sometimes up to more than 90 % of the ostracod association. Such low diversity associations are hard to interpret using population ecology alone. A clue to palaeoecology may be environmentally driven phenotypic variation. *L. sinensis* displays several morphological forms, characterised by different grades of node formation and ornamentation on their valves. This feature is so distinct that several junior synonyms were described from this species by different authors during the past 30 years. *L. sinensis* is a member of the ostracod group of Cytheracea known for node formation caused by water chemistry. We assume a phenotypical variability driven by water chemistry for *L. sinensis* also. In order to identify the driving factors, we investigate *L. sinensis* populations from samples representing different water chemistry, water depth, and habitats of selected southern Tibetan lakes. The analysis comprises the grade of node formation (number, size, spines), valve size and shape, as well as the sex ratio of associations. First results show a connection between nodding and conductivity of the ambient water. Surprisingly, nodes are not most common in low conductivity populations but highest within

the beta-oligohaline range. Looking onto  $\text{Ca}^{2+}$  concentrations, however, highest values are present in the sampled freshwater environments.  $\text{Ca}^{2+}$  is of crucial importance for osmoregulation, regulating the penetration of water into the body fluid under hypoosmotic regulation. An excess water inflow during moulting of the ostracods may cause blowing up of nodes in the not yet calcified cuticula. Biomineralization of such pathological nodes on the body surface will stabilize and conserve those structures as already known from *Cyprideis torosa*, another cytheracean ostracod with nodes. *L. sinensis* associations of the highest studied salinity (beta-mesohaline range) show rather smooth valves with a reduced reticulation. We assume a combined effect of salinity and  $\text{Ca}^{2+}$  ion concentration on the formation of nodes in *L. sinensis*. The number of nodes increases as the proportion of noded individuals within the population with decreasing salinity, but a high  $\text{Ca}^{2+}$  availability reduces the node formation. Together with the smoothed reticulation at high salinities, the noding phenomenon can be used tracing salinity changes for *L. sinensis* assemblages from Holocene lake sediments. It has to be taken into account, however, that changes in ion composition, especially the proportion of  $\text{Ca}^{2+}$  ions, may alter the salinity effect. So far, no direct salinity estimation but the detection of trends in the geological past are possible.

#### **GCG10 - Megadrought, population collapse and soil erosion: The role of epidemics in environmental change in central México 400 to 500 years ago**

*Klaus Heine (Universität Regensburg)*

Recently, there has been growing interest in historical megadroughts, arising from a variety of motivations; these include documentation of the past climatic record, impact of such climatic events on past environments and civilizations, the possibility of future megadroughts, and their interaction with the greenhouse effect (Hunt & Elliott 2002, Rees 2005). Here I show that the 16th century Mexican megadrought caused a population collapse resulting in abandonment of cultivated areas with consequences for soil erosion processes and environmental change. The relationship between climate and accelerated soil erosion (sediment yield) in central Mexico was modulated by population fluctuations in the areas of summer-rain-fed agriculture. In the 16th century, in central Mexico a climatically (megadrought) driven epidemic (cocolitzli) caused a population collapse which in turn resulted in an abandonment of cultivated land, reforestation/recovery of natural vegetation and retardation of soil erosion processes. There is no evidence from any central Mexican site that we have

investigated, to suggest that climatic change and/or climatic hazards (e.g. droughts) had had a significant, direct impact on erosion rates.

#### **GCG11 - Summer monsoon history in SE-Tibet displayed in tree ring parameters of *Larix griffithii* and *Juniperus tibetica***

*Philipp Hochreuther (University of Erlangen-Nuremberg), Jussi Grießinger (University of Erlangen-Nuremberg), Achim Bräuning (University of Erlangen-Nuremberg)*

South- and Southeast Asia is home to more than one third of the world's population, with the monsoon system as the main provider of precipitation. The hydrological dependency and thus vulnerability of the region, in combination with the variability that inherits the system on a year-to-year basis means, as a consequence, great risks to the whole region. The reconstruction of patterns evolved by three different monsoonal branches poses therefore an important and challenging task since spatio-temporal availability of instrumental climate data is sparse in High Asia. Our paleoclimatic approach to disentangle and to reconstruct monsoonal activities in southeast Tibet is tackled by using different dendrochronological parameters. Each is known to react specifically to a set of climatic and environmental parameters. Within this multiproxy approach are time series of tree-ring width (TRW), maximum latewood density (MXD) and stable oxygen isotopes ( $\delta^{18}\text{O}$ ). First results show high synchronicity between ring width and MXD in cases of extreme events, whereas the oxygen isotope variations display long-term variability of summer monsoon precipitation. For the calibration period with instrumental data, the linkage between low ring width, low MXD and increased summer monsoon activity was proven. The established time series also reveal information about global climatic periods of the late Holocene like Little Ice Age (LIA). An additional research goal is to gain knowledge of the behavior of monsoonal temperate glaciers regarding a changing climate. To achieve this, geomorphological and sedimentological data will be combined with dendrochronological material, in order to reconstruct glacial fluctuations and the climatic conditions under which they occurred.

#### **GCG12 - A Study on the Near-Surface Wind Speed Change in South Korea during 1954-2010**

*Seungho Lee (Konkuk University), Jun Suk Hong (Konkuk University)*

The wind is involved in the movement of material as well as has close relation directly or indirectly with other climatic elements such as evaporation,

temperature etc. Besides it has relation with large scale circulation concerned with climate changes. In this study near-surface wind speed change will be analyzed, and discussed whether this wind speed change is the phenomena caused by the urbanization or the change of temperature difference of the continent and ocean due to increasing temperature. The study are used the 14 weather stations (Seoul, Incheon, Gangneung, Ulleungdo, Chupungnyeong, Jeonju Daegu, Pohang, Ulsan, Gwangju, Busan, Mokpo, Yeosu, Jeju) in South Korea retaining long term observation data where the 57 years?(1954-2010) data are available. The data are for the monthly and seasonal mean wind speed which is derived from carrying out quality management and homogeneity test. In addition, the changes for the number of days not only with strong wind of more than 14 m/s in maximum instantaneous wind speed but also with calm of less than 0.5 m/s will be reviewed. The trend of wind speed change and the change of the number of days with phenomena related with the wind in the Korean Peninsular region will be reviewed to investigate the effect of climate change on the wind speed change. ""This work was supported by the National Research Foundation of Korea Grant funded by Korean Government (NRF-2010-330-B00278).

**GCG13 - The variation characteristics of Ca, Mg, Sr concentrations and the ratios of Mg/Ca, Sr/Ca and Mg/Sr in soil infiltrating water overlying**

*Furong cave, Chongqing, China, Junyun Li (Southwest University), Wang Jianli (Southwest University), Li Tingyong (Southwest University)*

Abstract: In order to track the deposition mechanism of trace elements in the speleothems, a continuous monitoring program was performed in Furong Cave, including the overlying soil. In this paper, the transportation of Ca?Mg'Sr in the soil infiltrating water, which was the transition process from local precipitation to cave drip water, was detected. The soil and soil infiltrating water overlying Furong Cave were sampled from January to December in 2010. The concentration of Ca, Mg, Sr, in soil infiltrating water had been analyzed and the ratios of Mg/Ca, Sr/Ca and Mg/Sr had been calculated too. The data show that the discharge of soil infiltration water approximately corresponded with the local precipitation amount synchronously. Although the residence time of soil infiltrating water influenced the concentrations of Ca, Mg and Sr in soil infiltration water, it affected element Sr more. While, the seasonal variation of biological activities on ground and in soil, together with temperature changes, influenced more on elements Ca, Mg, than that to element Sr. This difference was further

approved by the different correlation between the elements in soil infiltrating water, which with the  $R=0.82$  and  $R=0.88$  for Mg and Sr, correlated to Ca respectively and  $R=0.67$  for Sr correlated to Mg. The concentrations of Ca, Mg and Sr in soil infiltration was increased from the surface layer to the deep layer in the same soil profile. This was due to the increasing interaction between soil water and minerals by the added infiltrating length and the different element concentration of soil minerals through out the soil profile. Because of the different influence on Mg and Sr which induced by the residence time of soil infiltrating water and seasonal temperature variation, there was a negative correlation between the ratios of Mg/Ca and Sr/Ca ( $R=0.61$ ). The peak values of Mg/Sr ratio was presented in the months of July and August, which with the highest air temperature during 2010, and occurred in April too, during which the air temperature was relatively low while the rainfall increased evidently, compared to the rainfall during the period from January to March. It demonstrated that the residence time of soil infiltration water and the amount of precipitation besides air temperature impacted the ratio of Mg/Sr in soil infiltration water. Key Words: Furong cave, Soil infiltration water, Ca, Mg, Sr, Ratio of elements.

**GCG14 - Spatial and temporal trends of Climate Extreme Indices in the Caucasus Region**

*Ina Keggenhoff (Justus-Liebig-University Giessen), Lorenz King (Justus-Liebig-University Giessen), Mariam Elizbarashvili (Tbilisi State University), Nato Gogatishvili (Tbilisi State University)*

The mountainous ranges and adjacent lowlands of the Caucasus react highly sensitive to recent climate change. Thus, a change in extreme climate patterns in this region is also very likely. It may lead to an increase in intensity, duration and frequency of extreme climate events and in the risk of hydro-meteorological hazards like droughts, flash floods and landslides. This study analyses recent temporal and spatial trends of extreme temperature and precipitation indices in the Caucasus Region. The daily minimum and maximum temperature data used for this study encompass over 40 station records with observations for the period 1946-1997. Daily precipitation time series from over 80 stations were analysed for the observation period 1940-1991. The 52-year analysing periods were chosen to optimize data coverage for the different climatic zones throughout the study area. Quality and homogeneity testing as well as the trend analysis for 22 precipitation and temperature extreme indices have been processed using the open source software RClimDex 1.0. These Climate

Extreme Indices (CEIs) are approved as core indices by the CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI) (<http://cccma.seos.uvic.ca/ETCCDMI>). Additionally, selected indices were investigated regarding decadal space-time patterns and the correlation between altitude and trend intensity per decade across the study area. An increase of minimum and maximum extreme temperature was observed as well as a decrease in the frequency of cold days and nights. Extreme precipitation patterns show an increasing trend especially in heavy precipitation events for most of the stations, which indicates that more hydro-meteorological events can be expected in future.

### **GCG15 - Endogenous capital of towns as the way to overcome peripheralization (an example of the small towns in Wielkopolska)**

*Barbara Konecka - Szydłowska (Adam Mickiewicz University)*

Endogenous capital of towns as the way to overcome peripheralization (an example of the small towns in Wielkopolska). In contemporary socio-economic conditions endogenous capital, often described as endogenous potential or endogenous resources, becomes an important factor for development of small towns. That is why Polish spatial policy should appreciate the role of small towns, and the significance of sustaining and strengthening their functions in spatial organization of social life. The process of reconstruction and sustaining the economic potential of small towns should be based first of all on the endogenous resources thereof. It will be necessary to support regional self-governments? activities involving local communities and institutions of local development aimed at undertaking common initiatives for local development and co-operation with bigger urban centers (Korcelli 2007, Heffner 2008, National Development Strategy 2007-2015, National Spatial Arrangement Policy until 2033). The aim of this paper is a comparative analysis of employing the endogenous capital in development of small towns. Recently many small towns seek for an idea how to shape new and unique branding leading to greater promotion and eventually development in local tradition and identity. All of these actions should result with overcoming the threat of peripheralization both in local/ regional as well as national/international dimensions. In this paper, the endogenous capital of small towns is identified as local property and production base (economic endogenous capital), natural and landscape resources (natural endogenous capital) and local tradition and identity (social endogenous capital). Analysis comprises the stages of local strategy implementation employing the endogenous capital in broad sense. It is the local self-government, who plays

the leading role in building the local development strategy and creating the town's brand based on endogenous resources. It should be highlighted that also the participation of inhabitants and local organizations or associations is as much important. The role of endogenous capital in small towns? development is carried out on example of small towns in Wielkopolska voivodeship, which is characterized by the largest number of small towns among all Polish regions. The centers are diversified in many ways- due to their geographic location, size and administrative functions. Methodology of research is applied equally to all centres under scrutiny. In the first stage, an analysis of web-sites and official documents such as development strategies and plans have been researched. In the second stage the in-depth interviews with public persons: mayor, representatives of promotion department, members of local associations and organizations have been carried out. Press articles and publications are complimentary to this material.

### **GCG16 - Future change in mean and extreme temperature indices over the Republic of Korea using high-resolution regional climate model**

*Kyoungmi Lee (National Institute of Meteorological Research), Hee-Jeong Baek (National Institute of Meteorological Research), Su-Hee Park (National Institute of Meteorological Research), Hyun-Suk Kang (National Institute of Meteorological Research), ChunHo Cho (National Institute of Meteorological Research)*

The climate of Korea has experienced a gradual warming throughout the 20th century. Negative impacts of climate change on society and ecosystems are mostly expected to arise from extreme events. The changes in extremes have impacts on human activities such as agriculture, human health, urban development and planning and water resources management. The behavior of these extremes can be quite nonlinear. Therefore, it is important to examine changes in frequency and magnitude of climate extremes as well as changes in the mean state. This study focused on the spatio-temporal changes of temperature indices over the Republic of Korea using daily mean, maximum and minimum temperature data from a regional climate projection at 12.5km grid spacing. Seven temperature-based indices are selected to comprehensively consider the frequency and intensity of extreme events. In addition, the linear trend method is used to detect the statistical significance of trends in these indices. The Arcgis9.3 software was used to analyze the changes of spatial distribution. The regional climate model (HadGEM3-RA) reproduced by National Institute of Meteorological Research (NIMR) was nested in HadGEM2-AO (a

GCM of Hadly Centre). HadGEM3-RA simulations projected climatic changes under the IPCC RCP scenarios. A reference (1971-2000) and a future climate (2070-2099) time slices are simulated to calculate changes in relevant climatic variables. For the validation of the reference simulation covering the period 1971-2000, we used the climate observations from 57 stations with long-term time series and few missing data maintained by the KMA (Korea Meteorological Administration). Based on the validation of a reference simulation against a dense network of station observations, the model reproduces the PDF of daily maximum and minimum temperature distribution reasonably well. The temperature indices show overall good agreement with those from observations. Indices based on daily minimum temperature show a considerable change towards warmer climate conditions while indices based on daily maximum temperature do not reveal any distinct trend, implying an asymmetric response of daily minimum temperature and daily maximum temperature to global warming. In the future projection for the 21st century, the degree of warming is sharply accelerated. The hot days and tropical nights at the end of the 21st century is expected to have much higher values than the present (1971-2000), while frost days are projected to decrease noticeably. In addition, the decreases of heat degree days and increases of cooling degree days are projected due to rise of temperature. In the future, the most areas of Korea except for Taebaek Mountains are projected to include in the subtropical climate region. \* This research is supported by a project, ""NIMR-2012-B-2"".

#### **GCG17 - A land use switching model under climate change in perennial crop industry**

*Sangjun Lee (Michigan State University), Jinhua Zhao (Michigan State University), Suzanne Thornsby (USDA Economic Research Service)*

Farm income will be at risk if crop yield declines or fluctuates greatly under climate change. Among many potential adaptation options, land use switching is one of most widely acknowledged strategies with farmers seeking the land use which maximizes profit. Land use conversion includes multiple layers of cost and uncertainty. These barriers are inherently greater for perennial crop production where land use change often requires significant investment or establishment costs and the investments are often irreversible. Furthermore, future returns from current and alternative uses are typically uncertain. These characteristics of land use change can be conceptualized using the real option approach, and a growing body of literature has employed this approach to examine land use change or production restructuring problems in agriculture. Traditional real

option modeling, which relies on continuous stochastic processes, may not capture the extreme events underlying climate change impacts on agriculture. Moreover, impacts of climate change on yield are highly nonlinear, potentially resulting in drastic yield declines beyond certain climatic thresholds. These fat-tailed uncertainties are not well identified by standard continuous stochastic processes (e.g. geometric Brownian motion) which are typically employed in real option modeling. We developed a real option land conversion model under climate change using Lévy processes, which are a natural extension of Brownian motion. Specifically, we assume a grower's profit stream to be a mixture of jumps with Brownian motion with drift. While Lévy processes can incorporate the heavy tail phenomena into the real option modeling, these models are highly intractable to obtain numerical approximations as well as analytical solutions. In order to circumvent this, we employ spectrally negative jump diffusion with Poisson-arrival and exponential-size jump distribution, which can approximate a fairly flexible class of the Lévy processes. Since an exponential distribution has a higher peak and fatter tail than the corresponding normal distribution, it can better capture heavy-tail phenomena. When the profit stream follows a geometric Lévy process as a special case, our model allows for analytical expressions for optimal switching thresholds. Our preliminary results indicate that a drastic drop of return under a current land use may induce an early land conversion to an alternative land use which is less vulnerable to climate change. Hence, our model suggests that it is optimal to adapt earlier rather than later and that intense and frequent jumps will invoke early actions. The model was evaluated using the tart cherry industry in Michigan (USA). Tentatively, this empirical application suggests that the proposed model fits the example industry well and can be extended to other industries which have similar characteristics.

#### **GCG18 - Analysis of climate change in selected regions with tart cherries orchards in Central Europe and Michigan (USA) based on regional climate model simulations**

*Malgorzata Liszewska (Interdisciplinary Centre for Mathematical and Computational Modelling), Krystyna Konca-Kedzierska (Institute of Meteorology and Water Management), Julie A. Winkler (Michigan State University), Pang-Ning Tan (Michigan State University), Zubin Abraham (Michigan State University), Perdinan Perdinan (Michigan State University), Sharon Zhong (Michigan State University)*

Potential climate change was analysed for several areas in Poland and Michigan (USA) where commercial tart cherry production is a major component of the



local economy. We used results of regional climate model simulations carried out in the frame of the ENSEMBLES EU project for Central Europe and as part of the NARCCAP project for Michigan (USA). Verification analysis for temperature and precipitation was performed for the reference period of 1971-2000. European simulations with boundary conditions from the ERA40 re-analyses were compared against the EOBS gridded data, and North American simulations driven by the NCEP re-analysis were compared to North American Regional Reanalysis and to observations at individual climate stations. To illustrate the pattern similarity between the considered set of models/simulations and observations, Taylor diagrams, portrait charts, as well as the climatic diagrams of Walter & Lieth are presented. As expected, there is much better agreement for the temperature fields than for precipitation. Simulated temperature correlates with observations at the 0.95 to 0.99 level for Central Europe. Similar results are seen for the NARCCAP simulations for Michigan. Changes in climate parameters in future periods up to 2050 and 2100 (for Poland) and 2041-2070 (for Michigan) were assessed. Also demonstrated are climate indexes for the regions: frequency of dry and wet days, iced, frost and summer days, growing season length, strong wind days and percentiles. Climate indexes for the future periods are examined with respect to estimates for the reference period.

#### **GCG19 - Le Grand Alger: Vers une nouvelle spatialité entre la métropolisation et les perspectives de développement durable.**

*Tarek Medjadj (Université de M'sila)*

Le Grand Alger : vers une nouvelle spatialité entre la métropolisation et les perspectives de développement durable. 1) Auteur: Mr MEDJADJ Tarek, Maître assistant, université de M'sila, Algérie La métropolisation, en tant que phénomène récent, ses conséquences sont multiple sur l'aménagement des territoires. La « compétition » entre les grandes villes du monde se concrétise jour après jour. Alors, la capacité de tirer le monde des affaires semble le critère économique qui peut justifier ce phénomène. Cependant, les incidents sur la ville et son fonctionnement s'affichent bien dans son niveau de métropolisation. Aujourd'hui, on trouve les grands pôles urbains telles que : Paris, London, New York'etc. accaparent le pouvoir de décision et de finance à l'échelle mondiale. Tandis que, d'autres villes du sud telle que : le Caire, Mexico, New Delhi'etc. ont la même taille mais elles ne remplissent pas les conditions qualitatifs en matière de fonctions métropolitaines internationale. D'autre part, on ne peut pas affirmer que la métropolisation est-elle liée uniquement à la mondialisation. Mais d'autres

facteurs locales peuvent intervenir en tant qu'atouts ou contraintes pour lancer le processus de la métropolisation. La ville d'Alger comme objet d'étude son poids économique, politique et démographique est considérable à l'échelle nationale malgré les pertes et la régression de son rôle sur le plan international depuis quelques années. Elle se retrouve aujourd'hui devant le fait accompli, la nécessité d'adapter son développement urbain avec les normes de développement durable notamment après l'adhésion à l'initiative des villes durable (IVD). Nous voulons s'interroger si cela va dans le sens de renforcer la métropolisation d'Alger. Mais avant de lancer ces hypothèses nous devons faire un diagnostic si les conditions de performances minimales au seuil pour être métropole sont-elle remplies ou Alger figure parmi « les métropoles incomplètes » ?

#### **GCG20 - Drought induced variability of radial increment, carbon isotope composition and wood anatomical parameters of *Fagus sylvatica* in the climatologically exceptional year 2011**

*Cathrin Meinardus (University of Erlangen-Nuremberg), Volker Raffelsbauer (University of Erlangen-Nuremberg), Timo Hetzer (University of Erlangen-Nuremberg), Achim Bräuning (University of Erlangen-Nuremberg)*

From a climatological point of view, 2011 was an exceptional year in Germany: Spring-time was the driest since the record began in 1893. March, April and May were very sunny and showed abnormally high temperatures. During the summer months, temperatures fluctuated strongly, while the amount of precipitation in June, July and August was higher than average. In contrast, autumn, especially October and November, was remarkable dry again. Since the frequency of such climatic extreme years is expected to increase in the near future, it is important to investigate the effects of climatic extremes on forest ecosystems and on individual tree species. Common beech (*Fagus sylvatica*) is one of the economically and ecologically major tree species of central European broadleaved forests. However, it is known from dendroecological studies that common beech reacts sensitive to drought events and responds to severe water deficiency by forming a narrow tree-ring in the current season or in the following year. The future occurrence of common beech at some very dry sites might be endangered under possible future climatic conditions. We investigated *Fagus sylvatica* at different sites along a moisture gradient in northern Bavaria (Southern Germany). In this study we combine several methods to examine how dry periods are reflected in different wood parameters. Changes in radial increment were measured using band dendrometers. By quantitative analyses of

wood anatomy, we evaluated how vessel size and other wood anatomical features are influenced by drought in different phases of the growing season. Another important indicator of drought induced stress to trees is variations of stable carbon isotopes ( $\delta^{13}C$ ) in tree rings, which we analyzed intra-annually to obtain a high temporal resolution. Hence, analyzing the growth reactions of common beech to the climate parameters during the climatically still unusual year 2011 in comparison with years showing average climatic conditions might indicate how *Fagus sylvatica* may cope with changing climate conditions.

### **GCG21 - Geo-Spatial Analysis of Occurrence and Factors of Vulnerability to Malaria with Changing Weather Patterns in a Traditional Nigerian City**

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Health and climate have close affinity since antiquity. Several studies have affirmed that climate and weather can affect communicable disease patterns since disease agents and their vectors are distinctly cognizant of climatic variability. This study analysed the seasonality of climate, spatial patterns of malaria occurrence, people's perception of transmission and prevention of malaria, and the factors of vulnerability to malaria in a traditional Nigerian town, Ile-Ife. Questionnaire was used to obtain information on people's perception of malaria. Data on malaria occurrence (2004-2007) was obtained from hospital records. Field observation, questionnaire and satellite imagery were used to ascertain the behavioural and environmental factors of vulnerability to malaria. Ile-Ife town comprising of two LGAs was stratified into the 21 existing administrative wards (neighbourhoods); in which 200 questionnaire were administered to households based on their population. Remote Sensing and Geographic Information System analytical operations employed with ArcGIS 9.2 include land-use/land-cover classification, query, overlay and Inverse Distance Weighted (IDW) using SPOT 5 XS (5m resolution). Data show that there exists spatial variation in the occurrence of malaria with the highest cases recorded at Ilare1 (73), while Yekemi, Akarabata, Okewere1 and Modakeke2 have no reported case. Also, intra-annual variation in the occurrence of malaria shows that highest cases recorded between July and December (230) and it is attributable to high temperature, relative humidity, heavy rainfall, and availability of domestic and peri-domestic sources of mosquito breeding. Chi-square analysis was used to determine people's perception about mosquito-prevention

practices in the study area. Three mosquito prevention practises were reported - the use of mosquito repellent (30%), insecticide (20.5%) and bed-net (7.5%). Also, 63.5% of respondents have a wrong knowledge of mosquito breeding. Some observed environmental and behavioural factors make people vulnerable to malaria; for instance, 57.5% of households have temporary pools of water and water containers favourable for the breeding of mosquitoes around their dwellings. Also, 56.5% of the housing units surveyed do not have good drainages and 62.5% with no proper means of refuse disposal. The study concludes that the occurrence of malaria varies over space, and that certain environmental and behavioural factors make people vulnerable to malaria. Also variability in weather and climate greatly influences the seasonality of malaria transmission. Hence, malaria prevention efforts should take cognisance of spatial peculiarities as well as access to resources. Key words: Geo-spatial; climate change; prevention; malaria occurrence; Nigeria.

### **GCG22 - The International Urban System between Korea and Japan in Terms of Enterprises Alliances (1990-1995)**

*Jonghuyn Park (Hosei University)*

The urban system consists of node and linkage, which are indispensable to study the changing process of the urban system. This study examined interurban linkages in the international urban system between Korea and Japan through interfirm alliances during 1990-1995. The data used in this study were obtained from the three major economic newspapers in Japan published by Nihon Keizai Shimbun, Inc., which are The Nihon Keizai Shimbun, The Nikkei Industrial Daily, and The Nikkei Marketing Journal. The results are summarized as follows. 1. According to the indices by the Murayama model, the overall pattern of development of interfirm alliances suggests that : (1) enterprises based in the world cities (Tokyo, Osaka, and Seoul) play the most important role ; (2) the linkages among the other cities are still weak ; and (3) the alliances associated with the enterprises based in Tokyo and Seoul has particularly developed. 2. A discriminatory analysis of relationships between industry group and inter-urban linkages revealed that: (1) within the inter-world city linkages, the alliances of enterprises engaged in various industries developed, especially the machinery manufacture industries; and (2) as regards the inter-nonmetropolitan city linkages, alliances are not found in the industries associated with the producer service, such as banking and insurance, and transport and communications. 3. Various factors have brought about concentration of the alliances among the world cities in Korea and Japan, especially, among the big

business groups (kigyoshudan) located in Tokyo and Seoul, with their strong networks with subsidiary and affiliated firms.

### **GCG23 - Trade and Social Networks of Informal Cross-Border Traders in the Greater Mekong Sub-region: Strategies for Survival in a Globalising World**

*Lada Phadungkiati (University of Sydney)*

The research examines the form and degree of which globalisation and regionalisation have affected trade operation of informal, cross-border traders especially by creating change in border and cross-border trade governance scheme. Through ethnographic fieldwork, it investigates trade and social networks as strategies that local people use to overcome difficulties and benefit from opportunities that created by these processes. Increased regional economic integration in the Greater Mekong Sub-region (GMS)?reinforced by ASEAN Free Trade Area (AFTA)?has created several changes in cross-border trading activities. Firstly, governments have promoted trade liberalisation through initiatives aimed at facilitating and streamlining cross-border trade. Improvements in transport infrastructure and the removal of trade barriers, for example, have contributed to significant increases in cross-border trade in the GMS. At the same time, however, governments have attempted to regularise and channel flows of trade. This blend of trade liberalisation on the one hand, and increased regulation and formalisation of trade on the other, characterises a new phase of border governance in the GMS. At first sight, it appears that male-dominated, large-scale, cross-border traders who use formal trade channels are the winners in this new trade landscape, while female-dominated, informal cross-border traders who usually conduct trade in smaller scale are the losers. However, there is evidence that a significant number of informal cross-border traders survive and are doing well. Furthermore, there has been a continuous inflow of newcomers into the market. Various authors highlight that networks between cross-border traders and kin and non-kin actors are essential to their survival. However, most of these studies do not provide a complete picture of these trade networks and relationships. Gender relations within networks are rarely given attention, and most studies do not place informal cross-border trading within the context of globalisation and regionalisation. The research use Thai-Lao border at Mukdahan and Savannakhet Provinces of Thailand and Lao PDR as a case study. This area has been selected as it has been one of the main border crossings between Thailand and Laos since many decades. Since 1998, the area has regained importance as an important node in the so-called

'East-West corridor' in the GMS, promoted by the Asian Development Bank and other regional players. As a result, trade and social relations have been changing rapidly in the area. In-depth ethnographic fieldwork gives insight into the strategies used by old and new actors in the area to adapt to these changes.

### **GCG24 - Indian Summer Monsoon Variability and its Physical Mechanisms in the last Millennium**

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The last Millennium is the best documented climate period affected by variations in external forcing and an internal variability in the highly nonlinear climate system. According to that the Indian Summer Monsoon and its high variability on different time scales plays an important role, studied in the interdisciplinary HIMPAC project (Himalaya - Modern and Past Climates). In order to understand the forcing mechanisms, feedbacks and amplifiers concerning monsoon variability of the last 1000 years, the five ensemble members of the full forced simulation of the Millennium experiment (Jungclauss et al., 2010), using the coupled COSMOS Earth System Model (ECHAM5/JSBACH-MPIOM/HAMOCC) in a T31L19 spatial resolution, have been statistically analyzed to detect strong wet and dry periods of monsoonal rainfall due to interannual rainfall anomalies and special monsoon indices within the South Asian monsoon region. Later the selected periods of extreme rainfall events have been simulated in a higher spatial resolution with the uncoupled atmosphere version of COSMOS Earth System Model (ECHAM5) in a T63L31 resolution. The focus is on the monsoon variability of 200-years-long time slices within the Medieval Climate Optimum (900-1100 AD), the Little Ice Age (1500-1700 AD) and the Preindustrial (1800-2000). A comparison with paleoclimatic reconstructions from Dandak and Jhumar cave record (Sinha et al., 2011) helps to verify the model results, and the model has been used to check the consistency of the proxy data. In addition high resolution regional climate model simulations with COSMO-CLM will be carried out for the selected time slices driven by the ECHAM5 simulation results.

## GCG25 - Changement climatique et dynamique de la végétation dans les Andes du Chili central, depuis le milieu du XXe siècle:

### L'exemple de la Vallée de Yerba Loca

*Jorge Quense (Universidad Catolica de Chile)*

Les milieux oroméditerranéens sont considérés comme particulièrement sensibles aux changements climatiques. Deux questions sont posées dans ce contexte : quelles sont la nature et l'ampleur des modifications climatiques à l'échelle régionale (climat et enneigement) au Chili central, depuis les années 70 ? Quels sont les changements de la végétation en montagne (dans la tranche d'altitude 1.500 - 2.500 m), en particulier au niveau de la limite supérieure de la forêt à *Kageneckia angustifolia* ? Les données climatiques enregistrées les 30 dernières années aux stations d'El Yeso (2.500 m) et de Los Bronces (3.500 m), montre une croissance d'environ 1 °C pour la température moyenne annuelle, réchauffement plus marqué à El Yeso, au niveau des températures minimales. Pour l'enneigement, il est montré une haute variation interannuelle de la couverture de neige et une élévation de la limite de la neige durant les dernières décennies, d'environ 300 m. Ces résultats, sont accompagnés d'une augmentation faible du NDVI. Au niveau de la vallée Yerba Loca, l'étude diachronique de l'écotone supraforestier montre des transformations vers une augmentation de la superficie des espaces forestiers et leur densification.

## GCG26 - Dating coastal landforms in Central Chile by cosmogenic nuclides: In situ <sup>10</sup>Be ages of a wave-cut platform and a depositional marine terrace

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Cosmogenic nuclide dating significantly evolved during the last two decades. It was applied to glacial geomorphic settings in most cases, providing a reliable temporal framework for the timing of the deglaciation in many parts of the world. By contrast, the potential of using cosmogenic nuclide dating in the context of coastal environments was hitherto disregarded. Although in particular marine terraces may record the complex interplay between Quaternary sea-level fluctuations and active tectonics, they were barely investigated with this dating technique. Provided that reliable ages for their formation are available, they allow inferring long term uplift rates in coastal areas. However, dating Pleistocene marine terraces (MIS 5 or older) remains challenging since conventional dating

methods (<sup>14</sup>C, U-series, ESR...) all have their specific limitations. In this contribution we explore the potential of in situ-produced cosmogenic nuclides in the littoral environment by dating two Pleistocene coastal landforms in northern semiarid Central Chile, found at comparable altitudes above mean sea level, but formed by the interplay of different processes: a wave-cut, abrasive marine platform and a depositional marine terrace. Recently, Saillard et al. (2009) published <sup>10</sup>Be exposure ages for a sequence of 5 wave-cut platforms in the Altos de Talinay, based on quartz-rich surface samples. However, such surface samples and the resulting exposure ages are highly sensitive to denudation processes, which might have been significant during more humid periods throughout the Pleistocene. Thus, in this study, the sampling strategy comprised depth profiles, allowing for constraining the evolution of <sup>10</sup>Be concentration with depth and, importantly, the determination of both exposure times and denudation rates. From the sediments of the depositional marine terrace, we collected 6 quartz-rich samples (i.e. quartz pebbles or gruss from weathered granite boulders) from the surface to a depth of 3 m. From the erosive marine terrace, we extracted 6 bedrock samples from the Holocene cliff (from the subsurface down to a depth of ~10.5 m), where quartz veins cropped out at different levels within folded micaschists. Since the bedrock was directly sampled, the latter sampling technique avoids problems with inheritance (i.e. nuclides accumulated prior to the exposure episode), which may interfere in our sediment samples from the depositional terrace. This study, therefore, provides an interesting methodological comparison regarding (i) the sampled material (bedrock and sediment), and (ii) the forming process, and may help to advance the cosmogenic nuclide dating technique. Reference: Saillard, M., Hall, S.R., Audin, L., Farber, D.L., Hérail, G., Martinod, J., Regard, V., Finkel, R.C., Bondoux, F., 2009. Non-steady long-term uplift rates and Pleistocene marine terrace development along the Andean margin of Chile (31°S) inferred from <sup>10</sup>Be dating. EPSL 277, 50-63.

### GCG27 - Microfaunal investigations in the Quebrada Pachingo coastal swamp (Bahía Tongoy, northern central Chile) – Late Holocene environmental changes and their potential causes

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Chile belongs to one of the seismo-tectonically most active areas of the world. Moreover, its coastline is directly exposed to the influences of (i) the Humboldt Current, causing aridity in the north, (ii) the Westerlies, responsible for remarkable rainfall and humidity in the south, and (iii) the El Niño Southern Oscillation (ENSO), resulting in a high climatic and, consequently, geomorphological variability. The northern part of the central Chilean coastline provides few geological archives suitable for the study of Holocene environmental changes. By means of the microfaunal analysis of a sediment core from the Quebrada Pachingo coastal swamp (Bay of Tongoy, central Chile; 30°18'11" S; 71°33'49" W), this contribution intends to detect late Holocene palaeoenvironmental changes and aims to discuss their potential causes. Situated in the transition zone between the hyper-arid northern and the humid southern part of Chile, the study area is assumed to be particularly sensitive to late Holocene climatic variations. In addition, the high seismo-tectonic activity along the Andean subduction zone involved significant vertical crustal movements, resulting in the formation of uplifted marine terraces and beach ridges throughout the Pleistocene [1]. Ongoing coastal uplift during the Holocene [2] is reflected by the succession of fluvial terraces close-by. Possible earthquake-related tsunami events are assumed to have provoked changes in late Holocene palaeoenvironmental conditions of the coastal marsh of the Quebrada Pachingo as well. According to variations in the occurrence of different ostracod species and their characteristics, significant environmental changes took place in the study area within the last millennium. At around 1000 cal AD, a coastal brackish water body characterized the Quebrada Pachingo river mouth. After ~1000 cal AD, palaeoenvironmental conditions were suddenly dominated by a freshwater habitat. Later, salinity again gradually increased, suggesting a recovery of the marine influence in the coastal swamp. It is assumed that either a rapid coastal uplift due to a major earthquake or a severe flooding event caused the described change of the microfaunal association. Although intercalating sand deposits within the sedimentary succession may suggest tsunami inundation, they could not definitely be verified as tsunamites

due to the lack of marine faunal elements within the strata. [1] Pfeiffer, M., Le Roux, J.P., Solleiro-Rebolledo, E., Kemnitz, H., Sedov, S. and Seguel, O., 2011. Preservation of beach ridges due to pedogenic calcrete development in the Tongoy palaeobay, North-Central Chile. *Geomorphology* 132(3-4), 234-248. [2] Ota, Y. and Paskoff, R., 1993. Holocene deposits on the coast of north-central Chile: radiocarbon ages and implications for coastal changes. *Revista Geologica de Chile* 20(1), 25-32.

### GCG28 - Shaping the Territorial Cohesion – the example of Wielkopolska

*Katarzyna Szkudlarek (Adam Mickiewicz University)*

A process of integration with the European Union can be regarded as one of the most important causes of the widespread interest in the regional development in Poland. The European Union seeks in its regional policy to increase the level of cohesion in three dimensions: economic, social and territorial. Each of these dimensions is analysed at the level of states and regions, such as NUTS II (in Poland - 16 voivodeships) and NUTS III (in Poland - 66 subregions). It is assumed that the increasing cohesion may lead to improvement in competitiveness of the regions of the European Union. Moreover, it should be noted that the emphasis is increasingly on stimulating endogenous development by providing support to areas of comparative advantage rather than compensating regions for disadvantages (Fifth Report on Economic, Social and Territorial Cohesion, 2010). When Poland joined the EU on 1st May 2004, all Polish regions were below the threshold of 75% of the EU average in gross domestic product (GDP) per inhabitant. As a less developed country Poland has become one of the main beneficiaries of the financial tools of EU regional policy, which include the Structural Funds and the Cohesion Fund. It must be emphasized that the main source of funding for regional policy in Poland are the EU funds. The EU financial perspective 2007-2013 is the first full period of implementation of regional policy in Poland. The creation of sixteen separate Regional Operational Programmes is indicative of partial decentralization of development policy in Poland in 2007-2013. The aim of this presentation is to assess the impact of realisation of regional policy on the shaping of territorial cohesion of Wielkopolska voivodeship in years 2007-2011. In addition, an attempt has been made to diagnose the role of Poznań agglomeration in this process. The research procedure is composed of three stages. In the first, an operational definition of territorial cohesion is given, which allows to systematise projects co-financed from the EU funds over the years 2007-2011 by criterion of

intervention direction (within each of three dimensions of cohesion: economic, social and territorial). This evaluation has been based on the analysis of projects conducted in the Regional Operational Programme For Wielkopolska 2007 - 2013 (WROP), both the completed ones and those in progress. WROP is the main instrument of the regional policy in Wielkopolska. It makes it possible to determine the directions of intervention granted from the EU funds and outlays devoted to increasing territorial cohesion in Wielkopolska. In the second stage, selected diagnostic measures for territorial cohesion are subjected to effectiveness analysis (based on the product and result indicators). Then, the empirical results make it possible to assess the real impact of intervention granted from the EU funds on the territorial dimension of cohesion in Wielkopolska.

#### **GCG29 - Local Assessment of Urban Vegetation in the Context of Global Climate Governance**

*Jan Tigges (Humboldt-Universität zu Berlin), Tobia Lakes (Humboldt Universität zu Berlin), Patrick Hostert (Humboldt Universität zu Berlin)*

To date discussions move ahead on carbon regulation towards mitigation of climate change. To a great extent such global change is analyzed in the perspective of its local effects. Whereas recent research mostly disregards the opposite point of view concerning the importance of local urban vegetation in the context of adaptation and mitigation strategies of global climate change. In the matter of climate relevant functionalities of carbon storage, urban vegetation has recently gained more attention in the role of a regulating ecosystem service. The assessment of such service is challenging as field measurements of vegetation lack up-to-dateness and a consistent area-wide basis. Moreover field measurements do not offer a unique representative value of an ecosystem service as it is manipulated by different stakeholders. Stakeholders differ in their assessment of a service due to individual interests and different scales of acting. Therefore the aim of this case study is to discuss a remote sensing and modeling approach to assess urban vegetation in the city of Berlin (Germany) as a proxy for carbon storage concerning different stakeholders? strategies on climate change. The discussion considers different stakeholders? interests, possibilities and problems of adaptation and mitigation of global climate change, among those are such public awareness, planting strategies, green economics as well as addressing public and private space. A remote sensing and modeling-based approach addresses measurements of carbon storage of urban trees to provide a spatial up-to-date and consistent area-wide basis. This basis of field

measurements is confronted with urban stakeholders considering their individual evaluation of urban vegetation as a climate regulating service. Regarding the evaluation is to first say that a high quantity of urban vegetation might act as a global carbon sink itself. The second is to point out that urban vegetation offers various ecosystem services which act as complementary climate regulators, as cooling & shade of trees can reduce energy consumption of urban housings as well. The third is to say that the urban share of total carbon storage of urban vegetation might be low. Nevertheless urban stakeholders can function as a seedbed inducing and diffusing socio-ecological and socio-economic behavior towards climate governance on a global scale.

#### **GCG30 - Coastal onlap and landward migration of a Holocene barrier sandbar (Amrum Kniepsand/ German North Sea) investigated through GPR and sedimentological data**

*Tanja Tillmann (Goethe University), Jürgen Wunderlich (Goethe University)*

Barrier sandbars and barrier islands are geologically young, highly dynamic and represent a complex coastal system that includes a number of different but closely related sedimentary depositional environments with geomorphologic elements of varying origin, genesis and evolution. Barrier sandbars are exposed ridges of sand that are built offshore by wave action. The so-called Kniepsand on the island of Amrum represents one of the widest beaches in Europe. The Kniepsand originally belongs to a system of sandbars lining the North-Frisian coast. Some of these sandbars are already attached to the mainland (e.g. St. Peter-Ording-Sand and Westerhever-Sand). The offshore sandbars of Japsand, Norderoogsand and Süderoogsand are located in front of the western coastline of the North-Frisian Island and the Halligen and fulfil the function of natural coastal defence dissipating the energy of the incoming deep-water waves of the North Sea. Barrier sandbars are usually investigated through the use of aerial photos and borehole data. Therefore, the processes of evolution and the internal structure of sandbars are often unknown. That is why this study chooses an integrated approach using high-resolution ground-penetrating radar (GPR) and sedimentological analyses of shallow sediment cores drilled at selected sites along the radar profiles. A geophysical Survey Systems Inc. radar system, SIR-2000 coupled with a 200 MHz antenna, was used. Based on these data a sedimentary model was generated that describes the process of barrier sandbar migration and the attachment to the Pleistocene island core. According to historical maps and nautical charts of the sixteenth and seventeenth century, the Kniepsand used to be a solitary barrier sandbar located well in front of the

island's west coast without any connection to its Pleistocene core consisting of Saalian moraine deposits. The presented model shows how the Kniepsand has welded onto the Pleistocene island core of Amrum. Before the barrier sandbar was connected to the island, tidal flat deposits had been accumulated in a low energy environment. Tidal flat deposits show a general coarsening upward trend and turn into overlying coarser grained beach deposits. Old cliffs formed through several storm surges are also preserved in GPR data. Normally, the former structure of the barrier sandbar will be lost as its sediment is welded onto the island core to form the contemporary sandy beach. The study indicates that GPR-data make it possible to reveal the structure of the former sandbar and to figure out and understand the barrier sandbar attachment process.

### **GCG31 - Calibration and validation of the hydrodynamic model DYRESM to estimate future impacts of climate change on aquatic ecosystems**

*Stefan Weinberger (University of Munich), Mark Vetter (University of Munich)*

Modelling the thermal structure and heat content of lakes in climate change is getting more and more important as a fundament for ecological lake models. Various studies demonstrated the strong impact of climate change on environmental systems, including the ecosystems of lakes. Anyhow there are several gaps in understanding the complex interaction of atmosphere and hydrosphere as well as in modelling their impact on aquatic ecosystems. When using a hydrodynamic lake model for ecological studies, the careful calibration and validation is an essential condition. The results of the validation process and the following statistical analysis will be presented in this contribution. Afterwards the hydrodynamic model is suitable to estimate future trends in the development of the lake's thermal characteristics, e.g. vertical thermal stratification, Schmidt stability or thermocline shift, which have a significant influence on the aquatic ecosystem. Therefore it is advisable to use data of existing regional climate models, e.g. REMO on the basis of different IPCC emission scenarios. Finally the hydrodynamic model can be coupled with an aquatic ecological model to support the future water quality management. We are working with the one-dimensional hydrodynamic model DYRESM (Centre for Water Research 2010), which is a process based model using a Lagrangian layer scheme. It was established successfully in different investigation areas around the world, in Middle Europe for example at Lake Constance. The input parameters of the model are provided by the meteorological network of the DWD and the Bavarian environmental agency. The calibration covers a period between 2001 and 2007,

the validation between 2007 and 2011. As study object we selected the pre-alpine, 83 metres deep, currently dimictic Lake Ammersee, which is located 30 km south west of Munich. This lake was chosen due to the fact that in our opinion it could be representative for many other lakes in the northern foothills of the Alps considering their similar geogenic, climate geographic and limnologic character. There is no other lake in Upper Bavaria where such a large calibration and validation of a hydrodynamic model was achieved. To quantify the current model error when comparing the modelled data with the measured data during model calibration and validation at Lake Ammersee, we calculated the root mean square errors (RMSE), mean absolute errors (MAE) and coefficients of determination in different depths. This statistical analysis we will also present in this contribution.

### **GCG32 - PM10 concentrations in Bavarian cities and their relation to local meteorological conditions and large-scale circulation types**

*Claudia Weitnauer (University of Augsburg), Christoph Beck (University of Augsburg)*

PM10 concentrations in Bavarian cities and their relation to local meteorological conditions and large-scale circulation types Claudia Weitnauer<sup>1)</sup>, Christoph Beck<sup>1)</sup>, Jucundus Jacob<sup>1)</sup> <sup>1)</sup> Universität Augsburg, Institut für Geographie, Universitätsstraße 1a, 86135 Augsburg, claudia.weitnauer@geo.uni-augsburg.de Numerous studies have shown that local PM10 concentrations depend not only on PM10 emissions but as well on the local meteorological conditions (e.g. air temperature, windspeed, precipitation, global radiation) and the large-scale circulation characteristics, as for example reflected in occurrence frequencies of circulation- or weather types (e.g. Beck 2011). This has become evident for instance during the exceptionally warm and dry year 2003 - with significantly increased frequencies of anticyclonic circulation types over Central Europe - when critical thresholds of daily mean PM10-concentrations ( $> 50 \mu\text{g}/\text{m}^3$  on more than 35 days per year) have been exceeded at 140 out of 366 stations in Germany (Umweltbundesamt n. d.). Against this background it can furthermore be expected that possible future climate changes in mid-latitudes, as projected by different global climate models, will in turn lead to changes in PM10 concentrations. In this contribution we present first steps towards the estimation of possible future - climate change induced - variations in local PM10 concentrations in Bavaria. To this end the relationships between local PM10 concentrations in different bavarian cities and local meteorological variables and large-scale circulation characteristics respectively are analysed during the period

1979-2010 on the basis of daily PM10 and meteorological data and daily circulation types by means of multiple linear regression models and synoptic downscaling approaches (e.g. Philipp et al.2010). Based on these initial analyses it is further intended to develop robust downscaling models for estimating possible future - climate change induced - variations in local PM10 concentrations in Bavaria from scenario runs of global climate models. References: Beck, C. (2011): Monthly mean PM10 concentrations in Augsburg (Germany) and their relation to large-scale atmospheric circulation types. Geophysical Research Abstracts Vol. 13, EGU2011-12920. Philipp, A., J. Bartholy, C. Beck, M. Erpicum, P. Esteban, X. Fettweis, R. Huth, P. James, S. Jourdain, F. Kreienkamp, T. Krennert, S. Lykoudis, S.C. Michalides, K. Pianko-Kluczynska, P. Post, D.R. Alvarez, R. Schiemann, A. Spekat & F.S. Tymvios (2010): Cost733cat - A database of weather and circulation type classifications. J. Phys. Chem. Earth, 35 , 360-373. Umweltbundesamt (n. d.): Episodenhafte PM10-Belastung in der Bundesrepublik Deutschland in den Jahren 2000 bis 2003.

### **GCG33 - The Effect of Caspian Sea Level Changes on Bed Rivers Morphology**

*Mojtaba Yamani (University of Tehran)*

Bed Rivers may reflect the influences of erosion, tectonic and climate changes. Meanwhile, a factor perhaps more important role in these changes, the effects of tectonic and base level of rivers estuary. In this study, the role of Caspian sea level changes in the pattern of the channel bed rivers in south of Caspian Sea has been studied. Research problem is that the river beds of the Caspian coastline near the estuary are deep cutting. Purpose is the role of factors on base level changes and geomorphologic changes of the river beds. Digital topographic maps, aerial photos and geological maps have formed physical tools of this research. Detailed field work for obtain of sections and longitudinal profile of river bed and record their locations using GPS and other geometry tools has been done. Data in GIS environment and AutoCAD software are processed. Also, the pattern of river channel based on the findings and theoretical principles of classification and finally, the interplay of the Caspian Sea water level fluctuations and tectonic effects Alborz combined with other data and analysis has been. The results show that short-term changes in water level of the Caspian Sea near the mouth rivers (up to 5 km from the shoreline) to have been affected. This impact in east of Sefidrood river that the Kenik is closer to the beach and coastal plain is wider than the West and Northwest, is more. On

the other hand, the Alborz uplifting against South Caspian Plate subsidence comes up in the drainages and about 10 km distance after leaving the mountains to be influenced and deep rivers in this area has been.

### **GCG34 - Measuring superficial changes of glaciers as an evidence for global warming (Central Alborz, Iran)**

*Mojtaba Yamani (University of Tehran)*

At the present time, among all Quaternary landforms, mountain glaciers present more clear evidence of global warming. Increase in average annual temperature resulted in ascension of snow lines and decrease in area extent of glaciers located in cirques and mountain valleys. The glacial evidences make the exact measurement possible. In this research Alborz mountain glaciers in the North of Iran are considered as the case study. Several cirques can be observed adjacent to the peaks above 4000 meters in this mountain range, with the remained evidences of Late Wurm glaciers. Among them Alamkuh glacier has a length of over 5 kms and is still active. To determine the glacier movement and thaw rate, 15 indices were placed in the surface of the glacier as bench marks (BM). The location and altitude of these indices were recorded by T16 Teodolite. Then during 2002-2008 time interval, measurements were carried out annually at the end of September. The results show that this glacier moves some 220 centimeters annually. Also measurement of surface thaw range of this glacier via BMs and drawing cross sectional profiles show that the glacier has an average depression about 15 to 20 centimeters per year. Moreover, measurement of the distance between the BMs reveals that the area of this glacier decreased in the studied time interval. The results evidently indicate the effects of global warming in the studied area, so that the complete melting of glacier is expectable in the next few decades.

### **GCG35 - Modeling studies of impact of climate change on vegetation NPP in Poyang lake wetland**

*Xia Zhou (Guangzhou Institute of Geography), Yingshi Zhao (College of Resources and Environment, GUCAS)*

Wetlands are one of the main ecosystems of the earth, and play a key role in global carbon cycle and in global climatic change. In this process, wetland vegetation plays a significant role, because it can fix atmospheric CO2 with high efficiency. While, the impact of climate on wetland vegetation is also a complex process. It will be helpful for understanding and management of wetland through





studying these processes. In this paper, the impact of climate change on NPP was explored using a process-based model in Poyang lake wetland. The model originates from an atmosphere-vegetation interaction model (AVIM) developed by Ji. To improve its applicability in the study area, the AVIM was modified so that its submodules such as the physical process model and plant growth model could appropriately reflect the characteristics of wetland. Three meteorological factors, temperature, precipitation and humidity were selected for single factor analysis. The results reveal that the effects of Meteorological factors on vegetation NPP is non-linear. Temperature has negative impact on the NPP, while precipitation has a positive effect on the NPP. There is a relatively weak correlation between NPP and humidity. While the responses of different types of grassland on climate changes are different. In order to reveal the integrated impact of meteorological factors, the scenario analysis was used. Eight scenarios were simulated based on the changes of the temperature, precipitation and humidity as following, scenario one: +2', +20% and +20%, scenario two: +2', +20% and -20%, scenario three: +2', -20% and +20%, scenario four: +2', -20% and -20%, scenario five: -2', +20% and +20%, scenario six: -2', +20% and -20%, scenario seven: -2', -20% and +20%, scenario eight: -2', -20% and -20%. The results show that the impact of Meteorological factors on the growth of vegetation is integrated, and the impact could be changed during the different stages of vegetation growth.

### UDC01 - Romanian demographic issues during post-communist period. Case study: Burnas Plain.

*Madalina-Teodora Andrei (Faculty of Geography), Florin Vartolomei (Spiru Haret University), Costin Dumitrascu (Spiru Haret University)*

In post-communist period, Romania's population has undergone significant changes. Burnas Plain, located in the south, falls into the same trends of national demographic trends. In this studied area were found the changes in population dynamics, both in the terms of number of population, as well as the natural and migratory movement of population. The trends are the decrease in values of demographic indicators. Significant changes are observed in the population by aging population, decrease of the working population contingent (mainly due to international migration), emergence of new minorities that were not specific (eg. Chinese). All demographic changes have led to changes in the social and economic life, thus creating different conditions and new demographic trends.

### UDC02 - Craiova – Main Urban Pole within the Development Region South West Oltenia (Romania)

*Alina Vladut (University of Craiova), Sorin Avram (University of Craiova), Cristiana Vilcea (University of Craiova)*

In the attempt to harmonize the Romanian legislation with the EU legislation regarding the local public administration, the settlement system undertakes some transformations in order to use the funds more efficiently and to achieve the decentralization of the administrative decisions. Even if in terms of theory or rapports sent to EU, statistical data are quantified and rendered at the level of the development region / NUTS II, these regions do not have juridical personality and, consequently, there emerge numerous dysfunctions of the local public administration. This study is focused on the influence of the main urban pole of Craiova at the level of the Development Region South-West Oltenia. This is one of the eight development regions of Romania, covering a surface of 29,212 km<sup>2</sup> and being composed of five counties (Dolj, Olt, Vâlcea, Gorj, Mehedin'i). Within the settlement system of the Development Region South-West Oltenia, the urban pole of Craiova detaches as the city with the highest rank. The central position within this region played a fundamental role in the development and becoming of the city as the main urban pole of attraction. This research quantifies the effect of Craiova city upon the social-economic and spatial components using representative indicators. In the first stage of this research we established the urban influence area using methods of spatial analysis, in order

to analyses the types of urban attraction. The results of the research outlined the existence of two concentric areas, one of peripheral influence, where the attraction of the urban pole is reduced, and the second one, identified with the metropolitan area, where the urban attraction is strongly felt. Finally, we analysed the spatial dysfunctions by reporting the internal structure of the study area to the community policies regarding territorial disparities.

### UDC03 - Urban image features in Craiova municipality, Romania

*Amalia Roxana Badita (University of Craiova), Liliana Popescu (University of Craiova)*

Despite many changes in the last years, it is known that the urban image can be still measured with the help of landmarks as it was described by Kevin Lynch. However, the city image is increasingly exposed to recent progresses and transformations of infrastructures and land use. This article aims to outline the perception of the urban image at micro- level scale with the help of data analysis resulting from several types of surveys (VPS- Visual Preference Survey, Community Image Survey) conducted in Craiova municipality, Dolj County, Romania. Based on a technique first developed by Anton Nelessen and Associates of Princeton, New Jersey, the community image survey and the VPS (both having similar patterns) represent the process that allows the community to participate in the assessment of its environment and develop a new common vision for the future. By ranking various different images of places, spaces, and land uses, which exist or do not exist, people from Craiova express their perception on the urban image and also what type of community they want to see in the future. The results show that the landmarks presented by the residents of Craiova municipality are those related to the built areas, emerging in this way the issue of a superficial spatial knowledge of the city. Consequently, we propose principles for improving both the sense of place and the sense of time from a new modern perspective.

### UDC04 - Périurbanisation et promotion sociale: des cheminements parallèles?

*Atika Benazzouz (EPAU), Hassina Cheballah (EPAU)*

Si la dynamique urbaine est générale à toutes les villes algériennes, elle affecte bien plus la bande septentrionale et encore plus la région d'Alger. Pôle politique et économique, Alger sécrète et subit son étalement urbain dont l'amorce fut perceptible dès la mise en oeuvre du Plan de Constantine (1959/1963). Ainsi,

entre 1966 et aujourd'hui, son emprise a été multipliée par 5 ; elle passe de 15325,3 hecets à 80900 hecets avec un taux d'urbanisation de 94,67%. Depuis deux décennies environ Alger se dépeuple. A cet effet, pour la première fois de son histoire récente (en 1998), les communes centrales et péri-centrales connaissent un net fléchissement du taux d'accroissement de leur population; cette tendance est confirmée par le RGPH de 2008. Si ces désaffections soulagent ces espaces exigus, engorgés et surpeuplés elles vont se traduire sur les espaces périphériques par un apport d'une nouvelle population. Les enquêtes menées sur le terrain indiquent que 34,82% de leur population sont originaires des communes centrales d'Alger. Cette mobilité résidentielle motivée,

- Par un foncier rendu accessible grâce à la rétrocession des RFC ou les offres introduites par les particuliers
- Par l'aspiration à plus d'espace et un rapprochement de la nature
- Par le désir d'affirmer et faire reconnaître sa réussite, son statut social, Aura pour conséquences :
- Une occupation des terres agricoles que de nombreux textes officiels ont tenté de protéger en vain ; le monde rural connaîtra un profond bouleversement.
- La conquête et la formation d'espaces périphériques, sans articulations avec le centre urbain existant et sans structuration d'ensemble qui inéluctablement progresse en s'étirant le long des principaux axes de communication.
- Une croissance démographique spectaculaire des communes périphériques du à un exode urbain.
- Une recomposition spatiale et sociale, celle de l'espace urbain mais aussi celle de l'espace rural.

#### UDC05 - les mutations des tissus centraux et péri-centraux à Alger

*Atika Benazzouz (EPAU), Larbi Sidi Moussa (EPAU)*

L'adaptation d'une ville aux transformations de société est un processus de développement historique. En Europe, à partir des années 70 du siècle dernier, spontanément mais surtout à la suite d'actions programmées, les tissus urbains et périurbains des principales villes se sont transformés, rénovés, renouvelés. Obéissant en priorité à des impératifs socio-économiques, ces opérations ont concerné des quartiers généralement centraux et péri-centraux dont les tissus ont été profondément transformés. Alger capital d'un pays en transition pluriel offre aujourd'hui l'image d'une ville hétérogène et désordonnée. Elle est la parfaite illustration d'un développement non planifié et mal géré qui a généré l'apparition au sein de certains quartiers en raison d'un entassement de population, de poches de pauvreté et d'exclusion source de conflits, générateurs de violences et destructions. Un examen de la configuration urbaine de la ville révèle un espace divisé en deux entités : un centre et un péri-centre,

plus ou moins organisé, constitué de quartiers d'époque coloniale qui déperit et se vide et une périphérie de grands ensembles et de lotissements anarchique et en extension permanente. Les quartiers centraux présentent un degré de désorganisation et de vétusté très prononcé ; d'immenses poches oubliées, offrant l'image d'un amoncellement de bâtisses en ruines abritant des entrepôts et/ou de petites unités industrielles dont le maintien en place va à rencontre de toute logique (économique, fonctionnelle et esthétique...). Par ailleurs, les anciens faubourgs de la ville à vocation agricole initiale, en raison de l'extension de la ville, occupent aujourd'hui une position privilégiée, en totale contradiction avec leur contenu actuel, lieu stratégique pour l'implantation d'une éventuelle future centralité de la ville. Faut-il détruire ces quartiers et les reconstruire ex-nihilo? Faut-il au contraire les conserver en les réhabilitant - Aujourd'hui, l'avenir et l'équilibre de la ville impose nécessairement une réflexion approfondie et fondamentale sur le devenir de ces quartiers. La reconquête de ces portions et leur réaménagement peut-il participer à la recomposition des fragments de la ville et permettre de doter ALGER d'un centre en mesure de lui assurer le statut de métropole auquel elle aspire.

#### UDC06 - Tunisia Election of 2011 and regional disparities

*Ali Bennisr (Faculté des Lettres et Sciences Humaines)*

The elections of 2011 in Tunisia, showed spatial and social divisions in the country. Two Tunisia emerged from these elections: modern Tunisia and traditional Tunisia. These divisions reflect the regional disparities in the country.

#### UDC07 - The Border Experience: Tracing the urban journeys of cross-border commuters in the Hong Kong Guangdong border region.

*Jonathan Burrow (University of Oulu)*

Immigration and passport control is a highly symbolic and regulated experience, which can carry with it feelings of both anxiety and relief for the traveler. This poster will explore the daily experience of cross-border commuters' between Hong Kong and Shenzhen special economic zone in Guangdong Province. Both part of the dynamic Pearl River Delta urban region. For these individuals presenting their identity documents for inspection is part of everyday life. The Hong Kong Guangdong border is an international strength barrier within a rapidly expanding urban region, a barrier that utilizes the latest biometric

technology to identify and determine who can cross it. The daily journeys of cross-border commuters rarely cover at more than a hundred kilometers or take more than an hour but transact two distinct jurisdictions under the eye of a single nation state, a state in which different groups of people are given distinctly different mobility rights at the barrier. Cross-border commuters through their, business, social and education activities are both benefices and servants of the change in systems that occurs as they cross this increasingly intra-urban barrier. Each border commuter's journey and experience is unique and this poster selects a sample of border commuters who's lives show the dynamic nature of the this region and its rapid transformation from agricultural backwater to a global manufacturing centre in a couple of decades. This poster is based on three months intensive fieldwork and in depth interviews conducted in the region for my Masters of Applied Anthropology as Macquarie University in Sydney, Australia. This poster will be built around a map of the urban region, layered with details of the commuters' journeys. As an interactive element, viewers will be able to use their smart phones to scan QR codes on the poster for more extended information about particular points in these commuters' journeys, allowing the viewer to take with them and consider ideas around the border experience on their own journeys home from the congress.

#### **UDC08 - Analysis of Spatial localization in educational equipment for the city of Tome, Chile**

*Carolina Rojas (Universidad de Concepción), Helen De la Fuente (Universidad de Concepción), Matias Casanueva Lermada (Universidad de Concepción), Constanza Villarroel (Universidad de Concepción)*

Tomé is a coastal city of Chile located in the Bio Bio Region just over 32 km of the regional capital Concepción. It has an area of 1495 km<sup>2</sup> with a population of 55,000 inhabitants, who are unequally distributed in the territory with supremacy of the Urban (87.64%) versus the Rural (12.36%). This striking and uneven distribution of the population will greatly influence the distribution of all types of services and in educational facilities. Tomé has conditions that make spatial distribution of education, must deal with complexities between the dispersion of the population and accessibility to the offer in education. It proposes to work with socio-analysis of the distribution of equipment, which allows comparison of distribution situations between territorial units, which is the first approach to reveal differences in space, in addition to assessing the welfare of the population distribution and equity of resources. For the identification and characterization of patterns of inequality and spatial expression in the municipality of Tomé,

statistical and graphical tools for data analysis were done, applying a set of indicators, alluding to the quality of education of educational institutions to national level as rate student - teacher, SIMCE results, provision of educational and assessment with the inequality index Sergeant Florence, spatial and temporal accessibility, among others. Through this work and its relation to location theory, we understand the educational distribution, there are places that act as a center, gaining a valuable social, symbolic and economic, where large flows of people converge more distant from the center periphery and disadvantaged areas synonymous with accessibility, resource allocation or quality of education as is the case of Tomé. The location-based planning uses the concept of accessibility, because inevitably there will be an unequal geographical access to any public services. This in practice means that some populations are better placed to take advantage or disadvantage imposed by geographical distance. Thus, if the population is most favored, this creates the strengthening of human capital, and social, one of the pillars for sustainable land development and important aspect to consider in developing countries like ours.

#### **UDC09 - Defining two new paradigms in planning**

*Pablo Coquillat Mora (Universidad Politecnica de Valencia (UPV)), Universidade de São Paulo (USP)*

Defining two new paradigms in planning The text proposes to discuss how to set links between two contemporary paradigmatic phenomena: urbanization of the planet and the uncontrolled population growth, emphasizing the necessity of incorporating interdisciplinary new tools to understand and reformulate the urban planning. At the starting point, the analysis attempt to state two new paradigms: overpopulation and urbanization. Through the text of Thomas Kuhn, *The Structure of Scientific Revolutions* (KUHN, 1998), we seek to demonstrate how the current urban planning instruments are inadequate for the definition of existing urban structures. Likewise, it is proposed a review of these instruments and the theorization of different scientific and social instances, and how they must incorporate these new paradigms to the discourse on planning. Secondly, it will be identified the urbanization-overpopulation binomial through data from contrasted sources on current processes of territory occupation, pointing out, mainly, experiences in the developing regions. It will set out the political, economic, social and spatial links established with the new paradigms, primarily pointing to the mechanisms of globalization and the production of capitalist space that generate them. Then, it will be explained the way in which urbanized overpopulation is organized in the territory: the formation of megacities, recurrent

million-plus cities, urban galaxies organization, hermaphrodite structures between the rural and the urban, the systems of chinese regional cities, or the Zwischenstadt ('intermediate city'). All of them will compose a kaleidoscope of references from the successes and failures of recent urban experiences that are being carried out in regions of the Third World. Finally, it will be described the principles on which the planning should be reformulated to incorporate the rules of a new situation which results in increased poverty and inequality, the informality of occupation processes of the territory, the rapid and uncontrolled changes in the production of the space, as well as the new positioning about the climate challenge. KUHN, T. S. A Estrutura das Revoluções Científicas. São Paulo: Editora Perspectiva S.A., 1998.

#### **UDC10 - Méthode de la synthèse trichromatique sans partition en classes: Les résultats d'une application aux pays arabes**

*Mohsen Dhieb (King Abdulaziz University)*

En cartographie, la méthode de la synthèse trichromatique de J. Bertin permet de visualiser la part relative de chacune trio de variables reliées sémantiquement (Bertin J, 1999). La combinaison résultante des trois couleurs primaires soustractives offre des tonalités ternaires changeantes, exprimant ainsi la dominance ou l'effacement, la forte ou la faible représentativité d'une (ou de deux) variable(s). La méthode Bertin est basée sur des paliers de valeurs distincts et discrétisés. Si la mise en classes regroupe en catégories distinctes des objets géographiques ayant des valeurs voisines, elle ne permet pas toujours de saisir les nuances des couleurs. De plus, la mise en classes cumulée au niveau de chaque modalité ou variable peut ne point être fidèle à la position précise de certains objets s'ils sont au bas ou en haut de la classe de valeurs (sur ou sous représentation). Ce sont là des biais qui s'ajoutent aux difficultés de perception des couleurs combinées. Or, nous savons que Waldo Tobler, a expérimenté la méthode de non partition en classes des séries de chiffres, arguant du fait que la non mise en classes permet de représenter la valeur réelle des objets. Pour lever quelques biais de la méthode de la synthèse trichromatique nous avons entrepris de combiner cette méthode avec celle de Tobler, et notamment lorsqu'il s'agit d'évolutions. Notre démarche est étayée à travers une étude du monde arabe. La cartographie analytique et synthétique des variables socio-économiques comme la structure par âge et la structure des activités économiques s'avèrent très utiles pour une meilleure compréhension du positionnement des pays arabes les uns par rapport aux autres. La place de chaque pays dans le continuum de couleurs ternaires, au sens scientifique du

terme, est un bon indicateur de sa structure économique et sociale. Les images résultantes de la synthèse trichromatique non classée offrent une meilleure lecture que certaines représentations classiques et permettent les analyses spatiales utiles. Les différences chromatiques entre les pays ne mettent pas seulement en valeur les décalages, mais aussi, dans leurs nuances, les atouts pour une éventuelle restructuration. Nous pensons mieux étudier les ensembles géographiques régionaux grâce à cette nouvelle méthode cartographique.

#### **UDC11 - Cultural Industries in Xi'an?A 2009 Survey of Spatial**

*Dongqian Xue (Shaanxi Normal University)*

The cultural industries have attracted increasing attention from researchers and policy-makers in recent years'because the research of regional distribution of cultural industries is not only conducive to understanding the development status of the cultural industries in this region, but also is a guidance of government decision-making. After classified the cultural industries in Xi'an, this paper examines more than 1980 cultural industries enterprises in urban area in 2009, then based on the point pattern analysis methods, we obtain the Cultural Industries' concentration index of ten areas through function. According to the present development of Cultural Industries in Xi'an?then the studied region is divided into three types: Core Area, Potential Area and Dispersion Area. Through analysis of geographic concentration and Kernel density, it founds that at present the characteristics of spatial distribution of cultural industries in Xi'an urban area, besides, the different type areas have their special concentration or dispersed mode and the location factors that affect the distribution of cultural industries enterprises.

#### **UDC12 - From Haiti to Brazil – the new migratory flow**

*Duval Fernandes (PUC Minas), Andressa Faria (PUC Minas)*

Brazil has been known as a country of emigration for a long time, once more than 4 million Brazilians lived abroad in the 2000s. With the economic crisis of the central countries, many Brazilians have decided to return to their country of origin and Brazil gets to know the reverse movement, the reflux of its citizens who have returned. At the same time that the return occurs, a new migratory flow begins: the increased immigration towards Brazil. On the northern border the movements have always been unimportant, restricted to the moving of some Brazilians who are in search of easy enrichment with the gold in French Guiana, Suriname, Venezuela or go to Bolivia by taking lands not far from the border.

However, a new flow, of no more than two years has begun to be produced: the immigration of foreigners from the Caribbean, by the border between the countries of the Legal Amazon. They are mostly Haitians seeking a better life away from their country of origin which is the poorest in the American continent and whose social and economic situation was strongly aggravated by the earthquake that struck the country in January 2010, killing more than 150,000 people, culminating in a large number of homeless and reducing to rubble a major portion of the housing and governmental infrastructure, deeply worsening the humanitarian situation of this nation. In the beginning just a few dozen arrived in Brazil, but in March 2011, this number exceeded the thousands and at the end of 2011 the total number of Haitians in Brazil exceeded 4,000 people. The characteristics of this flow are already known and they have arrived in Brazil with well-defined paths. Nevertheless, this is a new situation for the government and the Brazilian society and presents challenges to governance in terms of international migration towards the country. What we propose in this paper is to systematize the information on this new migratory flow, the routes to get to the Brazilian territory, the profile of immigrants, and comment on something about what this demand brings as challenges to the new realities that the world is facing with the human movement due to environmental grounds and, above all, the responsibility to ensure, first, that human rights of these immigrants are respected. We will use as sources administrative records provided by the National Immigration Council (CNIg- Conselho Nacional de Imigração) of the Ministry of Labor and Employment (MTE - Ministério de Trabalho e Emprego), and other agencies of the Federal Government, in addition to data collected by civil society organizations.

### UDC13 - Urban Regeneration Practices in the U.S., Germany and Austria

*Yvonne Franz (University of Vienna)*

Cities are embedded in ongoing transformation processes that are triggered and influenced by a mixture of political, economic, demographic and social changes. Cities constantly have to reinvent themselves while at the same time preserving their urban and cultural identity. If they do not, they remain stuck in a status quo and are at risk of facing severe challenges like shrinkage or artificial conservation; they lose their attractiveness and are finally unable to compete with other cities in global competition. Urban revitalization in terms of physical rejuvenation plays a crucial role in attracting future and existing residents, especially in times of urban renaissance. The potential for physical rejuvenation

differs within the specific context of a city. Investments for urban renewal cannot be covered solely by public funds on federal, state or communal level. Private public partnerships become more and more important not only for large scale developments. The investments of all actors who are involved in the urban revitalization processes have an impact on the economic and social structure of cities, too. Gentrification can be a potential outcome. Additionally, the dynamics of modern transformation processes are on the increase and demand comprehensive concepts and steering strategies. This poster will visualize different urban revitalization approaches and outcomes in the US-American, German and Austrian context. Vienna, Berlin and New York City serve as practical examples in this poster.

### UDC14 - Indicators, planning and urban observatory network in Mexico

*Oscar Frausto (Universidad de Quintana Roo), Thomas Ihl (Universidad Nacional Autónoma de México), Justo Rojas (CESAC), Esteban de Jesus Vazquez Rodriguez (Universidad de Quintana Roo)*

Indicators are regarded as important tools for the implementation of Monitoring of the Agenda habitat in Mexico. Since the beginning of the debate about indicators in 1992 different concepts have been developed. Some of the existing indicator sets have been tested already. The results have led to the conclusion that the indicator concepts of the "first period" need to be improved. One of the most important outcomes of the experiences made until now is that it is almost impossible to develop indicators or indicator sets, suitable for every spatial area or different regions. The results of the program of the UN Habitat Mexico confirm this fact. In the present contribution 44 experiences of sustainability indicator development for the Mexican Urban Observatory Network context are presented, the analysis time is for 2000 - 2010. The examples from Mexican cities underline the necessity to develop indicator concepts based on the specific problems and goals for the region without neglecting the global principles of sustainability. Furthermore, the description of both case studies (methodology of selection, indicators and her application) illustrates the problems and challenges of indicator concepts for a specific region. Finally the author gives some recommendations for the development of sustainability indicators for the National Urban Observatory Network for the Mexican cities planning.

### UDC15 - Possibilities of e-health technologies to support health care in rural areas

*Karsten Gödderz (University of Bonn)*

Demographic change imposes different challenges on our society making it older and fewer in number, hence causing a change in demand and supply of health care services in the future. Rural areas in particular face difficulties providing health care for the scarce population at high quality. E-health technologies have been widely discussed, yet not implemented in Germany to face these challenges. Certain resentments against implementation of e-health technologies exist, opposite to other countries facing similar problems such as the US or Scandinavian countries. Following the paradigm of Gesler/Kearns (Geography of Health) the study sets out to investigate the acceptance of a specific technology (Home telemonitoring for patients with heart disease) among patients and practitioners aiming at everyday geographies of both groups via qualitative research. Furthermore, the possibility of implementation regarding the views of health care systems' stakeholders was investigated. The study focused on the experiences made in the 'Partnership for the Heart project' (Köhler), set in the north of Brandenburg, Germany, an area highly affected by demographic change. Even though a qualitative single case study has been conducted, certain general characteristics for telemonitoring can be established. The results show that patients are extremely positive towards the implementation of telemonitoring devices at home to support their health care. Treatment at home, a place connected with a certain sense of place, improves quality of life by creating a feeling of security and enabling patients to follow their everyday activities. The high rate of acceptance cannot be found for practitioners, however. Resentments towards implementation of technology into the treatment process remain constituted by the fear of a thorough change in a practitioner's working culture towards a technical and impersonal treatment and a loss of their economic foundations. A similar refusal of this technology was discovered for some stakeholders within the system of health care in Germany due to a missing proof of medical efficacy and utility of telemonitoring, leaving them with scepticism towards its implementation. However, viewpoints vary from opposition to endorsement. In addition, the results pointed out that telemonitoring cannot be the sole solution for rural areas facing demographic change since it is always considered as an additional means of treatment. Nevertheless, it can contribute to providing expertise and treatment in remote locations, thus supporting supply in these areas. For patients, the telemonitoring shall lead to a more stable condition, leading to fewer hospitalisations and thus

to a lesser demand in health care services, mitigating the challenges of demographic change by reducing the workload on practitioners in rural areas. If designed similar to the PfH project, these goals seem reachable.

### UDC16 - Urbanization in Rajasthan (India): A Demographic Transition

*Sawan Kumar Jangid (M.L.V. GOVT. COLLEGE, BHILWARA)*

Urbanization in Rajasthan (India): A Demographic Transition Sawan Kumar Jangid Department of Geography M.L.V. Govt. P.G. College, Bhilwara-311001 (Rajasthan), India sawan.jangid@yahoo.com Abstract 32nd International Geographical congress cologne (Germany) 2012, 26-30 August 2012 This paper investigates how urbanization and demographic transition interrelate with each other via merits of population concentration and demerits of it. Urbanization is an index of transformation from traditional rural economies to modern industrial one. It is a long term process. This paper endeavours to illuminate on the process of urbanization in Rajasthan over a century with emphasis on level, tempo of urbanization and urban morphology using Indian Census data during 1901-2001. It will try to trace urban problems and related policy issues. At the moment, Rajasthan is among the state of low level of urbanization. Number of urban agglomeration has grown from 135 in 1901 to 222 in 2001. Number of population residing in urban areas has increased from 15.50 lakh in 1901 to 132.14 lakh in 2001. Only 23.39% of population was living in urban areas as per 2001 census. Over the years there has been continuous concentration of population in class I towns. On the contrary the concentration of population in medium and small towns either fluctuated or declined. The graduation of number of urban centres from lower population size categories to class I cities has resulted top heavy structure of urban population in Rajasthan. Rajasthan's urbanization is often termed as over-urbanization, pseudo-urbanization. The big cities attained inordinately large population size leading to virtual collapse in the urban services and followed by basic problems in the field of housing, slum, water, infrastructure, quality of life etc. Urbanization is a product of demographic explosion and poverty induced rural - urban migration. Urbanization is occurring not due to urban pull but due to rural push. Globalization, liberalization, privatization are addressing negative process for urbanization in Rajasthan. Policy relates to proper urban planning where city planning will consist of operational, developmental and restorative planning. Redirection of investment is recommended to develop strong economic base for small and medium city neglected so far so that migration flows are redirected to small and medium cities.

### UDC17 - Electoral aspects of the socio-political variability of big cities in Poland

*Katarzyna Kulczynska (Adam Mickiewicz University), Elzbieta Bilaska-Wodecka (Jagiellonian University)*

Urbanisation is regarded as one of the most important factors shaping electoral behaviour in Poland over the last two (post-1989) decades because here have appeared parties on the political scene in that period that captured much higher support in towns than in rural areas. Also, the biggest cities have shown the highest voter turnout in parliamentary elections. Among factors affecting the voter turnout and the spatial variability of electoral results at the regional level, apart from historical and socio-economic determinants, one can also find a religious element. Do those regularities appear in big cities as well? The subject matter of the analysis reported here was differences in the voter turnout and the results of parliamentary elections at the start of the 21st century in Poland's biggest cities. The analysis was also conducted in the intra-urban space with electoral districts or their sets (city quarters) as objects of study. This type of analysis, therefore, can be regarded as a specific form of socio-electoral ecology. Also considered at this level of analysis was the influence of socio-religious differences in the Roman Catholic Church. Differences (inequalities) in the support structure within those small territorial units are considered in socio-economic terms (e.g. as differences in religiousness). It should also be noted that this urban type of electoral behaviour tends to spread into the rural areas adjacent to a big city, which is a result of the process of their suburbanisation. A special role in the structure of big cities is played by so-called closed electoral districts (set up in hospitals, police jails and prisons, and nursing homes). Those units tend to acquire a politically distinct sense of place. Religion as a factor explaining electoral behaviour patterns is still significant in Poland, as opposed to some European states like the Netherlands or the Czech Republic, although its impact seems to decline gradually. In the case of Poland, the effect of religious factors on the election process can be seen in: (a) a clear relationship between the level of religiousness and the voter turnout (the higher the level of religiousness, the more steady the voter turnout throughout the years); (b) strong and persistent support for right-wing parties in areas showing a high level of religiousness, and (c) persistent support for left-wing parties in areas where the level of religiousness is low.

### UDC18 - Neighbourhood environment: Implications for childhood obesity

*Ana Lourenço (University of Coimbra), Helena Nogueira (University of Coimbra), Isabel Mourão (University of Coimbra), Vitor Rosado (University of Coimbra), Cristina Padez (University of Coimbra)*

**Introduction** Over the last decades, the prevalence of childhood obesity and overweight has increasing in developed and developing countries, becoming a serious worldwide public health problem. In Portugal, the prevalence of overweight reached 20,3% and obesity 11,3% among children aged 7-9 yrs. Many studies have identified associations between parental perceptions of the neighbourhood attributes and childhood weight status (Timpero et al., 2005): positive perceptions of safety, proximity of free or low cost recreational facilities, public transport options, existence of sidewalks and facilities to bicycle can potentially reduce childhood obesity rates because time spent outdoors is significantly associated with physical activity participation. Our main aim was to analyze the links between parental perceptions of the neighbourhood environment and weight status among children aged 3-9 yrs. **Methods** Data were collected between October 2002 and June 2003 in 24 kindergartens and elementary public schools in Aveiro. 1117 children's weight and height were obtained using standardized anthropometric methods. Body mass index was calculated and the cut-offs points published by Cole et al. (2000), were used to define overweight and obesity. Parental perception of the neighbourhood environment was measured using responses from the Environmental Module of the International Physical Activity Prevalence Study questionnaire. Parents indicated how much they agreed or disagreed with 15 statements about traffic safety, crime, sport and recreation facilities, aesthetics, streets connectivity, access to public transport and social environment. Chi Square was used to test differences in the proportions; and logistic regression to examine associations between neighbourhood environmental attributes and weight status. **Results** The prevalence of obesity (including overweight) in our sample was 29,0%. We found that girls have significantly higher values for obesity than boys (17,3% and 11,7%, respectively). Logistic regression analysis showed that children whose parents agreed that the crime rate in their neighbourhood allow walking in safety during the day were less likely to be obese and overweight (OR=0,63; 95% CI 0,41-0,96;  $p<0.05$ ). **Conclusion** Our results suggest that perceptions of neighbourhood safety were predictive of 3-9 yrs children's weight status. We found that living in a neighbourhood perceived as safe decreased the risk of excessive weight, suggesting that the promotion of a high-quality social



environment may be a possible way to prevent childhood obesity. This result is consistent with prior longitudinal studies on neighbourhood safety conditions and adiposity, as well as with other cross-sectional studies, highlighting the crucial role of local perceived safety on children's weight status. Key Words: Childhood obesity; Parental perceptions; Neighbourhood environment; Aveiro; Portugal.

#### **UDC19 - The process of demographic and economic polarization in the Republic of Macedonia**

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Demographic and economic development in the Republic of Macedonia is characterized by high dynamics, and an imbalance in development. Unequal social and economic development is one of the main negative features of development, especially during the transition period in which the regional development has been marginalized the expense of market development and stabilization and restructuring of the economy. No less important component of the development is the problem of concentration and dispersion of population and economic activities in the area causing the appearance of demographic and economic polarization in the country. Today the degree of the population and economic development in the Republic of Macedonia shows certain differences on the regional level, according distribution of the population, investments, GDP and etc. From the available social and economic indicators can be concluded that the Republic of Macedonia has the characteristics of a country with a mono-centrism model of development where the Skopje region stands out as the core of development, while other regions stagnate or grow with less intensity compared to the previous one. Therefore, this current problem requires finding solutions to reduce disparities in regional development and harmonization of the same.

#### **UDC20 - GIS based land suitability evaluation for spatial planning using AHP method at Shandiz urban region, Northeast Iran**

*Mehrnoush Afshari (Islamic Azad University), Mohammad Reza Mansouri Daneshvar (Islamic Azad University)*

The present study evaluated the land suitability for spatial development of Shandiz urban region on the basis of analytical hierarchy process (AHP) and geographical information system (GIS). Based on this method, the area and percentage distribution of land suitability were calculated and it was found that 12 landforms (22.5% of the region) is under the high and moderate suitability to spatial development. Our results revealed that the regions with high suitability spatial development are located in the middle and south parts of the study area. Our study presents a map of land suitability for spatial development of the region, which will aid in planning appropriate, quick and safe mitigation measures and future development strategies based on the identification of the region. As a result we develop and apply a systematic regional planning approach to identify geographic priorities for on-ground natural resource management actions that most cost-effectively meet multiple natural resource management objectives. Our systematic regional planning approach utilizes integer programming within a structured multi-criteria decision analysis framework.

#### **UDC21 - A functional, ranking-based, land planning methodology for resource optimization, in resource deprived areas: A Spanish Applied case.**

*María Asunción Martín Lou (CSIC), María J. Lozano de San Cleto (Real Sociedad Geográfica), Alberto Míguez Iglesias (ESCUN)*

The object is to create a functional map presenting a global and actual view of the land, as a planning tool to distribute and optimize resources over 'sustainable influence areas'. To get the functional ranking, a synthetic index is created by mixing a correspondence point analysis (McGranahan, D., et al 1972) and a CRITIC multi-criteria weighting system (Diakoulaki, et al 1992). In said synthetic index we have included any basic facilities available: culture centres, sport areas, schools and health services (EIEL, 2009), as well as other land features: demographical (absolute population and density) data, accessibility (road network) and economic activity (number of financial entities). Its global analysis facilitates determining the functional ranking and influence area of the municipalities, object of the land planning. This methodology is applied in the

Autonomous Community of Castilla y León, a connecting area for trading flows between Northern and Southern Spain and between Portugal and other European regions. Its 94,223 km<sup>2</sup> of area (18.6 % of Spain) makes it the first largest region in Europe. Its population in 2010 amounted to 2,559,515 inhabitants (5.69 % of Spain), with a density of 27.16 inhabit/km<sup>2</sup> and 2,248 municipalities. To obtain the functional ranking, any municipalities over 50,000 inhabitants were excluded and the mean rate became 646 inhabitants per municipality (1,446,018 inhabitants distributed in 2,239 municipalities). Due to this atomization of the population, this kind of tool is needed to reach some resource managing policies to insure the population has access to basic services.

#### UDC22 - The governance and development strategies: Work and Timorese youth

*Gabino Moraes (UNESP/FAPESP)*

East Timor is a small Southeast Asian country that gained independence in 2002, and since then it has enjoyed the support of different international social actors like the UN, the World Bank, International NGOs, among others. What synergistically orchestrate development strategies. In Timor, half the population of about 1,066,582 inhabitants, have less than 15 years and the fertility rate is at approximately 8.3 children per one. This summary aims to investigate the role of governance as a strategy for urban development. Where the question of labor and employment policies for young people present themselves as a central issue. The theoretical framework underlying this research is related to studies on governance and territorial development that has been produced within the international context and geography in Brazil, the specificity of UNESP, in Rio Claro. The governance and development strategies are the core of East Timor today. 'Due to this process of nation building, it is important to note that the various social actors involved in foreign and local projects to promote these strategies have different ideas about how to promote them' (Guedes and Mendes, 2005 and Silva and Simião, 2006). But in a scenario of high population growth rate of an intense process of urbanization and a low prospect of employment growth, with a rapidly increasing young population (World Bank, 2007 and 2008) the development of these strategies is inevitable. The methodology is based on the diagnosis of the material: 'East Timor Force Survey 2010'. Joint initiative of the Secretary of State for Vocational Training and Employment (SEFOPE) and National Directorate of Statistics (DNE), which represent the first attempt of this kind, held in East Timor after independence. It

covered 4,665 households spread across 311 fields through East Timor. Detailed information on the economic activity of 17 000 people in each household was collected. With emphasis on the economic conditions of people aged 15 to 29 years. Of these, about 51,000 are employed and 6,000 unemployed. This data collection provides an important set of labor statistics, including data on employment, unemployment and underemployment. In order to provide a real monitoring of labor market policies in East Timor. Finally, it is expected that the results of this research can contribute to the analysis of governance strategies for urban development in Dili. Pointing diagnoses facing the Timorese urban space, and the country, with regard for youth employment.

#### UDC23 - Analyse du changement de l'occupation du sol par automate cellulaire à Menzel Bouzalfa (Cap Bon\_Tunisie)

*Monaem Nasr (Laboratoire SYFACTE), Mohsen Dhieb (King Abdulaziz University)*

Nous nous proposons d'étudier les dynamiques spatiales et les mutations agricoles des différents modes d'occupation du sol à Menzel Bouzalfa, ancien bourg rural situé dans la plaine de Grombalia (Cap Bon\_Tunisie). Caractérisée par son activité agricole notamment agrumicole, cette ville a connu des changements remarquables et des mutations profondes au niveau de son occupation et utilisation du sol. Il s'avère indispensable dès lors de penser à la modélisation prospective, à l'aide des Automates Cellulaires, de la masse d'informations relative à l'évolution de la région de Menzel Bouzalfa pour mieux gérer et organiser cet espace dans le futur en mettant l'accent sur le bâti comme expression de l'étalement. Dans ce cadre, un modèle de type automate cellulaire est nécessaire afin de produire des images du futur de l'espace périurbain et rural. La production d'images différenciées du futur des modes d'usages du sol et des structures paysagères selon différentes hypothèses est envisagée à travers une approche prospective spatialisée. Elle est effectuée à travers des scénarios élaborés selon une démarche participative auprès de différents acteurs et le développement d'un modèle de type automate cellulaire (SpaCelle). Ce dernier est une application programmée dans le but de répondre à une problématique semblable à celle à l'évolution de l'occupation du sol dans l'agglomération rouennaise.

### UDC24 - Human-Environment Interaction: Analysis of the transformation of urban space in the city of Coimbra in the time period 2000-2010

*Diogo Neves (Universidade de Coimbra), Viviane Neves*

Within our current life cycle and increasingly global society we live in, frequently and profound changes begin to occur more constant in our daily lives. If, then, for some authors this movement for change that we witness in the contemporaneity space is an inherent characteristic of the time we live in and so we have to get used to them. We can not deny that his understanding comes understanding many phenomenon in the composition space. The way in which our cities and towns are now surely is the fruit of our past relationship to it, but we can not deny the future importance of the constant transformations that urban centers are within our day-to-day. With this we affirm that although the past has key role to understand the contemporary, certainly our contemporary relations will generate reflections on the spatial structure of the future. Sometimes we see that man as an agent of transformation of urban space and the environment in which they are inserted does not realize the possible consequences of (beneficial or not) of their actions. Thus, we must have a clearly established these spatial changes in our cities and towns for in the future, we can better absorb the effects and consequences in the spatial structure. So, in this work we propose to make a list of the main processes of urban change in Coimbra occurred in the last decade (2000-2010) to understand the dynamics of use and occupation of land in the urban center and to generate benefits to a future analysis of its features and potential benefits from the processes of transformation of the urban space of Coimbra.

### UDC25 - Location of facilities and the vulnerability in Andean Cities: The Case of La Paz

*Javier Nuñez Villalba (II GEO-UMSA)*

Latin America is a unique place in terms of the phenomena affecting the world such as global change, migrations, and new democracies, since these phenomena are more drastic in this region. In terms of population for example, according to the United Nations Population Fund, the worldwide population will increase to 5 billion people, with the most significant growth in developing regions such as Latin America (where eighty percent of the planet's urban population is concentrated). Because the high concentration of population in

urban areas, according to Pelling (2003), is only 1 % of the terrestrial surface, cities such as those in the Andean region become key places for the analysis of global change. Difficult geographic conditions (accessibility, climate, topography, etc.) in the Andean region have not impeded the construction of immense urban cities such as Quito and La Paz, which are both characterized by accelerated growth that is expanding through valleys and mountains. This growth multiplies both human and natural threats, however due to constant landslides in places with highest slopes (that cause entire neighborhoods to disappear) it is often believed that the most significant threats are natural, without taking into consideration the urban planning that allowed for these areas to be occupied in the first place. An analysis of the plannification of these urban areas, through a sequence of aerial photographs and satellite images shows the true vulnerability of these urban areas.

### UDC26 - Spatial Pattern of Occurrence and Factors of Vulnerability to Cancer in Ile-Ife, Central Western Nigeria: Using GIS and Remote Sensing

*Oludotun Olagundoye (Obafemi Awolowo University Ile-Ife, Osun State), Olawale Oluwafemi (National Space Research and Development Agency), Akinola Akinwumiju (Bunmak Systems Limited)*

This study analyses the spatial patterns of cancer occurrence, accessibility of cancer patient to treatment centre and factors of vulnerability to cancer in Ile-Ife city, Central western Nigeria. The study area constitutes 21 administrative units (wards). Handheld Global Positioning System (GPS) receivers were used to determine the exact location of cancer patient (cancer neighborhood) using their residential addresses as recorded at the registry between 2000-2010. 200 heads of household were randomly selected from the administrative units for questionnaire interview to serve as attribute data. Cancer occurrence data (2000-2010) obtained from cancer registry, Obafemi Awolowo University Teaching Hospital Ile-Ife, Nigeria. IKONOS multispectral imagery (1.1m resolution) was used to perform landuse and landcover classification, query, buffering, overlay, point density analysis and spatial interpolation (Inverse Distance Weighted) using ArcGIS 9.2 software. Data shows that 2778 cancer cases were reported to the Obafemi Awolowo University Teaching Hospital from various regions of the country while 535 cases were reported at Ile Ife for the period of ten years. Also, 21 cancer types were reported in the study area with the breast cancer having the highest (13.6%), stomach (9.3%), abdominal (8.7%) while brain cancer having the lowest (1.7%) among others. Six landuse and landcover classes were

determined, light forest (37%), built up area (35%), gallery forest (15%), water bodies (5%), bare soil (5%) and bare rock (3%). Also, several observed environmental factors make people unsafe to cancer. The study identified household with close proximity to communication base station (83%), 67% of the household have refuse dump around their dwellings, households with sawmills around their dwellings 30%. 31.5% of the households interviewed have their major source of water close to dumpsite and 13% of respondents have source of water close to pit latrines. Also, certain behavioral factors observed includes alcohol drinking 56.6%, 52% engaged in smoking habit while 55% involved in bleaching cream usage among others. Chi square analysis was used to test validity of the assertion that refuse dumping and tobacco use induces the occurrences of cancer. However, significant association exists between dumpsite and cancer ( $\chi^2 = 0.132$ ;  $p < 0.05$ ). Also, significant association exists between tobacco use and cancer ( $\chi^2 = 0.220$ ;  $p < 0.05$ ). The study concluded that cancer is a spatio-temporal disease and can be attributed to the effects of carcinogens or infectious agents and recommends that cancer prevention effort should take into cognizance the rate of urbanization and awareness programmes for the citizenry. Key words: cancer; carcinogens; prevention; GIS; Central western Nigeria.

#### **UDC27 - Geo-Spatial Patterns of Primary Health Care Facilities in a Traditional Nigerian City**

*Olawale Oluwafemi (National Space Research and Development Agency), Adekola Olaitan (Standard Mineral Exploration Company, Abuja Nigeria), Nicholas Elugoke (National Centre for Remote Sensing, National Space Research and Development Agency), Kehinde Adebawale (National Space Research and development Agency, Abuja)*

This study situates the distribution of primary health care facilities in a traditional Nigeria city, Oyo town, within the context of geography, accessibility and population of the city. Hence, the study analyses the spatial pattern of primary health care facilities among 14 administrative units in the city. Also, the ownership structure of facilities and the relationship between population and distribution of health care facilities in the city are analysed. The list of primary health care facilities and ownership in Nigeria obtained from the Department of Health Planning and Research, Federal Ministry of Health served as database for the analysis of the spatial patterns of distribution and ownership of primary health care facilities in Oyo city. Also, the National Population Commission census figures provided information on the population of the city. Handheld

Global Positioning System (GPS) was used to determine the locations of 34 existing primary health care centers within the study area. Field observation, questionnaire and IKONOS multispectral imagery (1.1m resolution) acquired from National Centre for Remote Sensing were used to ascertain the road network, built-up areas, location of primary health care facilities, spatial coverage and population as factors of accessibility to primary health care facilities in the study area. Remote Sensing and Geographic Information System analytical operations employed using ArcView 3.3 include proximity analysis (buffering), overlaying and querying. Data show that there exists inequality in the distribution of PHCFs among the various administrative units in the city with Owode having highest distribution of 17.6%, followed by Sabo 14.7% and Apaara with no PHCF. The study identified three categories of PHCFs in the study area- Comprehensive Health Centre (38.2%), Health Centre (38.2%) and Basic Health Centre (23.6%). It is observed that the patient-physician ratio is (1:15), population-physician ratio (1:7035), patient-nurse ratio (1:5) and population-nurse ratio (1:2438) for the three categories of PHCFs. Although the government dominates the ownership of health care facilities in the state, but private organizations dominated the ownership in Oyo city with 58.8%, and government 41.2%. The study concludes that primary health care facilities tend to be located closely to the elite population in the city. Also, Comprehensive Health Centre (CHC) which is the highest level of PHC is haphazardly located and does not conform to the population variation and distribution within the city. Hence, appropriate authorities should endeavour to achieve a more equitable distribution of primary health care facilities in the city, taking into consideration geography, accessibility and population so as to engender equity and social justice. Keywords: Geo-spatial, spatial pattern, primary health care facilities, Oyo city, Nigeria.

#### **UDC28 - The impact of inter urban distances on rural economy: A network theory approach**

*Ajith Padmanabhan (Bernstein Center Freiburg)*

The spatial distribution of cities in a region play an important role in shaping up the overall economy of the region. Hitherto, network theory has been utilised to understand the advanced capitalist urban networks. In developing economies with significant dependence on agriculture they can play an important role in the shaping up of the rural economy. In the poster to be presented, the effect of urban spatial distribution on the overall economy is studied from a network theory perspective. A network of cities are built with cities as the nodes.

Parameters like transport, distances, communication facilities are defined by the strength of the connections between the nodes. Simulation of such a system highlights the advantage a widespread urban spatial distribution (smaller cities spread out throughout the region and more in number) compared to a concentrated urban spatial distribution (bigger cities and fewer in number) provides. Specific examples are chosen and the conclusions are verified. The states of Tamil Nadu (widespread spatial distribution) and Maharashtra (concentrated urban distribution), the two most urbanised states in India are analysed with reference to the model. References: Loretta Lees, Rematerializing geography: The 'new' urban geography, Progress in Human Geography February 2002 26: 101 - 112

### **UDC29 - From the origin of the environmental speech to the collapse of the public space: The paradox of the sustainable neoliberal city in Brazil**

*Fernando Pinto Ribeiro (Universidade de São Paulo )*

This article proposes to advance the debate about the territorial implications instituted by the neoliberal ideology in Brazilian cities, in order to establish a link between this ideology and the growing environmental speech linked to the spheres of the State and the market. The intention is to analyze a space that is reproduced according to a logic of development in which the neoliberal State and the market make use of the environmental matter as a business strategy. The objective is to evaluate, in the Brazilian metropolitan context, some indicators that show how the environmental issue articulates with the urban issue from the dispersion of housing enterprises with sustainable character. With eminently historical character, the Brazilian urban pattern implies the selective modernization of the cities, without, however, breaking the social structures that have existed since the colonial era, when the ruling elite consolidated its appropriation of the means of production, the State and the land. Such a deepening implies an increase of poverty and urban environmental degradation, with irregular occupations on the banks of the rivers, lakes and catchments, on the tops of the hills, dunes and other vegetation areas. Also, with regard to the collapse of public policy, which gives space to the enterprisation of the urban management with a focus on competitiveness and on the search for private investments. With regard to the real state / housing sector, the intensification of competitiveness will use the urban problematic itself in order to develop marketing strategies, among them, the environmental one, marked by the dispersal of enterprises considered 'sustainable'. We take as example the

so-called 'Ecovilles', nomenclature used to characterize many private closed projects in Brazil, which adopt technologies with 'green' certificate, or that have a further location from the major urban centers. This is the case of new developments in Curitiba, Porto Alegre, Campo Grande, among others. In Florianópolis, another example is the emergence of the sustainable housing enterprise Cidade Pedra Branca and Sapiens Park, large investments that add environmental concepts together with elements associated with social and economic sustainability. The speech always seems to be the same: its function is to meet current and future environmental demands, through specific engineering mechanisms in order to rationalize the nature resources and improve waste treatment. On the urban side, green areas are designed and areas with mixed zoning are planned, in order to discourage the use of the car through a greater accessibility to urban services. Finally, the elements that have been summarized here intend to stimulate the debate about the urban implications and practices of sustainability in Brazil.

### **UDC30 - Influence of Industrial Area against Congestion in the Bogor highway**

*Dimas Raharjo (University of Indonesia)*

**Abstract** The high price of land, home or the living cost in Jakarta creates an alternative that Bogor city (Suburban) as a place of living for the workers earning their living in Jakarta. This case makes Bogor Highway has a very important role as an access between Bogor and Jakarta. Although there are Jagorawi toll and railways commuter trains connecting the two cities, Bogor Highway remains as the top choice for the people having an interest in the eastern part of Jakarta or those having private vehicles are reluctant to spend extra money for toll charges. Bogor Highway is a primary arterial road becoming one of the locations of traffic congestion in Jakarta. With the road conditions in only about 7 meters per segment, it is not proportional for the volume of the vehicles passing by the highway. The problems presented in this study is how far the industrial area in Bogor highway affects congestion, because the land use along the Bogor highway region is dominated by industry. There are approximately 400 industries scattered along corridor of Bogor highway with spreading pattern diversity. The method used in this study is the method of the observations done during the rush hour at 6:00 to 8:00 AM and at 5:00 to 07:00 PM. The observations were made to obtain data required in this study, such as the volume of passing vehicles, the type of passing vehicles, the points congestion, travel time of vehicles, the average speed of vehicles, road conditions, the number of crossing

people, which will be connected with the existence of regionally industrial linkages, shopping centers, residential and public facilities such as hospitals, bus terminal, schools, place of worship and amusement center which are quite a lot along the Bogor highway. The purpose of this study is to analyze how far the industrial area contributes to the congestion on the Bogor highway. Therefore, the action planning program can be structured to handle the existing problems of congestion on the Bogor highway. Keywords: industrial area, congestion, landuse, suburban.

### **UDC31 - Urban networks and the medium-sized cities in the Brazilian Amazon**

*Douglas Sathler (UFVJM)*

In the past decades, the Amazonian urban networks have been developing with the emergence of middle size cities and the multiplication of new towns and small urban agglomerations along the main regional roads and rivers. Even though there is an urban hierarchy that seems to be similar to those of other country's regions, with regional and local centers clearly established, the various urban hierarchic levels have different demographic, spatial and socioeconomic dynamics. Within this context, the debates on the legal Amazon's intermediate cities? role and meaning become more significant, in light of the theme's relevancy in the urban and public policies study field. Thus, the present study dialogues with the conceptual issues concerning the sprouting of medium cities in the Amazon, considering the different existing types: the cities of rubber, of the great mining company, of the (un)organized gold mining, the agro-industrial activities and those of the colonization processes.

### **UDC32 - Facing the 'Zwischenstadt' – The transboundary 'Zwischenstadt' Alpine Rhine Valley and its challenges for a sustainable regional development**

*Julia Scharing (Institut für Geographie), Stefan Obkircher (Institut für Geographie), Janine Fellner (Institut für Geographie), Lukas Weiß (Institut für Geographie)*

The poster abstract submitted for the IGC 2012 Conference in Cologne examines the challenges and opportunities associated with sustainable regional development in the trans-boundary Zwischenstadt Alpine Rhine Valley. Urban sprawl, increasing land use as well as high economic and population growth rates are amongst the processes that characterise the Alpine Rhine Valley. In

total 450.000 people, distributed amongst small or medium sized cities, live in this area. Decades of progressive sprawl have led to a singular continuous settlement ribbon. The Alpine Rhine Valley is the border region between the Principality of Liechtenstein, Switzerland and Austria and therefore features numerous types of boundaries. The region is organized in a polycentric manner, characterised by multiple functional relations. Despite of high volumes of cross-border commuting, a common living environment has not formed yet. As a result of the increased coalescence of spatial structures and growing functional relations, existing boundaries are becoming less defined. New 'spaces' emerge, in which socio-ecological and physical boundaries are not yet, or no longer, defined (Davy 2002). The structures and developments described above correlate with the concept of Zwischenstadt, defined by Thomas Sieverts in 2001. The term Zwischenstadt describes landscaped cities and urbanised landscapes. It is neither city nor landscape; it has elements of both spatial categories. Extrapolating from analyses by Ben Davy (2002), which also associate the Zwischenstadt, with the creation of 'spaces of hope for future development', such spatial phenomena can also be interpreted as 'spaces of possibilities'. Based on this consideration the following hypothesis is suggested: The Zwischenstadt Alpine Rhine Valley has unique qualities that could be harnessed to create 'spaces of possibilities' that promote sustainable regional development. The poster identifies key 'spaces of possibilities' in the Alpine Rhine Valley. Examples include 'spaces of identity', 'spaces of culture', 'spaces of participation' and 'open spaces'. Different 'spaces of possibility' are investigated on the poster, by means of a SWOT-analysis and related to their impacts on sustainable development. All shown examples are preliminary results of the research project 'Alpine Rhine Valley Perspectives', carried out at the Institute of Geography, Innsbruck. Surveys are conducted in a qualitative-participatory setting; methods include think tanks and qualitative interviews. These are supported by net- and mental-mapping, photographic documentation, film interviews and participatory observations. Another focus is placed on statistical analyses of municipal, land-use and demographic data. In the conclusion learning effects extracted from case-studies of other Zwischenstädte are illustrated and an overarching development vision is articulated, based on previously identified 'spaces of possibilities'.

### UDC33 - The impact of urban growth on agricultural households – A GIS-based integration of land use and household survey data from Moshi/Tanzania

*Johannes Schlesinger (University of Freiburg), Axel Drescher (University of Freiburg)*

Today, Africa is the world's least urbanised, but fastest urbanising continent. This urbanisation process to a large extent takes place in medium-sized cities. These cities are highly dynamic and often characterised by manifold transformation processes. One of them is the conversion of areas traditionally shaped by agricultural activities into zones fulfilling urban functions. Yet, agriculture in these areas of transformation contributes to the overall food security of cities in Africa. Furthermore the ongoing transformation processes shape the socio-economic situation of urban and periurban farmers and play an important role in the spatial development and planning efforts in cities. The so-called 'periurban' becomes more important as cities grow and as these areas become the battlefields of conflicting interests. This case study concentrates on the changes of the importance of urban and periurban agriculture along the rural-urban continuum in medium-sized Moshi, a municipality of about 180.000 inhabitants located on the foothills of Mt. Kilimanjaro, Tanzania. With an innovative GIS-based transect approach, changes along the rural-urban continuum can be analysed and visualised. A twofold approach was applied to get a comprehensive data set on the importance of agriculture for the livelihoods of Moshi's inhabitants on the one hand and about the spatial and temporal changes of land use patterns along the rural-urban continuum on the other hand. Therefore four transects from the city centre to the periurban areas of Moshi have been identified, each eight kilometres long and a hundred meters wide. Within those transect polygons, a Geographical Information System (GIS) was applied to sample about 400 households that were interviewed with a standardised questionnaire to assess the importance of agricultural activities for the individual households. Secondly, the land use patterns within these transect were mapped based on high-resolution satellite imagery and in situ methods. The land use data was imported into a GIS and a database was set up containing information on land cover, crop production systems and size of plots. The GIS then was supplemented with the geocoded household data generated through the household survey. Other information such as census data and results of the interpretation of satellite image time series were also incorporated into the GIS. Several spatial indexes could be developed for every respective scale unit. These integrated spatial indexes cover aspects of agricultural

activities such as land use intensity, involvement of households in agricultural production and its economic importance for the households. Spatial and temporal changes along the rural-urban continuum can be identified and appropriate measures addressed. This method helps understand the transformation processes that come along with spatial growth of medium-sized cities and can therefore support future policy options.

### UDC34 - Coping with a changing supply of services of general interest: Long-term strategies of the population in two aging regions in Germany

*Alexandra Tautz (Johann Heinrich von Thünen Institute)*

In Europe, the debate about the demographic divide between growing metropolises and shrinking rural peripheries, combined with a deepening of social disparities across the continent, is ongoing. In declining and ageing regions one major topic discussed is the question of how to ensure services of general interest (SGIs) in future. Due to constraints within the municipal budgets the situation often worsens and SGIs in rural areas are reduced or shut down completely. At the same time the provision of SGIs has changed. Many mobile and internet-based offers extended their range. That is why the assumption that the quality of life in peripheral rural areas is generally declining needs an empirical verification. In Germany, the debate so far focused on shrinking cities and regions in Eastern Germany but the issue has now reached Western Germany as well. The two rural areas with the oldest population compared to the national average include the regions Osterode am Harz and Lüchow-Dannenberg. Here aging is the result of different selective in- and out-migration processes of the past four decades. Both regions are also characterised by a long-term population decline and were chosen because of their different settlement structure. The latter is essential for the organisation of SGIs. The research project to be presented is in its initial stage and is designed as a doctoral thesis at the Institute of Rural Studies of the Johann Heinrich von Thünen Institute (vTI). It aims to investigate coping strategies and capacities of different population groups with respect to the thinning out of SGIs. The issues to be addressed within the project, through comparative case studies, include: What kinds of strategies are pursued by different population groups over the course of their lifetime to cope with a changing supply of SGIs? What kinds of coping capacities can be activated to compensate perceived deficits? The focus of the investigation are senior citizens, especially young elderly people (50 years and older). By applying different methods (a standardized questionnaire survey

and in-depth biographical interviews with senior citizens) it is planned to pay particular attention to coping capacities and strategies in the life course, as this is an under-researched issue in the debate so far. Previous research projects have not addressed the longer-term developments of coping and adaptation of the rural population. Though, one can assume that in rural areas the examination of facilities and services of general interest takes place constantly during the course of life and is a vital part of living in such places. This knowledge, a typology of coping strategies and capacities, is necessary for both the scientific community and regional planners to steer and provide user-specific SGIs. Finally, the project wants to put the debate of 'deserted villages' into perspective.

**UDC35 - The puzzle of measuring the urbanization process: Coincidences and divergences between various sources of spatial information (test on Andalusia)**

*Miguel García Martín (Universidad de Sevilla), Arsenio Villar-Lama (Universidad de Sevilla)*

The various maps on land use raised in the last decades have drawn and measured the process of urbanization. However, depending of the source of information there are notable differences in the localization and quantification of this phenomenon. The choice of one or other methodological parameters -data source, scale, capture, interpretation of the urban land?- explains these contrasts. This work aims to quantify these differences by comparing four different sources: the Corine Land Cover (CLC), the land use map and land cover types of Andalusia (MUCVA) and data gathered in authors' doctoral theses. In contrast with the media, that usually publishes questionable indicators about the urbanization process, this research underlines the caution in expressing the dimension of a complex phenomenon with fuzzy boundaries. **KEYWORDS:** urban-altered land, process of urbanization, Corine Land Cover, Map of uses and land covers of Andalusia, Geographic Information Systems, Andalusia.

**UDC36 - A Study on the Rules of Rural-urban Migration during China's economic transitional period**

*Guoxia Wang (Shanxi University)*

**Abstract:** Since China's Reform and Opening-up there have been great changes and some rules are demonstrated in the rural-urban migration in China in the

aspects of migration demographic characteristics, migration approach, spatial pattern and so on. Chinese scholars have been paying more attention to case studies of migration due to more availability to migration data since 1980's and making considerable accomplishments, but little progress has been made on migration theories. By doing a tentative work, the author concludes three migration laws by extending and integrating the present research results. 1. The migration motivation and the spatial pattern of migration follow the Economy-incentive Rule. The economic factor acts as the main driving factor of rural-urban labor force migration. The migration destination is adjacent to the migration departure. The spatial pattern of inter-provincial migration demonstrates a polarization trend. 2. The demographical features and the migration behavior demonstrate the Human Capital Differentiation Rule. Most migrants are elites in rural areas. The migration distance varies according to the migration's population: first an inverse increase and then an accelerative increase. Migrants with high human capital value tend to migrate to the urban areas with their family members. The new generations of urban migrant workers more desire to integrate into the city than their peasants. 3. The migration patterns and the employment selection follow the Social Relationship Rule. The chain migration is the most common migration pattern and their access to employment information still relies upon their social networks. In the future, a large-scale rural-urban migration will continue with the economic incentive still being one of the important factors affecting the population migration. Since urban areas centering metropolitans will continue to promote China's economic development and play an significant role in the process of urbanization, the places such as the cities in eastern China and the large and medium cities will continue to be ideal destinations for migration workers. But with the implementation of China's policies on regional balanced development and other related efforts, the trend of large-scale inter-regional migration will be on decline and rural labor force will move to central and western regions or smaller cities (towns). Although the new generation of farmers have a strong will to live in cities, China's present institutional arrangement can not realize their dream at once so the migrant workers will continue to move between urban and rural areas. But the population who choose to live in the cities is predicted to rise. **Key words:** rural-urban migration, migration rules, China



### UDC37 - Concept and Prototype of Map of Land Use Neighborhoods. Case Study of Warsaw Metropolitan Area (Poland).

*Piotr Werner (University of Warsaw)*

Land use is defined as spatial distribution of forms of land cover patches, utilized or not by man within framework of the spatial and mutual relationships. The term refers to the functional character of given terrain and is identified also with the socioeconomic description of the surface. The observed dependency of land use and neighboring land cover patches is pointed out in many publications from geography or spatial economy; i.e. the economic utilization of observed lot (or patch) has the smaller consequence for future than the existing land use in its neighborhood. Either the situation, existing neighborhood or predominant land use types in given, whole region are the factors stimulating of further land use changes of the observed lot (Hagoort, 2006). The majority of land use models come from geography. The research field of land use changes is interdisciplinary and forces the application of integrated tools based on simulations; GIS software obviously has become the tool of simulations and geovisualizations of the models' results. The aim of the concept is to verify the hypothesis stating that existing spatial pattern and the range of area with different classes of land use show defined tendencies for further spatial development according to the geographical model (Hagoort, 2006, after Tobler 1979). The application of the neighborhood indicator in analysis of land use changes is the idea of combination of the method of map algebra and two-dimensional cellular automata. The neighborhood indicator is reversible and calculated as the result of the expression of the ordered, numbered, nominal classes in the surrounding. The analysis is based on the one-to-one relation between the each unique configuration of neighborhood land use classes and the calculated Neighborhood Coefficient (NBC, Werner, 2009, 2011). Thus the intermediate map of neighborhoods can be obtained. It is possible to make the spatial comparisons of the new intermediate map of the NBCs and the map of land use classes. And what is more and gives the interesting results - it is also possible to analyze the successions of neighborhoods. Bibliography: Hagort, M J. 2006. The Neighborhood Rules. Land use interactions, urban dynamics & cellular automata. Utrecht : Netherlands Geographical Studies, 2006. Werner, P. 2009. Application of Cellular Automata and Map Algebra in Studies of Land Use Changes. The Neighborhood Coefficients Method. Geoinformatica Polonica. 2009, vol. 9, pp. 7-20. Werner, P., Kozubek E., 2011, Visualization of land use changes in Poland based on neighborhood analysis (1990-2006), Proceedings

of XXVth International Cartographic Conference (ICC), Paris, France, 3-8 July 2011, ICA".

### UDC38 - A spatial autocorrelation analysis of the residents' living distribution by groups in Beijing based on their social characteristics

*Jianhui Yu (Chinese Academy of Sciences), Wenzhong Zhang (Chinese Academy of Sciences), Dai Wang (Chinese Academy of Sciences)*

On the background of continued expansion and population growth of Beijing, the distribution of people's spatial living is becoming more and more important and gets increased emphasis by researchers. Based on the large-scale survey from 2005 to 2009, this study used the method of ecological factor analysis and spatial autocorrelation analysis to give the spatial living distribution of different groups of residents in eight districts and the suburbs of five representative regions including a total of 134 communities. Using the ways of Principal Component Analysis and Cluster Analysis, the thesis tries to identify all the residents' characteristics into two main integrated factors, which are the level of potential for the future and the level of existing standard of living. Then the paper divides all the residents into five groups with those factors, i. e., the groups of low-potential and poor-status persons (type I), high-potential and poor-status persons (type II), high-potential and medium-status persons (type III), medium-potential and medium-status persons (type IV) and high-potential and excellent-status persons (type V). By using spatial autocorrelation analysis, the paper reveals that the groups of types II, IV and V people have the most significant living aggregation from the view of global spatial autocorrelation. From the view of local spatial autocorrelation, the article finds that the groups of types I and II people obviously cluster to the eastern and northeastern parts of the city. The group of type I has the largest proportion in the communities of Heizhuanghu, Tongzhou and Dougezhuang. The group of type II is concentrated in a fan-shaped region with Dongzhimen Street as the center. Most people of type IV live in the inner city. The groups of types V and III people are scattered, and settled mostly in Tiantongyuan and Sijiqing.

### UDC39 - Seasonal variations, urban-rural differences and major determinants of respiratory health symptoms among urban poor in Dhaka

*Md. Mobarak Hossain Khan (Bielefeld University), Arina Zanzdana (Bielefeld University), Alexander Krämer (Bielefeld University), Alexander Krämer (Bielefeld University)*

Introduction Diseases of respiratory tract, as classified by World Health Organization, range from acute respiratory infections to chronic conditions such as asthma and chronic obstructive pulmonary disease. Chronic respiratory diseases cause up to four million deaths annually. Several major risk factors are related to chronic respiratory diseases: tobacco smoke, urban air pollution (indoor and outdoor), allergen and occupational agents. People living in highly urbanized areas are highly exposed to multiple risk factors for respiratory diseases. In low-income countries there is scarcity of data about respiratory diseases. The primary aim of this study is to assess the prevalence and the incidence of self-reported respiratory symptoms (RS) among the residents of urban slum areas and villages of Dhaka. The secondary aim is to identify their major risk factors. Methods A total of 3,207 families were systematically selected from 12 slums in Dhaka and 3 rural villages for data collection. Four surveys were periodically conducted in March (baseline), June (1st follow-up), September (2nd follow-up) and December (3rd follow-up). Self-reported RS (including cough, asthma and breathing difficulties) built the outcome variable. Logistic regression and Cox regression analysis were performed at the individual level ( $n=1938$ , 2009) and at the household level ( $n=3207$ , 2008-2009), respectively. Results RS within 3 months before the baseline interview were reported by 14.1% of adult respondents ( $n=1938$ ). Family occurrence of RS ranged from 33.9% to 49.6%. RS among adult respondents were strongly associated with a history of fever. Stagnant water around living areas positively correlated with the higher frequency of RS (OR=1.35; 95% CI 1.01-1.79). Drinking water from a pipe inside the house was associated with less chance to report RS as compared to drinking water from a pipe outside the house (OR 0.71; 95% CI 0.55-0.90). Younger average age and urban area were positively associated with family occurrence of RS. Discussion Occurrence of RS was higher among urban slum dwellers and peaked in the period from September to November. Younger families and families with higher number of women were more affected by RS as well as families with more than a half members smoking. Adverse housing conditions such as an unhygienic type of toilet, stagnant water and unsystematic garbage disposal correlated with RS in the individual-level

analysis. A positive association was found between the biomass fuel (wood) and RS. Further examining of RS in a prospective manner with emphasis on diagnosis and concurrent symptoms as well as an assessment of the corresponding health services use can broaden the picture of respiratory disease burden among population of urban slum areas in tropical countries.

### UDC40 - Study on the Relationship between Land Cover and Land Surface Temperature Based on Landsat TM Remote Sensing Data: A Case Study In Hefei, China

*liangsong zha (Anhui Normal University)*

Study On The Relationship between Land Cover And Land Surface Temperature Based on Landsat TM Remote Sensing Data:A Case Study In Hefei,China (College of Territorial Resources and Tourism,Anhui Normal University,Wuhu 241003, China) ·Liangsong Zha; Shan Jiang Abstract: In this paper, taking advantages of remote sensing and geographic information systems (GIS) technology, the land cover types were classified in Hefei city using maximum likelihood method, and the land surface temperature (LST) was retrieved using Landsat TM data, then normalized difference vegetation index (NDVI), modified normalized difference water index (MNDWI), normalized difference built-up index (NDBI) and normalized difference bareness index (NDBal) were calculated .On this basis, the spatial distribution characteristic of Urban Heat Island (UHI) in the study area and the relationship between LST and land cover types and various affecting factors were studied quantitatively. The research results show that the LST in different land cover types were remarkably different. The built-up area and barren land seem to be the major factors responsible for UHI intensification, while the vegetation and the water body play an important role in reducing LST. Regression analysis shows that there exists a significant correlation between LST and the four indices. The research results could be effectively applied for urban residency environment research and the ecological environment process analysis. Key words :Urban heat island(UHI);Land cover·Remote sensing·Land surface temperature(LST);Regression analysis National Soft Science Program of China(2011GXQ4D052);National Natural Science Foundation of China(40771207); National Soft Science Program of Anhui Province(11020503071) \* Corresponding Author: Liangsong ZHA; chaliangs@sina.com; phone 13956157079 e-mail: chaliangs@sina.com.



#### UDC41 - Spatial-temporal change of Jinta oasis in the past 20 years in arid China

*Jie Gong (Lanzhou University), Yuchu Xie, Peng Sun, Heling Wang, Caixia Zhao*

Oasis was a small and medium scale azonal ecological landscape in arid area of China, but it is vital for sustain human survival, activities and development in the arid region. Recently, oasis research had been paid widespread concern and it was one of the most active fields of global change, land degradation and regional sustainable development. Jinta oasis located in Hexi corridor in the northwestern part of arid China, a fragile and typical ecotone of agriculture and animal husbandry in the dry desert zone. Due to the explosion of population, economic pressure and overexploitation of water resources, the ecological environment and sustainable development of Jinta oasis were affected enormously. Therefore, it is great significant to study the spatial-temporal change of oasis and its driving forces. So, this paper aimed to intensive study the characters and disciplinarian of oasis spatial-temporal changes on the township scale, then analysis the driving mechanism for the sustainability of Jinta oasis. Based on remote sensing and geographic information system and Landsat TM of 1990 and 2009, the land covers were divided into two categories as oasis and desert. Oasis included arable land, forestland, grassland, water area and residential area; desert included saline and alkaline land, gobi and other unused land. On the basis of field investigation and recheck of the interpretation, the spatial-temporal changes were analyzed with oasis dynamic index, oasis spatial distribution, change trend and regional differences of oasis. The results showed that: due to the influence of natural factors and human activities, currently, Jinta oasis was in an unbalanced state, oasis scale gradually expanded. The oasis area was increased 188.78 km<sup>2</sup> the expansion rate was 36.93% in the past 20 years. The oasis area change of each town showed with different varying degrees, the spatial distribution of oasis has also undergone a major change. The extent of oasis area changing were Yangjingziwan town > district of Jinta county > Dongba town > Sanhe town > Gucheng town > Zhongdong town > Jinta town > Dazhuangzi town > Xiba town. Oasis area became more intensive, and desert was been more stable relatively, the oasis/desert transition zone was decreasing obviously from 1990 to 2009. Human activities were the major reason cause the change of Jinta oasis in the past 20 years. The economic factors, demographic factors and government policy were the major driving factor of oasis change, and the water resources exploitation was the main limitation of oasis change.



# Postersession

Risks & Conflicts /  
Society & Environment



## Postersession Risks & Conflicts / Society & Environment

*Chair: Helmut Brückner*

### SE01 - Crowdsourcing of fine-scale, geolocated bird records: The need for an open species distribution mapping system

*Abdulkhakim Abdi (Columbia University)*

There are presently a several sources for open access geospatial data that enhance the capability of researchers and conservationists in providing rapid analysis of anthropogenic phenomena and monitoring species dynamics. For example, the 2009 pan-European land cover and use project (GlobCorine) was completed in under nine months, demonstrating that automated production of a general purpose land cover map can be made in a relatively short time. Similarly, several earth observation platforms such as MODIS provide data products in near real time. This not only facilitates timely incorporation of landscape changes in species distribution models but also facilitates delivery of information to decision makers. Finally, there are a handful of high-quality open-access species records databases such as eBird and the Global Biodiversity Informatics Facility (GBIF) that play an instrumental role in the dissemination of biological data to monitor species dynamics. On the other hand, the proliferation of affordable handheld global navigation units (both standalone and embedded in smartphones) has enabled the widespread use of this location technology amongst consumers. At the same time, there is a burgeoning population of amateur ornithologists and birdwatchers in Europe and elsewhere. For example, there are about one and a half million birdwatchers in the UK and about 50-70 million in the US. However, bird records rarely include the geodetic coordinates where a bird species was sighted; instead, the general locale of the sighting usually suffices. In this regard, there is a practical opportunity in taking advantage of global navigation units to attach geodetic location to bird records. This presentation postulates an unambiguous reporting protocol that specifies the inclusion of fine-scale geodetic coordinates of each reported bird sighting to high quality online portals such as eBird. This will facilitate the availability of open-access, geolocated data on species occurrences at a fine scale to the research community and allowing for cost-effective and timely analysis and modeling of species distributions.

### SE02 - Long-term variability of rainfall characteristics in the Philippines for the period 1910-2010

*Ikumi Akasaka (Tokyo Metropolitan University), Wataru Morishima (Nihon University), Hisayuki Kubota (IORGC, JAMSTEC), Jun Matsumoto (Tokyo Metropolitan University), Esperanza O. Cayanan (PAGASA)*

To clarify how rainfall characteristics will change with climate change as the global warming, as the first step, a lot of earlier studies have investigated the past long-term variability in different regions. However, the earlier studies for Southeast Asia covered limited time periods since the late 20th century. This is because the digitized daily rainfall data became available at most stations of Southeast Asia since approximately the 1950s. Meanwhile, historical meteorological observations from the late 19th century to the early 20th century have unexpectedly been found in the paper format in some Southeast Asian countries including the Philippines. Thus, the purpose of this study is to clarify longer-term changes in rainfall characteristics in the Philippines since the 20th century by combining these historical observation record and current station data. The 27 stations with almost same latitude, longitude, and name existed in both the early and late 20th centuries were used. These data have more than 80% of the data of a year. We used rainfall data from May to next April as 1-year because the seasonal march of rainfall in the Philippines characterized by the Asian monsoons, which start in mid-May around the Philippines. First, we calculated annual and seasonal amounts, frequency (more than 0.5mm/day), and intensity of rainfall. Then, to clarify changes in annual and seasonal rainfall amount, frequency and intensity, we classified all daily rainfall data into four groups by the quartile points and the median: the weakest rainfall class is Q1, followed by Q2, Q3 and Q4. Additionally, extremely wet days and heavy rainfall amounts were defined as the 95 percentile of distribution (P95) of annual and seasonal rainy days and amounts, respectively. To find long-term trend of rainfall characteristics, the Mann-Kendall test was applied to their time-series for the late 20th century at the 95% significance level for a two-tailed test. As a result, number of summer (Jun.-Sep.) and winter (Oct.-Jan.) rainy days significantly tended to decrease in the entire Philippines and the northwest part of the Philippines, respectively. Summer rainfall amounts in all groups tended to decrease with a 10-year cycle, especially in the northwest part of the Philippines. On the other hand, large positive anomalies in winter rainfall averaged in the whole area appeared during the early 1970s and from the late 1990s to the early 2000. Additionally, increases in the amplitude of the year-to-year variations were also shown since the 1970s. Winter rainfall amounts in P95 show significant

increasing trend in the northern Philippines since the 1950s. Heavy rainfalls (Q4 and P95) tended to increase with a 10-year cycle especially in east coastal region since the late 1990s. It was found that the long-term variability of rainfall characteristics showed different trends between summer and winter. Additionally, regions with remarkable trend also differ by each season.

### **SE03 - Stabilization of Rural Settlements Focusing on Location Models (case study in Kalat- Iran)**

*Farahnaz Akbar oghli (Payam Noor University)*

In the present paper, considering the environmental- ecological and human factors, the procedure of stabilization of rural settlements of Kalat has been studied with focusing on location models and service distribution. The objective of the present study is the connection of the regional rural settlement network to the general network of the country, the regulation of inappropriate and incoherent network of rural settlements and finally the attraction, establishment and stabilization of the under-study rural population by proper location and determination of stable areas. For achieving this, two holistic methods for studying the socio-economical subjects of the community and the superficial recognition were used for studying the environmental-ecological structure. GIS was applied for providing and analyzing data. During this process, firstly, the establishment of settlements with regard to the determination of stable areas from the viewpoints of environmental-ecological factors and human factors as well as access to different kinds of services and infrastructural facilities was studied. Then, merging the plans obtained by Bolin logic and Fuzzy logic, the stable regions appropriate for establishing rural settlements were identified. The studies showed that the instability of rural settlements of the region is due to environmental- ecological limitations which have caused socio-economical instability and functional irregularity of settlements. The location allocation model was used for regulating functional hierarchy of settlements on the basis of which the under-study community was suggested to be divided into four categories of systems, series, districts, and satellites.

### **SE04 - Tourism associated areas configuration based on hierarchical analysis model (AHP)( case study in Beihagh-Iran)**

*Farahnaz Akbar oghli (Payam Noor University)*

Determining tourism associated areas in rural spots, makes it a better situation for development coherent planning on rural tourism. To determine the tourism

associated areas in Sabzevar's district of Sheshtamad in Beihagh village, the hierarchical analysis model (AHP) and potent GIS software were utilized to produce and analysis of maps. During the process, first we used the Expert Choice software to arrange data and various criteria such as topography, altitudes, territorial function, waterways, geology, and distance from fault and also human criteria like distance from the road and distance from rural spots. Arrangement was accomplished through three stages of forming the hierarchical tree, valuing the criteria and calculation of the options' weight based on the hierarchical analysis model. Then, using ARC GIS software and mathematical overlapping function, configuration was done for Beihagh village to determine the tourism associated areas. The results said that about 8% for residential-recreational centers, 28% for resorts, and 4% for land space are appropriate to allocate out of the whole rural settlements which plus two rural settlements of Padar and Kizghan, totally 48% of the villages are potentially appropriate for the natural tourism purposes. According to the accomplished configuration, the other areas of the village as associated areas to service the tourists have got the potentials such as suitable rooms for car parking, power and lighting, health and amenity installation and water-supply. More appropriate access to transportation and other infrastructures can lead to easy access to amenities and services by the tourists due to being close to each other, making variety and specialization of the tourism areas and most importantly, economizing the installations and services, all of which are considered to be the privileges of configuration of tourism attraction areas.

### **SE05 - Geopolitical Aspects in Romania. Case study: The Danube Valley.**

*Madalina-Teodora Andrei (Faculty of Geography), Iuliana Pop (Faculty of International Business and Economics, Academy of Economic Studies), Petronela-Sonia Nedea (Christian University), Cezar Gherasim (Spiru Haret University), Dan Eremia (Spiru Haret University)*

The existence, the evolution of the peoples and the development of the nations are closely related to the waters, especially the large rivers, and the awareness of the importance of the position related to the waters contributes to the consolidation of the economic, political, cultural, geopolitical and geostrategic power. The Danube, because it crosses the European continent from west to east, has an important geostrategic position, and the connections through the Black Sea to the Orient and the planetary ocean offers a geopolitical importance, which can be observed over time. The Danube is organically connected to the

territory of Romania and its geostrategic interest is in full concordance with the geostrategic position of Romania. From a geostrategic and geopolitical point of view, Romania represents a bridge between the Occidental Europe, on the one hand, and Eastern Europe and the Orient on the other hand. The Danube represents Europe's largest navigable route, especially after the building of the important transcontinental navigational connection (which links the North Sea to the Black Sea). Due to the fact that the Danube is the navigable river, this becomes an important trading route. Due to its physical, geographical and economic features, the Danube may be considered an energy route. Nowadays, the Danube represents an important cultural route, being the link between the German, Slavic, Romance and Oriental cultures. The Danube can integrate these cultures in the great European culture and can consolidate the relationship between the other cultures on the other continents, especially the Asian one. The Danubian culture itself has a cosmopolite feature with global values.

#### **SE06 - Water resources in Montevideo before Rio + 20 conference after 11 years of local Agenda 21**

*Carlos Anido (Faculty of Engineering University of the Republic)*

It was stated at the 2005 IGC Congress that water resources in Montevideo, Uruguay, were affected by decades of rural, urban, harbor, and coastal activities. The city depends entirely of external basins for water. When drought arrives, there is not enough groundwater for rural purposes. The area is statically linked to El Niño phenomena. In last decades annual rain increased about 20%. Climate change would also affect this coast. The city has environmental problems created by waste, scattered and abandoned facilities, logistic, roads and suburban expansion, but with the same population. There were infrastructural and functioning improvements since 1990. An agenda 21 was installed in 2000. There were new local political subdivisions in 2010 (8 councils) and new national use-of-soil laws, but less actual rural area protection. A first submarine emissary pours sewage in the sea and a second is to be build. The first has leakages detected in 2003 without actual fixing plan. Poster's goal is to expose the state of water since 2005, thinking of next year earth summit, and situation of local agenda 21 with 3 editions (2000, 2002, 2008). The analysis of state is made from watersheds studies, monitoring by participatory commissions, reports on industry sewage, courses and beaches. Some results are: formal improvements in natural areas but scarce investments, more urban pressure. Metropolitan water demand has summer peaks of 650.000 m3/day and waste disposal reaches 684.000 ton/year. The rural area diminishes with

real estate speculation seeking soil change of use, generating less food production. Environmental laws and controls are weak, partly because promoted exporting for cash. No solutions have been yet build up for transboundary basins east and west. There is still polluting discharge in some beaches. Lately there are intense storms with more local floods. Sewage will be increasingly poured into the river, with new drainage works covering lower density areas. The city has an important footprint, including less water quality, probably making future city services costs unsustainable. Some conclusions are that city grows impacting drainage. Garbage still goes to water bodies. Some basins are better with plans, others has less rural area substituted by suburban areas. After improvements with civil works and management, a limit seems to be reached in state of basins. Water quality is poorer in summer. Quality plans obtained improved beaches. The expanding city shows a rising footprint with no plans for climate adaptation. Quality improvements were mitigated by more waste and discharges from anthropic activities, making future city services costs unsustainable. Problems appear with changes in new administration (2010), which stopped Agenda 21 and annual environmental reports, raising interrogations on future commitment with social participatory monitoring.

#### **SE07 - GIS technologies for assessing the ecological state and managing Armenia's farmlands**

*Shushanik Asmaryan (Center for Ecological-Noosphere Studies NAS RA), Armen Saghatelyan (Center for Ecological-Noosphere Studies NAS RA), Vahagn Mouradyan, Meline Amirkhanyan (Center for Ecological-Noosphere Studies NAS RA), Lilit Minasyan (Center for Ecological-Noosphere Studies NAS RA)*

The territory of the Republic of Armenia (RA) occupies an area 29.8 sq. km, the major part of which - 2077 hectares - falls on farmlands located at a height 400-3200m a.s.l. Such a variation in altitude complicates development of territories especially in the case they have an extensive character stemmed from the Soviet era: land plough-up on sites lying at a very steep angle of decline - >200, unregulated grazing and so on. A long-term, unplanned and unregulated use of farmlands entailed intense washout of upper soil horizon, which subsequently provoked intense development of erosion and degradation of lands. A practicable solution to this problem is a scientifically and methodically grounded assessment of ecological state of farmlands and economically 'competent' planning and management of agricultural resources. The GIS and Remote Sensing (RS) Department of the Center for Ecological-Noosphere Studies NAS RA has developed a scientific and methodical approach to the assessment of

ecological state with application of GIS and RS technologies, which underlay investigations on the assessment of the state of pastures in the RA. The approach implies availability and a wide use of diverse source information (aerial and satellite images of medium and high spatial resolution, large-scale topographic maps 1:25000 and different derivative thematic layers: landscape, climatic etc.), which treatment, collation and analysis is implemented using GIS softwares. The complex assessment helped obtained an exhaustive picture of ecological state of pastures of over twenty rural communities located in different administrative regions of Armenia. Presently the Department is building a vigorous GIS infrastructure to treat, store and transfer ecologically valuable information to relevant governmental authorities to underpin decision making and management in the field of agriculture.

#### SE08 - Using a low-cost Mini-UAV for Remote Sensing Imaging

*Andreas Bolten (University of Cologne), Juliane Bendig (University of Cologne), Georg Bareth (University of Cologne)*

The trend to minimize electronic devices also accounts for Unmanned Airborne Vehicles (UAVs) as well as for sensor technologies and imaging devices. Consequently it is not surprising that UAVs are already part of our daily life and the current pace of development will increase civil applications. The problem when designing a Mini-UAV for multi-sensor imaging is the limitation of payload of up to 1.5 kg and a total weight of the whole system below 5 kg. A Mini-UAV system with these characteristics is HiSystems? MK-Okto ([www.mikrokoetter.de](http://www.mikrokoetter.de)). Total weight including battery without sensors is less than 2.5 kg. Payload of a MK-Okto is approx. 1 kg and maximum speed is around 30 km/h. In our study, the MK-Okto is equipped with a handheld low-weight NEC's F30IS thermal imaging system. The F30IS which was developed for veterinary applications, covers 8 to 13 m, weighs only 300 g, and is covering the temperature range between -20°C and 100°C. From a flying height of 100 m, the camera's image covers an area of approx. 50 by 40 m. Additionally, the MK-Okto is equipped with Tetracam's MiniMCA. The MiniMCA is a four band multispectral imaging system in the 1000 nm domain. Total weight is 700 g and spectral characteristics can be modified by filters between 400 and 1000 nm. In this study, we used three bands with a width of 10 nm (green: 550 nm, red: 680 nm, NIR1: 800 nm) and one band is 20 nm wide (NIR2: 950 nm). First results of a combined thermal- and multispectral MK-Okto campaign in 2011 are presented and evaluated for a sugarbeet field experiment for pathogens and drought stress.

#### SE09 - Contemporary environmental changes of Jaszczce and Jamne stream valleys in the Gorce Mountains (Western Carpathians) in relation to land use and soil properties

*Anna Bucala (Institute of Geography Polish Academy of Sciences), Anna Budek (Institute of Geography Polish Academy of Sciences)*

Study area, Jaszczce (11,4 km<sup>2</sup>) and Jamne (8,9 km<sup>2</sup>) catchments are situated in the Gorce Mountains. The catchments are characteristic of streams in the Gorce Mts. In the upper part of streams channels (Jaszczce and Jamne stream) mainly erosion processes occur. These left-bank tributaries of the Ochotnica river have V-shaped, deeply incised valleys (up to 300 m) and narrow channels with numerous rock steps. The inclination above 18° have more than 61% of slopes. The lower parts of slopes are even steeper. The catchment of the Jaszczce stream is a narrow valley with very steep slopes exposed mainly to south and north-east. The higher parts of valley slopes are covered by forests, meadows and pastures. In the lower parts there dominate arable lands. The Jamne valley is wider. Its slopes are not so steep and they are exposed to the south. They are mainly deforested and arable lands here extend up to 1100 m a.s.l. In this region Brown soil (Dystrochrept) occur. That soils developed on loam and sandy or silty loam. The thickness of soil profiles increased in lower part of slope from 1.0 m to 1.6 m. In the upper part of slope catenas increased pieces of rocks in soil profiles. As well shallow and full of rocky pieces soil profiles occurs below the edges of agricultural terrace (Bucala 2010). The aim of the work is to present the contemporary changes of Jaszczce and Jamne stream valleys in relation to land use and soil properties. In this field, the first significant cause in the intensity of geomorphological and soil processes were adverse relief of Jaszczce and Jamne catchments, especially the large inclination of slopes. The second cause, physical and chemical properties was changed by shifting of land use, especially by cessation of tillage. In the upper parts of slopes increase of the forest and grassland areas and in proportion decrease of arable land. Land use changes between 1954 and 2004 years are an effect of socioeconomic transformations, especially after the 1989 year. They lead to decreasing of the arable land area by about 80%, and parallel increasing of forest areas and reduce excessive soil erosion on the slopes. It shall focus predominantly on land use changes during different time units (based on varied cartographic data: topographical maps, air photos and satellite pictures), and a field survey, which includes also their influence on the type and intensity of denudation and soil processes. The project is funded by the National Science Center (NN 306 659 940).



### SE10 - Poaching by traps in Sardinia: Old and new implications from a geo-historical perspective

*Isabella Capurso (Bicocca University of Milan)*

This paper examines whether poaching by traps in South Sardinia, which is continued common practice, still plays a role in defining a local economy and a cultural landscape. The aim of this analysis is to identify the main geo-historical connections that link current activities with their past meanings. In doing so, the 'geographie de la long durée' paradigm will be a suitable tool to look at the topic. To understand what 'poaching' exactly means in present Sardinia, it is necessary to understand what these practices had meant before official Acts declared them illegal. In fact, today's society starts to understand that trapping is an unacceptable way of hunting as it does not target a specific species. As a result, animals with an irreplaceable naturalistic value fall prey to traps. To conquer this issue, western institutions prohibit traps by a comprehensive normative system, involving International Acts, EU directives, as well as national and regional laws, reflecting the latest insights gained in biodiversity field studies. Subsequently, there is a better transparency of the legal situation in regards to cynegetic practices. Still, there is much more involved to fully understand this phenomenon. First of all, it is inevitable to learn who the poacher was in the different epochs to understand why and how these practices are still present in Sardinia, while they have almost entirely disappeared in the rest of Italy. The trapping in that geographic area has undergone changes in the course of time, which backgrounds are of social and cultural nature, rather than minority, localistic or independence supporting. Hence, the illegal activity of hunting by traps is rooted in the island through a significant system of social relations, an intricate structure of production and an expert connection with the local environment. Quantitative and qualitative data collected from recent investigations show how poaching by trapping birds still causes significant damage to the biodiversity, due to the high number of unintentionally killed animals including protected species. Moreover, this paper examines the socio-cultural and geo-historical mechanisms that make the phenomenon so persistent. The article indicates four main factors contributing to maintaining this practice: environmental, economical, cultural and political aspects.

### SE11 - Atacama's Sand Sea Geosite, Copiapó, Chile

*Consuelo Castro (Universidad Católica de Chile), Carlos Pattillo (Percepción Remota y SIG), Alvaro Zuñiga (Instituto de Geografía)*

Atacama's Sand Sea is a special component of Atacama's geoheritage, notable for its natural, scientific and educational value due to its geomorphologic and scenic features. The main objectives of this research (Fondecyt 1100400) is to highlight its originality as a start point for its protection and sustainable use, as part of the Atacama's Region geoheritage. These continental dunes belong to a geomorphological inherited feature and they constitute a noticeable scenic landscape near Copiapó (27° S). Also, dunes shelter the natural phenomena of blooming desert that takes place during El Niño Southern Oscillation. A geomorphological and vegetational data base was established using satellite images, aerial photography and field work. The Atacama continental dunes are found to the northwest of Copiapó, between 300 and 1600 meters of altitude, covering an area of 335 square kilometers. Dune's morphology and position are affected by the topography of valleys and surrounding hills; responding to complex wind pattern and dynamics. The types of dunes found in Atacama have been mapped and classified. Different dunes succession responds to evolutionary pulses that resulted in the formation of Atacama's sand sea. A cartography of the vegetation distribution and the blooming desert was made. The endemic vegetal species more commonly found is *Tillandsia Landbeckii*; its presence is explained by the coastal fog. The blooming desert consists in the flowering of more than 200 species during the spring season. Winter rains, reaching over 15 mm, activate this occasional event. The blooming desert takes place between 100 and 700 meters above sea level, on the surface of eolian planes and semi-stabilized dunes. The human uses of the sand sea are the extreme sport activities of Atacama Raid and Rally Dakar. Also iron and copper mining is developed in the subsoil of the coastal mountain range, where dunes are located. The geomorphological and vegetation cartography, will be useful in zoning the sand sea according to its potential and weakness to support human activities. This research also provides the scientific information that allows the recognition of the sand sea as a geosite and contributes to the land use planning for the development of the Atacama Region. Acknowledging the dunes as UNESCO geosite will contribute to raise its valuation as a part of Chilean geoheritage.

## SE12 - Between Subsistence and Subsidies: Food Security in the Indian Himalaya

*Juliane Dame (Heidelberg University)*

Issues of food security and its particularities in high mountain regions are often neglected in science and policy agendas. However, high altitude populations are affected by poverty, seasonal food shortages and low dietary diversity. Especially the phenomenon of 'hidden hunger' is considered to be characteristic in these regions. Mountain food systems have undergone significant transitions over the past two decades. Changes of environmental and socio-economic conditions have substantial impact on livelihood strategies of small-scale farmers. Whereas subsistence-oriented agriculture still forms the economic mainstay, current dynamics include livelihood diversification with new income opportunities and development programmes by government and non-government actors. Therefore, integrative assessments of complex food systems are needed to provide a basis for sustainable mountain development. Against the background of an empirical case study from Ladakh, Indian Himalayas, the research illustrates different dimensions and determinants of food security in high mountains. In the study region, malnutrition resulting from seasonality and low dietary diversity is prevalent. Following an actor-oriented and multi-methodological approach (quantitative and qualitative interviews, land-use analyses) the study shows how food security is shaped by the interplay of local choices and external interventions. Farmers combine subsistence agriculture with off-farm activities (e.g. in the army, in tourism), try to access new market options (e.g. cash crops) and use the benefits from development interventions (e.g. food subsidies, horticulture development). However, while some households enhance their well-being, new 'losers' are also created at the local level.

## SE13 - The state farm in Syria: Life and death of an experience based on a socialist model

*Maher Mustapha (Paris 1 Panthéon-Sorbonne), Maher Mustapha (Paris 1 Panthéon-Sorbonne)*

Key words: Syria, Agricultural policy, State farms, irrigation, big projects  
Abstract: In Syria, Agrarian Reform occurred in the 60's was mainly redistributive, but some state farms were put in place. Their creation wasn't only ideological and some of them lied within big hydraulic projects in order to train peasants and improve soil quality. Their organizational structure was very

hierarchal and the whole life of wage earners was taken into care in fully equipped apartments. The state farms are liquidated since 2000 and their lands are distributed by plots of 2 to 8 ha to different types of beneficiaries (former landholders before the state farm, former employees during the state farm, etc.). These land tenure changes aimed to encourage the development of a new middle class of peasants independent but subjected to an indicative production plan. What are the differences between these two models of production? What were the results of the state farms? What are the advantages and the inconveniences of the new agrarian structures put in place currently? The poster aims to answer these questions in placing the state farms within the context of the agrarian structures of Syria and within the history of the collectivization of the agricultural structures in the world. Then we will present the advantages and the inconveniences of the two models of agricultural production discussed in this poster. At last, we will take the example of one of the biggest state farm in Syria: the Al-Asad Establishment.

## SE14 - Place Names as Ethnic Indicators

*Stephan Fuchs (FAU Erlangen-Nuremberg)*

This poster discusses the quality and value of place names as indicators for ethnic settlement and cultural impact based on my work on German toponyms in the American Midwest. This includes a critical understanding of naming as a form of power and meaning. Place names represent important socio-cultural expressions that can signal the status, character, and intentions of eponyms and allow delineating areas of geographical concentration and absence when integrated into modern cartographic applications such as GIS. The study of place names also entails certain limitations in terms of scale, timing, and definition. The example of German place names in the Midwest yields concrete insights into the challenges and rewards of toponymic research. The compiled data include a variety of name types and origins such as places of religious or ethnically mixed background. Processed within a GIS environment, the resulting maps indicate local clusters and broader concentrations as well as zones of sporadic German presence on the regional scale which have been crosschecked using census data and secondary sources. Place names thus represent a valuable implement to approximate the extent, intensity, and character of ethnic distributions but require careful consideration of the respective group, scale, and timeframe. In addition, name changes and demographic shifts have to be considered. A full assessment and understanding

of the identified patterns - their local backgrounds and forms - however entail additional detailed studies of each area and locale.

### **SE15 - Regionalizing Aquatic Ecosystems Based on the River Subbasin Taxonomy Concept and Spatial Clustering Techniques**

*Junfeng Gao (Chinese Academy of Sciences), Yongnian Gao (Chinese Academy of Sciences), Guishan Yang (Chinese Academy of Sciences), Jiongfeng Chen (Chinese Academy of Sciences)*

Aquatic ecoregions were increasingly used as spatial units for aquatic ecosystem management at the watershed scale. In this paper, the principle of including land area, comprehensiveness and dominance, conjugation and hierarchy were selected as regionalizing principles. Elevation and drainage density were selected as the regionalizing indicators for the delineation of level I aquatic ecoregions, and percent of construction land area, percent of cultivated land area, soil type and slope for the level II. Under the support of GIS technology, the spatial distribution maps of the two indicators for level I and the four indicators for level II aquatic ecoregion delineation were generated from the raster data based on the 1,107 subwatersheds. River subbasin taxonomy concept, two-step spatial clustering analysis approach and manual-assisted method were used to regionalize aquatic ecosystems in the TaihuLake watershed. Then the TaihuLake watershed was divided into two level I aquatic ecoregions, including Ecoregion I1 and Ecoregion I2, and five level II aquatic subcoregions, including Subcoregion II11, Subcoregion II12, Subcoregion II21, Subcoregion II22 and Subcoregion II23. Moreover, the characteristics of the two level I aquatic ecoregions and five level II aquatic subcoregions in the Taihu Lake watershed were summarized, showing that there were significant differences in topography, socio-economic development, water quality and aquatic ecology, etc. The results of quantitative comparison of aquatic life also indicated that the dominant species of fish, benthic density, biomass, dominant species, Shannon-Wiener diversity index, Margalef species richness index, Pielou evenness index and ecological dominance showed great spatial variability between the two level I aquatic ecoregions and five level II aquatic subcoregions. It reflected the spatial heterogeneities and the uneven natures of aquatic ecosystems in the TaihuLake watershed.

### **SE16 - Pangasius at risk. Governance in farming and processing, and the role of different capital.**

*Sven Genschick (Center for Development Research (ZEF))*

The environmental impact of Vietnamese Pangasius production (*Pangasianodon hypophthalmus* and *Pangasianodon bocourti*) has been recently discussed as failing to comply with standards of sustainability, caused ostensibly by deficiencies in governance, which are driven by internal and external state mechanisms. The topics of Pangasius production and its sustainability have been approached by various scholars, who have questioned the reliability of discussions on sustainability in European retail industries as a means of protectionism (Bush and Duijf 2011). A bottom-up research approach will be applied to first of all elaborate on the perspectives of Vietnamese (potential) users on top-down governance mechanisms, and then secondly to identify further how institutions of governance on different scales are missing. This method will help to draw a more holistic picture and thus create a better understanding of controversies surrounding the sustainability of Pangasius production. The paper is based on a literature review on governance mechanisms in the Vietnamese Pangasius sector, as well as empirical research, in particular semi-structured interviews conducted at Pangasius farming and processing sites in Can Tho City, Vietnam. Using Bourdieu's theoretical approach of the theory of practice, the actions of actors in Pangasius sector are analysed and understood based on a combination of economic, social and cultural capital. The research thus draws attention to an already existing focus on economic aspects in the Vietnamese Pangasius sector, but goes further by showing that especially social capital and local institutions constitute important variables concerning the implementation and observance of governance mechanisms. These mechanisms can both compensate and create economic constraints and need to be considered in order to achieve sustainability in the Vietnamese Pangasius sector.

### **SE17 - Examining Bio-environmental Factors, Economic Consequences of Hamoun Lake (Iran)**

*Ali Ghasemi (Pars Arian Ravad Co.)*

Hamoun is the largest Iranian freshwater lake, located in the eastern part of Iran which plays an important role for livelihood of the local people. During last decade, however, due to the reasons including low rainfall, construction of multiple dams on Hirmand River which is regarded as the main source of feeding

for Hamoun lake, transfer of contaminated water of industrial , mining and domestic factories into the lake , entering agricultural sewages contaminated with chemical composts , throwing cane eater fish called Amour into the lake and as a result destruction of canebrakes , we are observing bio-environmental contaminations along with serious economic damages to agriculture, horticulture, animal husbandry and fishery ( because of drought) which the important ones are as follow : immigration of villagers and Takhtak settlers , extinction of marines and emigrant birds , destruction of farm lands surrounding lake . Keywords:Hamoun Lake, Takhtak settlers, Hirmand, Drought, Ecology, Sistan, Economic Consequences.

#### **SE18 - Holocene clastic and chemical deposition in the playa of Tayma (NW Saudi Arabia)**

*Andreas Ginau (Goethe University Frankfurt a. M.), Max Engel (University of Cologne), Helmut Brückner (University of Cologne)*

Knowledge on playas (continental sabkhat) is scarce and their role as geoarchives for Holocene climate and environmental change is not well understood. The continental sabkha of Tayma, neighbouring the northwestern branch of the An-Nafud sand sea, qualifies as an important study region for the analysis of sabkha sediments and processes and their potential for palaeoclimate relations. Sediments and processes in this sabkha geoarchive reflect the gradual change from relatively humid (c. 10-8 ka BP) to today's hyperarid conditions. The humid period was characterised by the formation of a perennial lake with the occurrence of ostracods and foraminifers adapted to strong salinity fluctuations. Lake contraction and high salinities were responsible for the formation of 'open water' evaporites (aragonite needles) and ooids. Dilution occurred during rain events and flooding; it is characterised by silt-dominated clastic layers that were deposited in thin graded sequences. These processes and further aridisation resulted in the formation of 'capillary' evaporites (e.g. gypsum, halite) accompanied by aeolian and fluvial deposition. The precipitates undergo constant fractionation and re-dissolution, which led to a typical lateral and horizontal distribution of salts: easily soluble salts are concentrated within the centre of the sabkha and proportions of less soluble salts gradually increase towards the outer environs. Thus, the bullseye model seems to be the most appropriate way to describe the evaporite pattern. Even though the formation of 'capillary' evaporites overprints the original stratigraphy, the sabkha of Tayma is still a valuable and regionally important geo-bioarchive for Holocene environmental change.

#### **SE19 - Recent and active deformation patterns along strike-slip faults (Dehshir fault in Central Iran)**

*Abolghasem Goorabi (University of Tehran)*

Satellite data including LANDSAT, SRTM90 m, ASTER, QuickBird and IRS images were used in conjunction with fieldwork observations to find the transition model of landforms along three active strike-slip faults (Nien, Dehshir and Marvast-Harat faults) along the Dehshir strike-slip fault zone in Central Iran since the Holocene. Over all the faults, the offsets of Holocene deposits, the age of which has been determined by correlation to others similar Quaternary deposits that have been dated in Central Iran, were measured. Offset measurements indicate that the right lateral displacement throughout all the faults has ranged between 4 and 55 m since the Holocene (4.0-5.5 mm/yr<sup>-1</sup>). The maximal offset of Holocene landforms belongs to middle portions of faults, which are documented for the Nain, Dehshir and Marvast-Harat faults and are 10-13 m (1.0-1.2 mm/yr<sup>-1</sup>), 55 m (4.5-5.5 mm/yr<sup>-1</sup>) and 30 m (2.5-3 mm/yr<sup>-1</sup>), respectively. The minimal offset measured north of the middle portions (named the last section) of the faults were 4.0- 5 m (0.4- 0.5 mm/yr<sup>-1</sup>), 11.0 m (0.9- 1.1 mm/yr<sup>-1</sup>) and 5.0-6.0 m (0.5-0.6 mm/yr<sup>-1</sup>), respectively. The offsets in the initial portions (south of middle portions) were moderate and measured 5.0- 6 m (0.5-0.6 mm/yr<sup>-1</sup>), 15.0 m (1.3- 1.5 mm/yr<sup>-1</sup>) and 6.0-7.0 m (0.5-0.7 mm/yr<sup>-1</sup>), respectively. Although the offset rates differ along all strike-slip faults, their offset patterns show the similarity between these three faults. Furthermore, every strike-slip fault is progressively subdivided into auxiliary branches less than 90° counterclockwise from the middle portions toward the end of the faults. Based on this investigation, these faults are very active, and paleoseismological investigations are required to recognize and date the events of faults.

#### **SE20 - Holocene climate variability and its potential influence on the cultural and environmental development in West Greece: New evidence from the Etoliko Lagoon based on geochemical proxies**

*Elke Haenssler (Kiel University), Kimon Christanis (University of Patras), Marie Josée Nadeau (Leibniz-Laboratory for Radiometric Dating and Isotope Research), Oliver Nelle (Kiel University), Eleni Zagana (University of Patras), Ingmar Unkel (Kiel University)*

An important characteristic of Greece is the well documented emergence and decline of advanced societies since ancient times. Often, climate variability is considered to have affected civilizations in the Mediterranean. A sediment core

of 8.8 m from the Lagoon of Etoliko, West Greece (38°29'N/21°19'E) is subject of an interdisciplinary approach of combining geoscientific investigations with written sources and archaeological evidence. The sedimentary succession is composed of a basal laminated part overlain by a homogeneous unit followed by clearly, probably annually, laminated sediments. X-ray fluorescence data with a spatial resolution of 1 cm are used to establish a geochemical stratigraphy. Further, thin sections comprising one meter of the annually laminated part are microstratigraphically examined and compared to XRF data in mm-resolution. Additional proxies will be derived from grain size- and CN-analysis. Geochemical evidence will be compared with the documentary evidence. In the study area pottery findings go back to the Neolithic and nearby Archaeological sites provide information about long-term human occupation. A synoptic investigation will evaluate a potential coherence between climate variability on human activity.

### **SE21 - Introduction of Naming Rights at Public Facilities in Japan**

*Teruo Hatakeyama (Nihon University)*

In recent years, lack of funds for managing public facilities due to the fragile economic situation has led local authorities in Japan to start introducing naming rights, a practice that began in the U.S. in 1973 in which the names of facilities are sold to businesses. [Remark 1] Since 2003, when Tokyo Stadium was renamed Ajinomoto Stadium, naming rights have been introduced at 136 public facilities in Japan (till November 2011). While naming rights are advantageous for both parties involved, secure independent revenue sources for local authorities and provide advertising and an improved image for businesses, they also cause a number of problems such as businesses withdrawing from deals due to scandals, names being changed with each new term of contract and the security of consensus from local residents. This study attempts to understand the situation pertaining to the introduction of naming rights at public facilities in Japan and presents issues related to policies for managing public facilities in local areas. In addition, the study examines the regional characteristics of naming rights in Japan by comparing with those in the U.S. and Europe. Similar to the U.S. and Europe, naming rights in Japan have been widely introduced at sports facilities' mainly professional stadiums for sports such as baseball and soccer' however, in recent years, their introduction at cultural facilities has also been observed. A characteristic of naming rights in Japan is that the contracts often have a short term and are for a small amount of money compared with those in the U.S. and Europe. This is because global awareness of Japanese professional sports is low, suggesting that the facilities only receive a modest

degree of exposure. Thus, we can conclude that businesses in Japan primarily aim to make regional contribution, and not advertising. In addition, naming rights in the U.S. and Europe are generally introduced at new or renovated facilities, whereas in Japan, they are introduced at existing facilities. This indicates that names of the facilities that are already named need to be changed, leading to a high risk that this action will not be approved by local residents. Moreover, there are increasingly more cases in which facilities are only given a company or a product name, thus obliterating local and informal names. As demonstrated above, many aspects of the practice of introducing naming rights in Japan differ significantly from those in the U.S. and Europe. It can be said that Japanese-style naming rights, in which businesses aim to make regional contributions, are widespread. However, there are a number of issues related to continuing the implementation of naming rights in Japan, such as a decrease in the number of businesses applying for naming rights and further reductions in contract amounts.

### **SE22 - Reclamation project in each period and its environmental impact – A Case Study of Osaka Bay in Southern Japan**

*Etsuko Hayashi (Nara University)*

This study was aimed at reclamation and landfill in Japan coastal zone. The subjects in this study were analysis of association of blue tide and submarine depression by construction of landfill with their change and feature. Artificial land formation has been developed formerly with of the rise and fall, nature, and so on. In modern scientific technology has evolved to a landfill in the form of offshore artificial island to be created. Along with its development, is going to issue a hotbed of depression and blue tide the sea. A case study of southern Osaka Bay seabed depressions backfill necessary condition for environmental improvement, but not sufficient condition that hardly points out with water pollution problem in the same bay. In conclusion, it is necessary to promote a project that encapsulated the problems of the complexity of the landfill construction project shoreline.

### SE23 - A study on variability of extreme precipitation by basin in South Korea

*Seungho Lee (Konkuk University), Eunhyung Kim (Konkuk University), Inhye Heo (Konkuk University)*

This study aimed to examine changes on extreme precipitation events by being divided into six basins in South Korea. It was analyzed 7 extreme precipitation indices at 60 weather stations in South Korea. Across Korea increasing trends in heavy rainfall were more stable than in heavy rain days. Increasing trends reached the greatest degrees of precipitation trends stability in 50pNoD, 99pT. Increasing trends in extreme precipitation indices-related heavy rainfall dominated in Korea. Han River was the basin with the greatest number of statistically significant trends, mostly increasing ones. The upper region of the Nakdong River and Eastern coast area were also strongly stable in heavy rainfall. But, Geum river and Seomjin river were not. Since the mid-1970s, increasing trends of precipitation from extreme events continued to be stable in Han River and Nakdong River, but since the mid-2000s, there was some regions where variability of extreme precipitation trends dominated. It means that the frequency and intensity of the heavy rainfall become more irregular recently.

### SE24 - Landslide-susceptibility analysis, mapping and validation in the Balacita Piedmont (South-West Romania)

*Oana Ionus (University of Craiova), Mihaela Licurici (University of Craiova), Sandu Boengiu (University of Craiova), Daniel Simulescu (University of Craiova), Emil Marinescu (University of Craiova)*

This work presents the results of applying the GMM to the mapping and validation of landslide-susceptibility analysis in different sectors of the B'I?ci'a Piedmont. The B'I?ci'a Piedmont represents the western subdivision of the Getic Piedmont, being located in south-western Romania. The main objective of the paper concerns the achievement of landslide-susceptibility maps based on the inventory, classification and description of the landslides within the study area. The main stages in the development of the landslide-susceptibility model are: modelling the matrix of the total surface of the study area (TSM), modelling the landslide matrix (LM), modelling the susceptibility matrix (SM) and validation of susceptibility maps. The landslide matrix relies on a previously georeferenced landslide database of the region, in which the slopes are distinguished into two simple classes: with or without landslides. The basic data in the inventory is provided by the source areas related to each landslide, this being appropriate for

detailed scale maps (1:25,000). Information concerning lithology, vegetation, thickness of superficial deposits, maximum precipitation in 24 h, average annual precipitation, geological contact, faults and proximity to flow channel was also used. GMM (GIS matrix method) has been applied to landslide susceptibility analysis, mapping and validation. The starting point was represented by the DEM and, subsequently, based on the lithological data, other determinant factors were analysed and reclassified in a vectorial format: slope angle, slope elevation and slope aspect. After the factors that determine instability were identified for each type of mechanism, susceptibility maps were drawn. In the resulting landslide-susceptibility map a model for the validation is presented (based on the determination and calculation of a set of landslides not). The landslide-susceptibility maps of the B'I?ci'a Piedmont are preventive tools intended to minimize risks in the threatened areas, especially near the settlements that are located on the left slope of the Jiu river and witness the reactivation of old landslides. An important aspect of the present paper consists in the correlation of the perimeters characterised by high susceptibility (the affected area in a given combination of determinant factors extends between 15 and 25%) and very high susceptibility (the corresponding value being above 25%) with the social-economic impact on the affected areas and with the local and national environmental strategies. Keywords: landslide, statistical analysis, GIS matrix method, susceptibility evaluation, landslide susceptibility map

### SE25 - Establishment Process For and Modern Issues Facing National Parks in Japan

*Yukimasa Kato (Nihon University), Mitsuru Sano (Nihon University)*

The purpose of this research is to make clear the process by which Japanese national parks are established, and give consideration to the modern issues that they face in the context of their historical background. It should also become source material that gives consideration to methods for the maintenance and management of these parks in the future. While the current national parks system in Japan was created based upon the American system, the Second World War, recovery period after the war, and the rapid economic growth period has completely changed this system. Once reason that can be stated for this is that many of the national parks overlap with places that had always been tourist attractions, and the development of tourist attractions has met with little resistance, even from local residents. Another reason for the development of tourism within national parks is the selection conditions for national parks that were established in the prewar period. These conditions desired locations those

were appealing as tourist destinations. It can therefore be said that the viewpoint taken by the Japanese national park system already differed from the one originally used in America at the stage of constructing the system itself, or at the stage of selecting candidate locations. Due to these circumstances, there will be an even greater requirement for the establishment of a management system suited to Japanese society in the future. In terms of current issues faced by national parks, one is the fact that awareness of national parks themselves remains low. For example, Mt. Fuji is located inside the Fuji-Hakone-Izu National Park, but very few people are aware of this fact. Also, Mt. Aso and its surrounding caldera are picturesque scenery inside Aso Kuj? National Park, but even the local residents living around Mt. Aso are almost totally unaware of the existence of the national park. It can therefore be said that the awareness of national parks themselves is very low domestically in Japan. The next issue is that the facilities within national parks, starting with the visitor center, are not being effectively used. Just as the low awareness of national parks has already been mentioned, in the same manner, awareness of the facilities within the parks is also low. People do not have a clear understanding of the kind of services that the visitor center offers. It is therefore difficult to increase awareness of national parks and make use of them in education. Taking these circumstances into consideration, it can be said that the immediate duty of the Ministry of the Environment, the body responsible for the management of national parks, is to work with local municipalities and elementary and junior high schools to promote national parks anew, and make effective use of them in a way that includes environmental education.

#### **SE26 - The early neolithic site at Düren-Arnoldsweiler, Lower Rhine area, Germany – Site formation processes as based on field description and micromorphology**

*Martin Kehl (University of Cologne), Peter Fischer (University of Cologne)*

Archaeological excavations at Düren-Arnoldsweiler (2009-2011) recently exposed remnants of an early neolithic settlement including more than 30 post-built houses, a burial ground with about 220 burials, a well and an earthwork. The geological situation at the site is complicated. The archaeological finds partly cut into a sequence of fluvial, solifluctional and reworked aeolian deposits including palaeosol horizons. These Pleistocene sequences are covered by several layers of Holocene soil sediments, which bury most of the archaeological finds. Our objectives are to elucidate site formation processes and to set up a reliable chronological framework of sediment accumulation and soil formation at

Düren-Arnoldsweiler. For this purpose we conducted geomorphological-pedological field work and micromorphological studies, which will be presented here. In addition, first luminescence age estimates using the silt size quartz fraction will be discussed. Under the microscope, all Pleistocene layers show signs of frost as indicated by platy or lenticular microstructures, banded fabric, vertically oriented elongated grains and vesicles. Near the southern end of the earthworks a dark grey paleosol (Humuszone), tentatively correlated with the Early Last Glacial, is found near the land surface at less than 1 m depth. It can be distinguished from the sedimentary fill of the earthwork and pits by its darker colour, thick illuvial clay coatings, and lack of charcoal. The modern soil consists of up to three stacked soil sediments (colluvial deposits) and an in-situ Btg horizon that represents the erosional remnant of the Early to Mid Holocene soil. The first soil sediment from the top (Ss1) is less compacted than the second one (Ss2), while both contain small pieces of charcoal. Thin sections clearly reveal the presence of illuvial clay in Ss2 and some, as based on field evidence tentative, Bt horizons. Most clay coatings in Ss2 have formed in-situ but disrupted ones suggest relocation from a former Bt horizon. The earthwork and ditches are filled with weakly compacted loess-derived sediments and soil materials. Abundant dark clay coatings are present. Most of the coatings are intercalated by thin layers of opaque substances, probably consisting of manganese. Most fillings also contain fine pieces of charcoal. First luminescence age estimates show that the accumulation of the soil sediments started during the Younger to End Neolithic (6.4-4.3 ka). The youngest soil sediment (Ss1), not affected by clay illuviation, was deposited during the late Iron Age. The micromorphological approach gives indispensable information on the sequence of soil forming processes and provides important criteria for distinguishing palaeosols, holocene soil sediments and sedimentary fill of archaeological features. The case study of Düren-Arnoldsweiler underlines the often complex history of sediment deposition and soil formation in the Lower Rhine area.

#### **SE27 - Effects of Suburban Valleys on Urban Air Quality – a Case Study in Climatology and Urban Planning in Past and Present**

*Gunnar Ketzler (Geographisches Institut), Timo Sachsen (RWTH Aachen), Katja Eßer (RWTH Aachen), Marie Dunkert (RWTH Aachen), Christoph Schneider (RWTH Aachen)*

Many cities are situated in complex terrain. Thereby, in urban history, valley plains along the urban-rural fringe were often developed less intense or left as open spaces. Today, these areas on the one hand form ventilation paths which

play a major role in urban mitigation strategies against air pollution and heat stress. On the other hand, such plots often are subject of urban development requests and, thus, elements in public discourses. In the framework of the project ""City 2020+: Engineering life quality for the future - The City under Global Demographic and Climate Challenges"" (Schneider et al., doi:10.5194/asr-6-261-2011), the connections and interrelations between urban summer heat waves, the distribution of airborne pollutants and effects of suburban cold air drainage flows are investigated including their historical and administrative context. Here, in a case study from the city of Aachen, Germany, phases of urban development in a small suburban valley are illustrated and assessed with regard to the correlating climatological conditions. The city of Aachen, Germany, is situated in a shallow basin. The town centre is partly surrounded by small valleys. Their positive bioclimatic and air quality effects on urban climate are well recorded. Especially for the valleys of Kannegießerbach and Ponellbach, numerous results from climatological measurements, extensive historical data and information on development procedures as well as model results are available. Modern urban development in Aachen began with the razing of the medieval city walls during the Napoleonic occupation. The early onset of industrialization, marked by the introduction of steam engines in the city centre in 1817, caused an initial increasing of industrial air pollution. By the end of the 19th century the occurrence of extensive steam engine usage had caused further massively increasing emissions. This fact and in addition to this the extension of the urban area (?Gründerzeit?) resulted in negative effects on ventilation. The combination of these factors had evoked both negative health effects for the local population and public discussions about the decreasing air quality in the city of Aachen with its spa town tradition. In the 20th century, urban development partly left the valley plain and mostly concentrated on higher located positions in the basin. In the last decades, the valley areas which are partly close to the city centre, again were in the focus of urban development. The development of these urban valleys is reconstructed both by historical data and similar information and climatological respectively model data. Especially the effects of building structures and vegetation on cold air drainage flows are investigated by using the model KLAM\_21 of the German Weather Service for the reconstructed historical and the present situation.

## SE28 - Distribution of the Amur River Flow Between the Subchannels in Multi-Channel River Passages

*Vladimir Kim (Russian Academy of Sciences Far Eastern Branch), Alexey Makhinov (Institute for Water and Ecology Problems)*

The Amur River not only has the largest drainage area amongst Pacific rivers but also is situated on the boundary of natural zones. These facts coupled with the impact of natural and anthropogenic factors in the river basin cause instability of water flow, active riverbed processes and specifics of temperature and ice regimes. That is why water and terrestrial ecosystems of the Amur River are highly dynamic and very vulnerable to external impacts (including anthropogenic ones). Intensive economic activities in the Amur Basin in the last 50-60 years sharpened many ecological problems. The ratio of river flow distribution between the Amur channels is extremely unstable within the plains, where the river valley has a vast floodplain and the riverbed is divided into numerous sub-channels. It is well known that rivers near big cities suffer various impacts caused by city water facilities. Different hydrotechnical constructions, river-training measures, channel dredging, extraction of construction materials from the river bottom significantly effect the dynamics of river channel processes. Besides, rivers always suffer anthropogenic loads near big cities. They are caused by a high concentration of population on a relatively small area and hence a large number of industrial and municipal facilities. Amur water regime changes due to operations of big hydropower stations on the major tributaries in its basin significantly affected the river hydrological regime. As the results new sub-channels appear and some old ones expand. Floodplain massifs undergo intensive erosion and accumulative processes. Due to lateral river channel shifts, formation of bars and sides of floodplain islands, meandering of subsidiary channels, accumulation of sediments on channel banks the floodplain relief is very diverse. That is why the redistribution of river flow becomes very complicated. All mentioned factors make urgent the mitigation of negative consequences of undesirable river flow redistribution.

## SE29 - Centrality 2.0 – towards a new understanding of diachronic socio-environmental developments

*Daniel Knitter (Freie Universität Berlin), Arne Ramisch (Alfred Wegener Institute for Polar and Marine Research)*

The spatial and hierarchical organization of cities was first described by Walter Christaller in his central place theory. Since then centrality has been understood



as the excess of importance of a place. When applied to specific case studies the concept of centrality lacks a general transformation of the theoretical considerations into the real world. Nevertheless a better understanding of centrality is necessary, especially by observing a continuous importance of some cities throughout time. Here we present a system theoretical framework using a concept of interaction and frequency to reconstruct and describe the centrality of a region and its determining parameters independent of time. Centrality is redefined as the relative concentration of interaction between individuals or groups. Hence, a central place is the spatial location where interactions are concentrated. As a quantitative measure of centrality, the frequency of individuals is introduced. In a first step the centrality throughout the time, i.e. starting from prehistory until today, is assessed using central functions and their occurrence on different spatial scales. Two exemplary regions of long settlement continuity are chosen to test the model. The first region is situated at the city Aleppo and its environs. Aleppo, as one of the world's oldest cities is able to indicate locational benefits at environmental and cultural frontiers. The other region is the Anatolian west-coast. Based on a comparison of the development of selected cities throughout the time the importance of social and natural parameters is reconstructed. As a result our analysis creates a link between modern geographical research and archaeological interpretation of past circumstances and may lead to a better understanding of the interplay between society and environment throughout the time.

**SE30 - Concept Presentation of the Project “Trail of Change” (TOC). An interdisciplinary Scientific Multi-media Approach on Change and Challenges in the Mountains from Bhutan to Pakistan.**

*Hannes Künkel (University of Göttingen)*

Everybody is talking about Change in the Himalaya Regions but who except the experts can mention more than maybe glacier retreats - One of the key problems not only in High Mountain Geography is the challenge of knowledge transfer and public acceptance of scientific content. In fact there seems to be a deep-rooted boundary between scientific research, results and proposals on the one hand and the local (or global ') actors on the other hand. There is not yet an interest of the broadband-sensitiveness towards change of those groups. Scientists, especially those who are working on development and change in remote regions should have long since noticed the importance of publishing research results to a broad public. Such procedure needs authentic, interdisciplinary, multi-media concepts which should be easily understandable,

but nevertheless by no means over-simplifying or dramatizing. 'Trail of Change' features different scientific research programmes and international researchers along the recently opened and strongly promoted 'Great Himalayan Trail' (GHT) from Bhutan up to the Karakoram. The thematic guideline of the project is the expression of ""Change"" along the GHT, documented and broadcasted live, using social media and satellite technology on several journeys and expeditions between 2013/14 and 2017. The aim of providing ""direct-correspondence"" with affected locals, scientists, NGOs and decision makers is a new trial. Strong Interdisciplinarity of the Content will provide a global perspective. The TOC-project is therefore open for any researchprogramme connected to ""Change"" and the mentioned region. The media coverage of the project will be a combination of A.) intensive social media use, B.) film documentary, C.) speech programmes and print publications. Intense interaction and cooperation with sponsors and partners from the economy is being planned. The presentation will depict the outline and aim of the project, lay open the already existing cooperations and invite colleagues to participate.

**SE31 - Geomedia in education – from Children University to University of the Third Age. A case study from Nicolaus Copernicus University.**

*Mieczysław Kunz (Nicolaus Copernicus University)*

Geomedia with a broad sense has its components and functions which are common parts of content within academic education on many faculties. Chosen contents from the field of geomedia can be found not only at environmental faculties but also at humanistic and science faculties. At present, they are becoming the part of the program realized within so called Children's University or the University of the Third Age. At Nicolaus Copernicus University all level of educations are realized. Apart from typical academic education for students there are also facultative didactic classes for children from kindergartens, primary schools, gymnasiums, and adults. Curricula prepared for these learners often have contents connected with modern geoinformation technologies. For children from kindergartens (3-6 years old) and pupils from primary schools (6-9 years old) topics connected with maps and aerial photographs, visualisations, geolocalisations seem to be very interesting. Third dimension (3D), virtual reality and global positioning system (GPS) within them geocaching field games are very interesting for older pupils from primary schools and students from gymnasiums (9-15 years old). Learners from the University of the Third Age are especially interested in remote sensing, the image of the Earth from space and

virtual journeys around the Earth. The study presents chosen problems, the content of classes, and experience concerning geomedia gained during lessons with children, pupils, and adults in the frame of facultative forms of teaching.

### **SE32 - Sustainability and profitability of rural spaces: New forms of entrepreneurship**

*Faculdade de Letras da Universidade do Porto Universidade do Porto (Universidade do Porto)*

32th International Geographical Congress Cologne, 26-30 August 2012  
Sustainability and profitability of rural spaces: new forms of entrepreneurship  
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Keywords: City-Field , Entrepreneurship, Profitability, Sustainability, Cultural Heritage  
The change recorded in the relationship between the urban and rural, and the current form as they are seen, allows us to make an approach which the central idea can be seen in search of new forms of occupation and profitability of rural areas in complementarity with the bordering urban areas. In this context, which way the cooperation city/countryside can result in entrepreneurship by contributing to the reduction of regional asymmetries? The activities diversification in the rural areas simultaneously with values preservation search, culture and heritage, becomes a strategic choice to be followed by the intervention local entities, involving with actively form the endogenous population, crucial part of the intangible value of places. In Portugal, the tourism in rural areas has been each more important, intervening with surgery in the regions. However, is important to assume a more active and modern rural environment, with the ability to attract creative clusters, countering barriers of the development, creating for their benefit a symbiosis between the surrounding places. In this sense, had start to arise recently, new classes of creative people, enterprisers, who, taking advantage of Portugal natural potential, founded new forms of monetize it, respecting its cultural identity. In this case of analysis, they are from England and from the Netherlands, and looking to the landscape heritage of Portugal, they come up with innovative ideas with a strong connection to the nature; they promote the Glamping, luxury camping, in Mongolian style tents with the particularity of including all city comfort. They settle them in little streamlined rural areas, some of them close to small urban centers. This class of creative people search places which are marked by natural and strong cultural values to their settle, joining the proximity of an urban center, aspect that is crucial for the investments attraction. With the construction of a new connection rural-urban developed in the context of rural spaces, it may consolidate relations of proximity and beneficial synergies

instead of asymmetric relations of the rural community, for beyond to transform the cities into effective bridges between rural areas and the outside world. With this research, it is pretended to give a perspective of the appreciation of the endogenous resources value by promoting the rural space as an integral and fundamental part of a country, as well as to reflect over new strategies to adopt in the near future.

### **SE33 - The Impacts of Urbanization on Changes of Extreme Events of Air Temperature in South Korea**

*Seungho Lee (Konkuk University), Inhye Heo (Konkuk University)*

This study aimed to analyze the changes of extreme temperature indices in order to investigate impacts of urbanization on changes of extreme temperature. It was analyzed 16 indices related to extreme temperature indices to 60 weather stations in South Korea. Extreme temperature indices-related summer mostly increased, and its related to winter decreased. Percentile-based indices were clearly increased more than fixed-based indices as a tropical night. Decreasing trend of extreme temperature indices related to winter had more clear than increasing trend of extreme temperature indices related to summer. It was similar to trend that urban temperature was more clearly increased in winter than summer. Decreasing trend of indices-related daily minimum temperature had more clear than increasing trend of indices-related daily maximum temperature. Also, it was similar to increasing trend of minimum temperature had more clear than maximum temperature.

### **SE34 - Tideland culture of Okinawa Island Awase in Japan**

*Sunae Lee (Miyazaki Municipal University), Akiko Ikeguchi (Yokohama National University)*

A purpose of this study is to clarify a historic geographical characteristic and continuity of the islands area tideland culture from an environmental adaptive viewpoint. The adaptation viewpoint to natural environments is important in understanding regionality of the culture. However, it is hard to say that there are many studies on adaptation to the coast environment that is close to human activities. However, it is hard to say that there are many studies on adaptation to the coast environment that is close to human activities. In Okinawa, the river is small, but the coral reef topography is remarkable, and various topography and biotas are seen there, and, as for them, there are the characteristic to be common to temperate zone area and continent region. The regionality of the

culture is understood by being considered for these continuities and commonalities from the adaptation to natural environment. One important problem of that purpose is examination of the tideland culture. The scale of the tideland of the islands area is small, but has outstanding bioproductivity in the tropical sea area that is oligotrophy. It is important what kind of characteristic of the culture were related with coral reef fishery and the agriculture of the allusion in clarifying regionality of the islands fishery. In addition, the use of marine resources by human is crucial with biodiversity and cultural relations and understanding a cultural uniqueness. Okinawa has image with island of the coral, but in 23 places, tidelands of big things and small things were at the coast of all of the islands. However the landfill construction of the tideland which began in 1980s, is continuing making in scraps in Island of Okinawa. In Awase, Okinawa, an expanse of the existing tideland and algae ground has the largest scales, but a large area is under landfill construction now. I want to clarify a transformation process of the local culture by such an environmental change.

### **SE35 - Spatial-Temporal Distribution and Geographic Context of the Neolithic Cultural Remains in Hanjiang River Basin, Southern Shaanxi, China**

*Feng Li (Nanjing University), Li Wu (Nanjing University), Chaogui Zheng (Chuzhou University), Wei Sun (Chinese Academic Science), Cheng Zhu (Nanjing University)*

The history of human life is actually about ways of inhabiting the world. Understanding how to live successfully within our environment is among the most pressing challenges facing contemporary society. This paper is attempted to probe into the problem on the basis of analysis and discussion on the relationship between the spatial-temporal distribution of the Neolithic Culture Remains and the geographic context in the Hanjiang River Basin in the south of Shaanxi Province, China. Archaeological studies have indentified 175 Neolithic Cultural Remains in the study area with a sequence of Laoguantai, Yangshao and the Late Period of Neolithic Age. The total amount of archaeological remains throughout the Neolithic Ages shown an early ascent and later descent curve and its proportion to the Shaanxi Province declined sharply. While in space they are concentrated in the Tertiary Red Basin formed in Qinling Orogenic Belt with altitude scope of 400~800m on the river terrace or terrace plain of the Hanjiang River as well as their main tributaries. Multiple data integrated clarified the critical effects of tectonic and geomorphologic conditions on the Neolithic remains distribution along with the comparing analysis revealed the correlation of

Holocene climate change and environment evolutions with the Neolithic cultural succession in the study area. Further discussion on the origin and the temporal-spatial distribution corresponding to the regional culture differentiation shed light on the compound and dynamic human-nature interaction system during the Neolithic Age, thus emphasize the wider field investigation and high-resolution reconstruction works of the palaeoclimate and palaeoenvironment in future. This primitive study is also original in the give area where experiencing intensive modern tectonic movement and secondary natural disasters, therefore would be central to the constructive society and regional sustainable development.

### **SE36 - Water Resources Supporting Capacity to Regional Socio-economic Development of China**

*Lijuan Li (Institute of Geographic Sciences and Natural Resources Research, CAS)*

An indicator called Water Supporting Index (WSPI) was built to measure the degree of water scarcity, which considered water resources and water withdrawal of both local and upstream areas. Evaluation model was established to calculate WSPI of 210 sub-basins and also in province scale and county scale. Water resources supporting capacity classes to regional socio-economic development was divided by WSPI. The spatial status of the capacity classes and its relationship with population and Gross Domestic Product were analyzed. Furthermore, the differences in regions suffering water scarcity were discussed. The result of WSPI was very similar to the actual water scarcity situation of China. Therefore, WSPI can be used in water resources management and socio-economic development decision-making.

### **SE37 - Study on landscape classification and ecological restoration strategies of Shangyi county**

*Li Ma (capital normal university)*

This paper discussed the principles and methods of landscape classification on the basis of related theories of integrated physical geography and landscape ecology. Based on the total differences reflected in the alteration and interaction of physical factors (such as climate, geomorphology, soil and vegetation) and human factors (such as land use) in Shangyi county, we take geomorphology and land use type as the key indicators to classify the landscape of this county. There are two interrelated ways of landscape classification: the "top down" division and the "bottom up" subsumption. Combining site of

the two ways is the senior land unit: mestnost (land system) type, along with field verification. In this paper, the landscape classification hierarchical system is composed of two levels. At the first level, the county's landscape is divided into 8 categories, which are further divided into 23 sub-categories at the second level. The 8 landscape categories are: Grazing and farming landscape on the river and lake beaches; Farming, grazing and forest landscape in the low relief terrains; Grazing, farming and forest landscape on the high plateaus; Grazing, forest and farming landscape on mountains on the edge of the high plateaus; Farming, grazing and forest landscape in the river valleys; Grazing, forest and farming landscape on the rocky hills; Grazing and farming landscape on the loess tablelands; Forest, grazing and farming landscape on the lightly eroded, middle sized mountains. Corresponded with the natural conditions and environmental problems of each landscape category, the ecological restoration strategies are proposed under the guidance of landscape planning theories and methods, which may act as reference for the environmental rehabilitation, ecological restoration and protective measures against environmental degradation.

#### **SE38 - Diets at three archaeological sites in Gansu, China around 4 cal ka BP: stable carbon and nitrogen isotope analysis of human and faunal remains**

*Minmin Ma (Lanzhou University), Guanghui Dong (Lanzhou University), Xin Jia (Lanzhou University), Fahu Chen (Lanzhou University)*

Gansu has been a favored region for exchange between eastern and western Eurasia in the past. Archaeological remains from late Neolithic and Bronze Age sites there indicate that prehistoric culture underwent an evidently shift in subsistence at around 4 cal ka BP. That is, rain-fed agriculture wilted rapidly. Subsequently, pastoralism replaced rain-fed agriculture as the dominant mode of subsistence in Gansu and Qinghai Province between 3.6 and 2.0 cal ka BP. Stable isotope analysis of bone collagen provides a means to gain direct information about the importance of certain foods at a site, and when compared with archaeobotanical information, to allow for a better understanding of subsistence practices and the evolution of prehistoric culture in NW China. Our study focuses on three archaeological sites (Hongguxiahaishi site, Buziping site and Yunbushan site) at ca. 4 cal ka BP in Gansu. Dietary patterns at these three sites are investigated by the analysis of stable carbon and nitrogen isotopes in human and faunal bone collagen. The isotopic data indicate human and domestic omnivores (*Sus* and *Canis*) had diets dominated by C4 foods,

probably from the contribution of millets (C4 plants). But two *Sus* samples had a diet dominated by C3 plants and is thus unlikely to have been domesticated animals. Minimally offset  $\delta^{15}\text{N}$  values between herbivore and human suggest low consumption of animal protein by human. The  $\delta^{13}\text{C}$  values of two *Caprinae* samples (averaging  $-13.9 \pm 1.8\text{‰}$ ) from the Hongguxiahaishi site reveal that both C3 and C4 foods were consumed. The diet included high proportions of C4 foods, suggesting that these animals were regularly foddered with millet plants, and that their grazing areas were mostly within the agricultural zone. The relatively wide range in  $\delta^{15}\text{N}$  values amongst bovid samples ( $2.9\text{‰}$  -  $7.6\text{‰}$ ) at Buziping and Yunpushan site reflects grazing occurred in variety of ecological zones. Overall, the stable isotope results presented here show that the people of the Machang and Qijia culture at ca. 4 cal ka BP centered on cultivating millet and keeping livestock.

#### **SE39 - Parametric Approach in Land Suitability Evaluation by using Multi Criteria Method for Selected Crops at Neyshabour Plain, Northeast Iran**

*Ali Bagherzadeh Chaharjuee (Islamic Azad University), Mohammad Reza Mansouri Daneshvar (Islamic Azad University)*

Land evaluation is applicable both in areas where there is strong competition between existing land uses in highly populated zones as well as in zones that are largely undeveloped. At the present study the qualitative land suitability evaluation based on parametric approach of multi criteria method was investigated for selected crops including wheat and maize, based on FAO land evaluation frameworks (1976, 1983, 1985) at Neyshabour plain, northeast Iran. Climatic and land qualities/ characteristics for selected crops were determined using the tables of crop requirements developed by Sys et al., (1993). Based on detailed soil profile studies some sixteen land units were determined at the study area for the evaluation practice. The soil profiles dataset corresponded to these land units by using ArcGIS ver.9.3 for preparing the final land suitability evaluation maps. Our results indicated that the soil characteristics including soil physical properties (s) and soil salinity and alkalinity (a) are the most limiting factors for wheat cultivation, resulted in S2 and S3 classes. In most parts of the study area climate (c) and soil salinity and alkalinity (a) are the main limiting factors affecting maize cultivation which are categorized into classes S3, N1 and N2, respectively. The results of qualitative land suitability evaluation for selected crops indicated the priority of wheat cultivation over maize at the study area.

#### SE40 - Intensity and Range of Forest Use for Charcoal Production in Nenoshiroishi near Sendai, Northeastern Japan

*Takeshi Matsubayashi (Tohoku Fukushi University), Arika Kano, Kiyoshi Saijo (Miyagi University of Education), Nobuto Morishita*

A forest landscape surrounding traditional settlements in Japan has changed. Coppice forest was one of the most popular vegetation in the hills surrounding traditional settlements in Japan. Such Japanese coppice forest is called ""Satoyama"" or ""Zoukibayashi"". It had been used as a source of fertilizer, and had been repeatedly felled in an interval of about 15 to 30 years in order to produce and provide fuel wood and charcoal. As a result, the coppice forest was dominated by various deciduous broad-leaved trees that were coppice regeneration, and had been a peculiar landscape. However, since the fuel revolution in the late 1950s and the early 1960s, the succession has not been stopped by the felling, and the previous vegetation structure has been changing. Moreover, coppice forest was reduced rapidly in the high economic growth that followed the fuel revolution, because large-scale residential development proceeded particularly in the hills surrounding urban areas. To understand the landscape transition, it is important to clarify the intensity and range of forest use surrounding settlements. The use of coppice forest was investigated in Nenoshiroishi in the western part of Sendai City. Fuel wood production was inactive but charcoal production was active in Nenoshiroishi. A charcoal production worker produced 1,500kg of the charcoal in the winter of 2009-2010. The material wood was felled in the 30-year old coppice forest in Nenoshiroishi. The felled area is approximately 800 square meters. The amount of production of charcoal was approximately 3,000,000kg per year in Nenoshiroishi in the 1930s, therefore the felled area is calculated approximately 1.6 square kilometers per year at that time. According to the land use map of 1964 immediately after the fuel revolution, most of the hills surrounding the settlements were covered with broad-leaved forest. Broad-leaved forest surrounding settlements were considered to be coppice forest which the resident had usually access to and used. The area of coppice forest which the resident used usually was estimated approximately 25 square kilometers. If felling coppice forest at 20 years cycles, the necessary coppice forest area is calculated approximately 32 square kilometers for sustainable use. It suggests that the range of forest use was not only a coppice forest but it was also-montane zones. The change of forest use has changed not only the forest landscape on hills but also montane zones.

#### SE41 - A shell midden in the Longotoma dune complex (Central Chile) – geochronological data and palaeoenvironmental context

*Simon Matthias May (University of Cologne), Helmut Brückner (University of Cologne), Alexandra Hilgers (University of Cologne), Dieter Kelletat (University of Duisburg-Essen), Steffen Pötsch (University of Cologne), Gilles Rixhon (University of Cologne), Anja Zander (University of Cologne)*

Shell midden archaeology plays a significant role in the research on the colonisation of the South American continent. While numerous archaeological studies exist from the coasts of Chile and Peru, geoarchaeological investigations concerning the palaeoenvironmental context of these cultures are rare although this may provide important additional information for their interpretation [1]. The Longotoma dune system is situated in the northern part of central Chile, framed by the estuaries of the rivers La Ligua and Petorca. Here, numerous cultural layers occur together with accumulations of mollusk shells, mainly the marine clam *Mesodesma donacium*. These middens are often related to stone fragments. While associated ceramics indicate a post-archaic age for many places, few hunter-gatherer sites of pre-ceramic, mid-archaic age are described as well [2]. For the estuary and dune complex of Longotoma, a succession of fluvial terraces and at least two main dune generations are inferred from satellite images and preliminary field work, the younger of which is characterized by presently migrating barchanoid dunes. Undercut slopes, formed by the La Ligua river, provide insight into the inner stratigraphy of the older dune generation at its eastern margin. This contribution presents first results from an international research project (DFG ref. no.: BR 877/29-1), dealing among others with the palaeoenvironmental context of these archaeological remains. Silty and clayey sediments of a former alluvial terrace were found below the present dune field. Along the steep undercut slopes of the older dune generation, a sequence of palaeosol sediments and an in-situ palaeosol were detected, associated with a shell deposit. Bone fragments of small rodents, charcoal remains and leafs as well as abundant mollusk shells (mainly *Mesodesma donacium*, *Concholepas concholepas*) confirm its anthropogenic origin. <sup>14</sup>C-AMS datings of two shells and a charcoal fragment yielded similar ages of c. 5200 cal BP, giving further evidence for the presence of archaic coastal hunter-gatherer populations at Longotoma. OSL datings provide a first chronological framework for the palaeoenvironmental context by (i) estimating the age of the fluvial terrace below the present dune field and by indicating (ii) different phases of dune activity as well as (iii) an intermediary period of geomorphodynamic stability, at least at the investigated sites. [1] Dillehay, T.D., 2002. Climate and Human Migrations.

Science 298, 764-765. [2] Berdichewsky, B., 1964. Arqueología de la desembocadura del Aconcagua y zonas venas de la costa central de Chile. Congreso Internacional de Arqueología Chilena 3, Viña del Mar, 69-107.

#### **SE42 - Investigations on microfossil distribution in modern aquatic sediments of the southern Tibetan Plateau; Part I: Systematic overview; Part II: Distribution, associations, and environmental factors**

*Juliane Meyer (Institut für Geowissenschaften), Peter Frenzel (Institut für Geowissenschaften), Frank Kienast (Senckenberg-Institut für Quartärpaläontologie), Claudia Wrožyna (Karl-Franzens-Universität Graz)*

The project 'Microfossils as Indicators of Aquatic Ecosystem Evolution and Monsoon Dynamics' tries to reconstruct changes in lake systems on the Tibetan Plateau during the late Quaternary using microfossil associations. Ostracods are the most frequently used microfossils, but there are many other species that could be used as bioindicators respectively proxies in palaeolimnological research. In this study, we analyzed about 50 modern sediment samples from the southern Tibetan Plateau to identify such non-ostracod bioindicators and the driving factors of their distribution. Recent samples have been taken from different water bodies (lakes, ponds, streams, wetlands) from altitudes mainly between 4000 and 5000 m a.s.l. The salinity range covers freshwater to hypersaline waters. Main environmental factors documented and analyzed are habitat type, salinity, water depth and temperature, anthropogenic impact, and water chemistry. Organism remains were collected from the size fraction >200 µm. We identified the taxa, if possible down to the species level, and calculated their abundance. Beside Ostracoda, almost all samples contain Chironomidae and other insect remains, Mollusca (mostly Gastropoda), seeds of Angiospermae, egg capsules (mostly Crustacea), oospores of Charophyta, and ephippia of Cladocera. Chironomids and seeds are highly diverse, but seeds are generally too rare to be used quantitatively. Gastropods and bivalves show a few species, respectively genera only and are therefore of limited use for palaeoenvironmental analysis. Egg capsules, oospores, and ephippia seem to have a great potential as proxies, however, their identification is problematical. We could not identify most of the insect remains to the species or genus level. The occurrences of the identified taxa are compared with chemical and physical parameters of the water bodies to define specific associations using multivariate statistics.

#### **SE43 - Environmental Justice under the conditions of climate change – Case study Berlin**

*Katrin Mörer*

The poster presents an overview of environmental justice and climate change. Within the Berlin pilot study "'Environmental Justice in Berlin'" the socio-spatial distribution of environmental burdens and environmental resources is investigated since 2008. Until now the study was focused on the environmental factors of noise, air quality, open/green spaces and thermal comfort. Climate change is ubiquitous and also affects Berlin. A modified climate suggests a modified thermal comfort. Therefore, this work analyses the environmental justice situation in Berlin under the conditions of climate change. Two times are observed: 2001-2010 and 2046-2055. The evaluation of the thermal comfort for Berlin planning areas, the expected changes due to climate change, the socio-spatial distribution of bioclimatic stress and the increasing stress as well as the impacts for the integrated environmental burdens for an overall assessment of the environmental justice situation in Berlin are central topics of this study. The 447 planning areas are the reference level for the project. The socio-economic situation in the planning areas is represented by the social development index, which is determined in the Berlin Senate Department's annual urban monitoring program. The bioclimatic burden for both time frames is aggregated from the block level to the planning area level. The bioclimatic evaluated block areas are weighted by the area for each planning area. The results are used and visualised cartographically (via ArcGis) and correlated with the social development index and the other environmental variables. Cities are characterised by a special urban climate. A high level of sealing, high building density, few open and green spaces, lack of ventilation paths and a variety of emission sources are the reasons for the effect of urban heat islands. Climate change affects the whole city but due to the mentioned factors some areas are affected stronger than others. Densely populated planning areas, in and around the Berlin environmental zone and also in marginal agglomerations such as Marzahn-Hellersdorf are affected by high to very high bioclimatic stress. These are the areas where the bioclimatic burden presumably mainly increases. Planning areas with a high social development index are predominantly favourable bioclimatic areas and they are located in the peripheral areas of Berlin. Socially disadvantaged planning areas are burdened at least middle up to very high. In these areas the bioclimatic stress will increase. For 2001-2010 and 2046-2055 a clear socio-spatial inequality in thermal comfort is detected. The raising bioclimatic stress in the course of climate change also concentrates on social disadvantaged

planning areas. Altogether the multiple environmental burdens will increase. The additional load is mainly concentrated on planning areas which are already affected by most of the other environmental factors, because they correlate with each other.

#### **SE44 - Global mining of environmentally critical minerals: Pressures on ecosystems and socio-environmental conflicts**

*Diego Murguía (Wuppertal Institute for Climate, Environment and Energy)*

In recent years the global socio-industrial metabolism has been demanding growing amounts of raw materials as essential inputs to support more growth of industrialized and emerging countries like China or India. Massive and new technology-oriented minerals, especially metals like iron, aluminium, copper, indium, rare earths or platinum group metals but also energy-minerals like coal, are key; recent studies have termed some of these minerals as 'critical', mainly from economic and supply-risk perspectives. This research considers this criticality aspect but complements it with an environmental perspective: it seeks to evaluate the environmental pressure of extracting and processing such minerals at a global scale. Thus other minerals whose predominant extraction technology provokes big pressures on the environment (i.e. open pit mining) are also included in the research scope: gold, silver, diamonds. The methodology consists of calculating the direct extraction pressure by measuring the space or land cover consumed by extraction projects (mostly open pit mining ones) for a certain number of environmentally critical minerals through the use of model mines and remote sensing (multi temporal analysis). At the same time, the study assesses the pressure exerted on ecosystems with different sensitivities and characteristics and evaluates conflictive regions where further extraction will very likely originate more socio-environmental conflicts in the years to come. This research is part of a PhD Project carried out as research at the Wuppertal Institute for Climate, Environment and Energy and the results are likely to be of interest to policy-makers, scholars, mining industry-related companies and civil society organizations working for the conservation of Nature and cultural heritage.

#### **SE45 - WebGIS for displaying information from paleoenvironmental literature**

*Takashi Oguchi (Univ. Tokyo), Yasuhisa Kondo (Tokyo Institute of Technology), Yasuhiko Takaya (CSIS, Univ. Tokyo), Mizuki Kawabata (Univ. Tokyo)*

WebGIS (Web-based Geographical Information Systems) provide interactive maps via the Internet. Users can handle the maps using a web browser to change mapping scale as well as the contents and extent of a displayed map. WebGIS can also provide text descriptions for particular locations. We use WebGIS to display information on paleoenvironmental literature published in academic journals. The original version of the WebGIS was constructed in the late 1990s and early 2000s, using ArcView IMS from ESRI for the main engine. It contained information from literature, including the location of areas studied, geomorphological and geological data used for paleoenvironmental reconstruction, target ages and eras, and references such as article titles, author names, journal names, and volume and page numbers. These data were taken from some 6,000 papers in international journals of earth and Quaternary sciences published in the mid-1990s to 2002. The WebGIS permitted the browsing of data using interactive online maps. The collection of data ceased in 2003 when a related research project ended. Recently another project 'Replacement of Neanderthals by Modern Humans' was launched in Japan by a group of archaeologists, anthropologists and geographers. For this project, we first transferred the data in the original WebGIS to a new system with ArcGIS Server from ESRI. Then we added new data from papers published after 2002. Because the project focuses on the Middle East, South Europe and North Africa, we have been collecting data for these areas until now. The new WebGIS will support the project for which the spatial distribution of paleoenvironment and its temporal change are crucial. The system is also open to public and easily accessible using a web browser. It will be used by researchers worldwide to collect basic information about existing paleoenvironmental literature.

#### **SE46 - New insights into the environmental conditions along the eastern trajectory of modern human dispersal to Europe derived from the Lake Prespa sediment record**

*Konstantinos Panagiotopoulos (University of Cologne)*

New insights into the environmental conditions along the eastern trajectory of modern human dispersal to Europe derived from the Lake Prespa sediment record. Panagiotopoulos K.1\*, Aufgebauer A.2, Schäbitz F.1, Wagner B.2 1

Seminar of Geography and Education, University of Cologne, Gronewald Str. 2, D-50931, Cologne, Germany 2 Institute of Geology and Mineralogy, University of Cologne, Zùlpicher Str. 49a, D-50674, Cologne, Germany \* corresponding author (panagiotopoulos.k@uni-koeln.de) Core Co1215 retrieved from Lake Prespa (40°57'50'' N, 20°58'41'' E, 849m asl) was investigated using geophysical, geochemical and pollen analyses. Lake Prespa is situated along the eastern migration pathway of modern humans from Africa to Europe and belongs to a network of selected sites in the Balkans, Anatolia and the Near East where a number of interdisciplinary studies were undertaken within the Collaborative Research Center 806: 'Our Way To Europe; Culture-Environment Interaction and Human Mobility in the Late Quaternary' (www.sfb806.de). This study aims to reconstruct the climate shifts recorded by the Prespa proxies that enabled our ancestors to colonize southeastern Europe during the MIS 3, which followed the harsh climate conditions of the glacial maximum in MIS 4. The age-depth model, based on radiocarbon dating and tephrochronology, indicates continuous sedimentation during the last glacial cycle. According to the pollen record, this mid-altitude site sustained refugial temperate tree populations throughout this period. Pollen concentration and TOC percentages retain relatively low values until the onset of the Holocene when closed forest formations dominated the landscape signaling the establishment of a warmer and moister climate. Distinct fluctuations of arboreal relative percentages coupled with the occurrence of IRD peaks can be tentatively correlated to Heinrich events. Climatic oscillations are sensitively recorded in the Lake Prespa sediments at a sub-millennial scale permitting a detailed reconstruction of the regional palaeoenvironment, as well as correlations with other regional and global climate archives. Keywords: Lake Prespa, Balkans, eastern Mediterranean, pollen analysis, palaeolimnology, modern human dispersal.

#### SE47 - Geoarchaeological research revealed the location of the Carrara marble trading harbour

*Marta Pappalardo (Dipartimento di Scienze della Terra), Alessandro Chelli (University of Parma), Helmut Brückner (University of Cologne), Monica Bini, Sandra Noss, Lucia Gervasini (Soprintendenza per i Beni Archeologici della Liguria), Marcella Mancusi*

The Carrara marble, a white stone type well known all over the world, was already quarried by the Romans. Historians report that it was traded through the harbour system of the city of Luna, located at the foothill of the mountains from which this stone was quarried (Apuan Alps, NW Italy). The ruins of this city

(remnants of public and private buildings, a theater and an amphitheater) are now located in a coastal plain 1.5 km from the sea. No archaeological evidence of the harbour location had ever been found. Recently a geoarchaeological research project was carried out; it provided a refined palaeogeographical reconstruction in the area that enabled to assess the coastline position at Roman Times and its indentations. The location of the marble trading harbour was revealed and remnants of a dock and related structures were highlighted. This work provides an example of how geoarchaeological research can be relevant for the solution of archaeological problems and of how palaeoenvironmental reconstruction can be achieved combining investigation techniques typical of different geographical sub-disciplines.

#### SE48 - Forest Fires in Odisha: Natural Disaster or Poor Management?

*Punyatoya Patra (Department of Geography, Aditi Mahavidyalaya), Rajesh Kumar Abhay*

The tropical highland region of India is very prone to forest fire which is a very natural phenomenon and helps forests to grow healthy. If it is not controlled and goes beyond its limit, then it converts to wildfire, i.e., a huge fire which becomes out of control and causes negative effects on our biological environment and also depletes our forest resources. This study focuses on Odisha state, located towards eastern coast of India covering an area of 1, 55,820 km<sup>2</sup>. Out of the total area of the state, about 28% is covered by forest which is mainly concentrated towards the western part. This part is the home of the tribals who depend largely on forests products for their livelihood. However, most of the forest fires are initiated by local people may be due to their ignorance of its end result or may be due to their short term profit. During last part of February to first part of April, fire incidence occurs. After mid-February, the trees shed their leaves and the forest floor is covered by dried leaves, which is highly susceptible to fire. Fire is the main factor responsible for inadequate regeneration and spoiling of the small saplings. Keeping all these problems in view, this paper comprises three objectives. They are: a) to study the spatial and temporal distribution of forest fires in Odisha; b) to analyse the causes underlying forest fires and their impact on our environment; and c) to suggest measures for their control. The study is based on both primary and secondary data. Secondary data have been collected from Forest survey of India and the State Forest Department. The primary data in sample locations have also been collected in the field by interviewing local villagers and forest department staffs. Both primary



and secondary data have been simulated by using GIS technology. The incidence and intensity of forest fires in different areas have been divided into three different intensity zones, such as, less, moderate and high. The less intense zone is found towards the western part of the Southern highland region. The moderate intense zone is found in the whole Northern highland region. Likewise the high intensity zone is found towards the eastern part of the Southern highland region. The forest fires are man-made and restricted to ground surface. The main reasons behind forest fires are setting of fire by man to collect minor products like mahua, kendu leaves etc., to scare animals for poaching, to bring up new grasses for animals; shifting cultivation; charcoal burning in the forest; carelessness after smoking. The impacts of forest fires are : loss of soil moisture, loss of regeneration, loss of timber value of standing trees as the trees develop defectiveness and hollowness, soil erosion and loss of biodiversity. The forest fires can be controlled by three ways- prevention, detection and douse. Each of these parts supports each other, and together they form a system for controlling forest fires.

#### **SE49 - Distribution of selected CORINE land cover classes in different natural landscape types of Slovakia**

*Robert Pazur (Institute of Geography, SAS), Ján Otáhel (Institute of Geography, SAS), Martin Mareta (ESPRIT, Ltd)*

The aim of this study is to model, evaluate and analyse distribution of selected CORINE land cover classes (11 - urban fabric, 21- arable land, 31- forests and 32 - shrubs and/or herbaceous vegetation associations) in different natural conditions. Three study areas (351 172 ha, 59 924 ha, 50 073 ha) representing stratas in three main natural landscape types in Slovakia (lowlands, basins, and mountains) for the purpose of this analysis were selected. Set of model variables contains binary forms (presence/absence) of each investigated land cover class, information about biophysical conditions (elevation, slope, soil characteristics) and information about proximity of main river sources and towns with important historical background. Other commonly used explanatory variables were considered endogenous and therefore we didn't incorporate them to our LC distribution models. Logistic regression were used to create the primary models. If bias caused by spatial autocorrelation occurs in model residuals, we either introduced a neighborhood variable which characterize proportion of particular CLC in direct neighborhood cells (in raster data format) or we incorporated regression kriging methods. To evaluate the goodness of fit of each probability maps, receive operator characteristics (ROC) statistics and split samples

statistics were used. We found that using logistic regression only neighborhood characteristics could be assume important in all (three) selected landscape and all (four) binary maps. Influence of other evaluated factors significantly differs in all study areas. Explanatory power of selected variables is higher in heterogeneous landscapes. Our findings supported by both statistical methods, highlights the importance of stratification in complex regional land cover or land use models.

#### **SE50 - The Grid-to-Grid hydrological model, a new operational flood forecasting capability at the Flood Forecasting Centre**

*Charlie Pilling (Flood Forecasting Centre/ Met Office)*

C. Pilling, D. Price Flood Forecasting Centre, Exeter, United Kingdom R. J. Moore Centre for Ecology & Hydrology, Wallingford, United Kingdom Marc van Dijk Deltares, Delft, Netherlands The Flood Forecasting Centre (FFC), a partnership between the UK Met Office and the Environment Agency, has recently introduced the distributed hydrological model Grid-to-Grid (G2G) into its operations. The G2G model has been calibrated across England and Wales, operates at a 1 km spatial resolution, and can produce data at a 15 minute temporal spatial resolution. The operational version of G2G was re-run using Numerical Weather Prediction (NWP) data that would have been available at the time of the flood event that affected Cumbria in 2009. Early results in river flow simulation, return periods and warning levels demonstrate that this is an effective approach for generating longer lead-time flood forecasts. Further examples from flood events during 2012 will also be presented. Although much of the attention so far has been on using deterministic NWP to drive G2G, probabilistic output from ensemble NWP as well as time lagging approaches will also be presented. Indeed, further improvements are also anticipated as high resolution ensembles are run in the operational environment at approximately 2 km resolution from Spring 2012. Some early findings will be presented.

#### **SE51 - Future patterns of land use/cover modeled for landslide risk analysis**

*Catrin Promper (Universität Wien), Anne Puissant (Université de Strasbourg), Jean-Philippe Malet (Institut de Physique du Globe de Strasbourg), Thomas Glade (Universität Wien)*

The geomorphic system is incessantly changing with some modifications being irreversible such as landslides. These irreversible processes often pose a

challenge for society like damage to infrastructures, loss of property or in some cases damming of rivers. The factors controlling landslides are either static (such as lithology and soil properties) or dynamic (such as precipitation and landuse). Changing the landuse leads to possible changes in landcover which in turn may lead to a changed pattern of landslide occurrence. This means that when the land cover is changed by anthropogenic interference or due to natural processes, this may, on a longer term, change the geomorphic system regarding possible landslides and their effects. In order to analyse the accompanying spatial and temporal pattern of landslides and thus landslide risk, a method involving different factors regarding global environmental change is proposed. This study represents first results focusing on the land cover aspect and is conducted in a district located in the alpine foreland of Lower Austria named Waidhofen/Ybbs. The landcover model framework CLUE is used to develop possible scenarios. It creates statistical relationships between the observed past land cover and possible driving forces (Verburg et al. 1999). Application of the model for the period 2005 - 2100 indicates that the land cover types prone to landslides shift along the investigation area. According to these first results, one can estimate the future possible spatial location of landslides regarding the landcover factor. In a further step, controlling factors such as lithology and precipitation will be integrated in the analysis for future landslide risk scenario developments. Verburg, P.H., de Koning, G.H.J., Kok, K., Veldkamp, A. & Bouma, J. 1999. A spatial explicit allocation procedure for modelling the pattern of land use change based upon actual land use. *Ecological Modelling* 116 (1): 45-61.

### **SE52 - Valuing abiotic nature: Contributions to landscape ethics**

*Joachim Rathmann (University of Augsburg)*

Geoparks comprise geological sites that are considered worthy of protection. Furthermore, the conservation of geodiversity - geoconservation - takes into account different values, like intrinsic, cultural, aesthetic, economic and scientific ones. But if a Geopark, or in general a landscape has intrinsic value then it doesn't have only instrumental value, but it is valuable in and of itself. There is an intense discussion on whether to assign intrinsic value only to living organisms to collective entities (e.g. landscapes, ecosystems) or even to abiotic nature. Can the landscape of Geoparks have intrinsic value and therefore deserve moral consideration? Can intrinsic value give a reason for geoconservation? It is generally easier to assign values only to human beings; the argumentation is much more sophisticated if collective entities are discussed. Thus holistic

environmental ethics are required to justify intrinsic values of landscapes. It will be shown, that previous debates on environmental ethics should be discussed to some extent more precisely as landscape ethics as landscapes include both living organisms and abiotic nature, as landscapes have specific aesthetic values and, in contrast to nature, have a limited spatial extent. Two approaches might argue convincingly for intrinsic values of landscapes: Firstly, a phenomenological argument based on atmospheres, which emanate from landscapes and affect the beholder. Aesthetically experienced landscapes are perceived as something valuable. Secondly, it can be argued by a teleological concept of nature, the end and therefore an intrinsic value of landscapes. Assuming that landscapes have goals, they should be analyzed in terms of means and ends.

### **SE53 - Impact of deforestation on vegetal arboreal communities & mammals in the Huasteca Potosina lowlands, México**

*Humberto Reyes Hernandez (Universidad Autonoma de San Luis Potosi)*

This paper analyses the impact of deforestation and forest fragmentation on floristic composition as well as the distribution and diversity of large and medium-size mammals in tropical forest remnants of the Huasteca lowlands of San Luis Potosi, Mexico. The paper points out that because of the intense transformation of the region only 66 relicts of arboreal vegetation with surfaces larger than ten hectares still persist; these fragments host 139 floristic species, representing 42 families and 89 genera. On the one hand, as compared with previous inventories, these data show a sharp drop in the number of floristic species, particularly in the subperennial medium tropical forest. On the other hand, the incessant deforestation has severely impacted on the permanence, distribution and local abundance of faunal populations; to date, there survive only nine mammals out of 19 species registered in previous decades.

### **SE54 - Nature protection or natural resources protection: Nature protection dilemmas in Brazil**

*Simone Rezende da Silva (USP)*

Several Environmental Protection Units existing in Brazil and around the world today were created in the territories of traditional peasant populations, triggering an expropriation process of their lands, way of life and culture. Several specialists have been studying this expropriation process because it offers an opportunity to discuss the relations between Nature and society, in addition of revealing conflicts between ways of life. In this paper we seek to show that the

Brazilian field presents a large diversity of landscapes and products as well as cultures, ways of life, and individuals who experience Nature in each region of the country in a particular way. This, far from being a problem, this is an opportunity for the implementation of new ways of Nature protection. The broadest and well-known notion on 'natural resources' refers us to the idea of a Nature used by people, which reveals the necessity to find in Nature the conditions for life maintenance. In a wider interpretation, this implies taking into consideration Nature's material and symbolic aspects. However, not all individuals are the same and the concept of Nature becomes an important tool for comprehending different views existing in societies, because each people relates to Nature in a specific manner. Brazil is a country with multiple features. Therefore, it is fundamental to consider the implications of different situations in order to draw an analytical framework. Thus, one may say that the expression 'traditional communities' refers to rural populations that reproduce their ways of life using natural resources in a low impact manner because they hold ethnoecological knowledge of Nature, depending on its preservation, either practically and symbolically. The predominant interpretation, up until recently, was that every relation between individual and Nature was destructive. This is simplifying and unfair to several cultures that have developed other ways of relating to Nature. In addition, this way of seeing individual and Nature in opposing camps has led to a Nature protection model in which the individual is considered merely a visitor, a temporary appreciator of an isolated Nature, preserved and untouched. According to several investigators (Diegues and Arruda, 2000; Furlan, 2000; Bensusan, 2006), this Nature protection model is in crisis, because it ignores the socio-cultural contexts in which protected areas are implemented, resulting in more obstacles for the protection of Nature. Our research argues that other forms of Nature protection are possible and necessary. Thus, in this article we will briefly discuss such alternatives through an analysis of the experiences of the Extractive Reserves.

#### **SE55 - Assessment of Landscape-Geoecological Systems with the applications of GIS-technology**

*Emma Romanova (Lomonosov Moscow State University), Marina Arshinova (Lomonosov Moscow State University), Ali Alyautdinov (Lomonosov Moscow State University)*

Assessment of Landscape-Geoecological Systems with the application of GIS-technologies E.P. Romanova, A.R. Alyautdinov, M.A. Arshinova Lomonosov Moscow State University, Russia Email: romanova@kmail.ru Landscape-

geoecological studies are being actively developed in Russian landscape science. The basic aim is to investigate the results of interactions between natural, economic and social structures at various spatial and time scales. Such works require the use of modern GIS-technologies for analysis of particular landscape units. A map "Landscape-Geoecological Systems of Europe" at the scale 1:5 Mln has been created at the Lomonosov Moscow State University. The following stages of research have been worked: 1. Elaboration of LGES model. Landscape-geoecological system (LGES) is a natural unit (natural landscape) modified by economic development. LGES is a complex geosystem which develops and functions as a result of interactions between natural, economic, social and management subsystems. 2. Compilation of a series of maps ("Types of Natural Landscapes in Europe", "Economic development systems of Europe"). The maps were compiled at the scale of 1: 5 Mln. Totally there are 613 landscape units on the map Present-Day Landscapes of Europe. The legend shows a complex hierarchy of these natural-territorial units. 3. Elaboration of GIS "LGES of Europe". A specialized geographical information system (GIS) has been elaborated in order to organize storage and processing of this vast data array. The GIS includes the following sections: a) Cartographic, i.e. computer versions of maps; b) Thematic database - data array of 48000 parameters on nature components, systems of economic development and ecosystem services; c) Conceptual design; d) Results of GIS-technologies realization: systematization and classification of LGES. 4. Investigation of natural-anthropogenic processes in landscapes. These are the processes stimulated by economic activities and they could be of two types: positive (constructive) or negative (destructive). 5. Calculation of these factors for quality assessment of LGES. The GIS was used to compile maps of particular natural-anthropogenic processes (erosion, acidification, pollution etc.) and to create maps of LGES for the territory of Europe and particular European regions. Key words: landscapes, geoecology, assessment.

#### **SE56 - Forest landscape and its dynamics in relation to forest use for fuel production**

*Kiyoshi Saijo (Miyagi University of Education), Marie Kubota (University of Bonn), Kohel Hoshi, Takeshi Matsubayashi (Tohoku Fukushi University)*

Forest use for fuel production (firewood and charcoal) had rapidly ceased in Japan after the late 1950's when common fuel drastically changed from firewood or charcoal to fossil fuels. As a result, secondary forest near traditional villages became free from human impact and ecological succession has

progressed during the past half century. Some evidence, such as abandoned charcoal producing kilns and coppice forests which suggest the widespread and intensive forest use in the past, remain in the secondary forest even in the present. Nonetheless, processes of landscape formation due to forest use for fuel production are inactive except for limited cases in Japan. In Germany, on the other hand, forest use for fuel and other purposes has come to life again recently. The observation of a small forest area near Lohmar, a town in the Rhein-Sieg district, in North Rhine-Westphalia, suggests that the forest landscape has been drastically changed in past several years because of forest use and ecological succession. Moor (Heide in German) appears after timber felling of artificial conifer forest, and it changes into broadleaf forest by succession or plantation. As a result, artificial conifer forest planted mainly in last part of the 19th century or early in the 20th century for economic purposes is remarkably decreasing. Alternately, broadleaf forest spreads year by year. Moor seems to be a transitional landscape between both types of forest. National policy about forest management and fuel supply resulted in such dynamic change of forest landscape.

#### **SE57 - Environmental quality indicators in Alfenas city, Minas Gerais State, Brazil**

*Clibson Santos (Universidade Federal de Alfenas-MG), Ana Luiza Marcelo Antunes dos Santos*

This contribution presents a proposal of the environmental quality indicators in Alfenas city, Minas Gerais, Brazil. Alfenas is an medium-size city, but presents problems of the large-size cities, as extreme growth demographic, social exclusion, environmental degradation and the natural resources. The proposal of indicators that reflect environmental quality, assist in the indication of policies that minimize problems resulting from the occupation of unsuitable areas. Considering the complex system of interactions in urban area and the environmental dynamic that involve human and natural systems, we used a methodology based on representing these interactions by means of indicators of Pressure, State and Response (P-S-R). Therefore, we used the proposed developed within the ELANEM Euro-Latin American project and the OECD Environmental Indicators. This study proposed indicators quantitative and qualitative of the environmental quality in Alfenas. In study area were defined seven environmental units, results of the integration of data geomorphologic, land cover/use and the census sectors. For each unit were defined nine indicators of the P-S-R; (P) demographic density, solid waste collection and the

wastewater collection network; (S) slope, drainage density, impervious surface, land exposed/vegetation, household income; (R) priorities defined in the public budget and the guidelines of municipal master plan, both indicators are related to improvements in environmental quality. These three dimensions represent the humans-environmental interactions. The Pressure represent the human activities exert pressures on the environment. Environmental conditions, or State refers to the environmental conditions of the area. Finally, the social Response to environmental changes, such as preventive or corrective actions. As a result of the integration of indicators can confirm the socioeconomic segregation in the city of Alfenas. The suburbs with little basic infrastructure are occupied by low-income. However, high-income community occupies neighbourhoods with better infrastructure. This behavior was also observed in environmental conditions. In poor communities, environmental degradation is more pronounced. These disparities highlight the need for more specific policies, they can expose and diagnose the main problems of each unit, but also be able to plan actions integrated preservation of the environment and improve social/sanitation conditions of the communities. The methodology used was efficient, because it allowed us to analyze the environmental/social problems in an integrated and indicate the priority units. This analysis assists in defining guidelines for land use planning and establishes standards more efficient for sustainable development. In addition, the use of data of the census and master plan city can be an alternative for regions that have few basic studies. This work was supported by FAPEMIG (Foundation for Research Support of Minas Gerais).

#### **SE58 - Coastal evolution of the Bay of Elaia, the port city of ancient Pergamum (NW Turkey)**

*Martin Seeliger (University of Cologne), Melanie Bartz (University of Cologne), Helmut Brückner (University of Cologne)*

As part of the excavation realized by the German Archaeological Institute (DAI) in Bergama/Pergamum, the University of Cologne started palaeogeographic and ge archaeological research in the Bergama region in 2008. The primary aim of these studies was to reconstruct the landscape history, based on sedimentological methods. Our project focused on the area of the former port of Pergamum near the ancient city of Elaia. We tried to study (i) the history of the Hellenistic harbour basin from its beginning to the total siltation, and (ii) the sea-level changes during the late Holocene. Some remarkable findings resulted from the investigation in the Bay of Elaia. The siltation of the central harbour and the surrounding area could be clarified. By sedimentological criteria, the literary

evidence which dates the construction of the central harbour pier in the Hellenistic period could be verified. Siltation was the reason why since 340-532 cal AD the central harbour has not been used any more. The siltation of the surrounding area reached a similar level during this period. Furthermore, we were able to create the first pollen chart for the area by analyzing sediment cores from the central harbour basin. It covers the period of about 800 BC to 600 AD, reflecting the strong human impact on the ecosystem during Hellenistic and Roman times. As for the sea-level changes during the late Holocene, in particular during the Hellenistic period, two drilling-transects helped to identify the maximum marine transgression around 1600 BC (1733-1534 cal BC) in the western transect and around 2000 BC (2129-1927 cal BC) in the northern one. In both transects, it is followed by a remarkable seaward shift in the shoreline. This 'regression' was one reason for the evolution of a wetland in the western part of the bay. In addition to these outcomes, we were able to decipher the use of some well preserved wall structures in the western part of the embayment, lying just 0.5-1 m below the present sea level. For a long time it was uncertain, when and for which purpose these wall structures had been built. Due to drillings very close to the western pier of the central harbour which reached the basal layers of the pier, it was possible to investigate the material, strong enough to sustain the heavy and robust boulders of the pier. As for the wall structures, our investigations brought to light that they had no substruction. Therefore, their interpretation as a pier, a mole or an offshore breakwater could be falsified. According to radiocarbon age estimates, the wall structures date to the Late Roman period (3rd - 4th century AD). In comparison with similar structures from other periods and places around the Mediterranean we finally came to the conclusion that the use as salt works is the most likely one. In order to refine the chronostratigraphy, the sediments on which the wall structures are based were OSL dated (Optically Stimulated Luminescence).

#### **SE59 - Decline of birch woodland in Þjórsárdalur Iceland from 1587 to 1938**

*Guðrún Gísladóttir (University of Iceland), Fridthor Sofus Sigurmundsson (University of Iceland)*

F. S. Sigurmundsson and G. Gísladóttir Department of Geography and Tourism, Faculty of Life- and Environmental Sciences, University of Iceland, Askja, 101 Reykjavik, Iceland H. Óskarsson. The Hekluskgar project, Gunnarsholt, 851 Hella, Iceland Land-cover changes in Iceland have been immense over the last millennium, which has resulted in birch (*Betula pubescens*) woodland depletion,

severely reduced vegetation coverage and inevitably extensive soil erosion. Changes in birch woodland cover in Iceland are well documented over the last decades, but few studies have focused on its spatial distribution change over centuries. Therefore the main objectives of this study were (1) to map the changes of birch woodland cover in Þjórsárdalur (14,000 ha) in southern Iceland over 350 years, from 1587-1938, and (2) to understand the impact of socio-economic and natural forces on the woodland over three periods: 1587-1708, 1708-1880 and 1880-1938. For this purpose we used a combined approach of historical reconstruction from diverse written archives, GIS-techniques and field work. The historical data included socio-economic and environmental descriptions, such as location of birch woodlands and shrub cover and conditions, demography and agriculture, woodland ownership and restriction on the use of woodlands, climate descriptions including extreme events such as cold spells and extreme northern storms, and tephra layers from volcanic eruptions. The historical data and GIS were used to reconstruct maps showing birch woodland cover; field work was conducted to verify location of place-names used for birch woodland in historical archives, to map present distribution of the woodland, birch tree remnants, and old charcoal pits. About half of the Þjórsárdalur valley was covered by birch woodland in the late 16th century but over a period of 350 years 94% of the woodland had been depleted; its cover changed from 6,200 ha in 1587 to 390 ha in 1938. The woodland was intensively used for firewood, leaf-fodder and charcoal making. Grazing pressure was limited, but winter grazing had negative effects on ecosystems that were already damaged by deforestation. The main driving force for this development was socio-economic, particularly ownership and management but in combination with climate, volcanism and extreme events which further exacerbated the woodland decline.

#### **SE60 - Women, Environment and Sustainable Development: A Case of Garhwal Himalaya**

*Suman Singh (Banaras Hindu University)*

Women in Himalayan region always play a significant role in managing and operating most of the household and agricultural activities. Except to plough, harvesting, threshing and some time grazing livestock, which is symbol of male domination rest all other activities in agriculture and animal husbandry are in the exclusive domain of women, and thus their contribution in total work input of agriculture and animal husbandry is more than 85 percent. Beside this they toil through the day, starting with the family works, nurturing children, going out for

fodder, fuel, drinking water and Non timber forest produce collection for sustaining livelihoods. They are maintaining the traditional practice of agriculture by their rich indigenous knowledge system and also retaining the essential linkages between the forest, livestock and agriculture systems. They play a significant role in natural resource management, on which the livelihood and the very survival of hilly families/communities depend, and are an enormous source of traditional knowledge related to daily life and use of bio-resources around them. Undoubtedly they have a very important role in the subsistence economy, but this is considered only secondary to the role of the men. Women's are economically, socially and emotionally dependent on the male or head of their family. However, in recent years, environmental degradation, poor resource management, and increased migration of men to plains, have deteriorated livelihood options and added more work-load on women in the Himalayan region. The nexus between women, environment degradation and poverty is still poorly understood and rarely treated in an integrated way. Therefore, the objective of the present paper is to analyze the work participation of women operating at different sub-systems, impact of environmental degradation and role of women in sustaining the traditional agro-ecosystem in Gadmolga Gad Watershed of Garhwal Himalaya.

#### **SE61 - City2020+ – The City under Global Demographic and Climate Challenges: an interdisciplinary assessment of impacts, needs, and strategies**

*Agata Siuda (RWTH Aachen University), Marten Brunk (RWTH Aachen), Wolfgang Dott (RWTH Aachen), Heather Hofmeister (Goethe-Universität), Carmella Pfaffenbach (RWTH Aachen), Christine Roll (RWTH Aachen), Christoph Schneider (RWTH Aachen), Klaus Selle (RWTH Aachen), Mareike Buttstädt (RWTH Aachen), Katja Eßer (RWTH Aachen), Sarah Ginski (RWTH Aachen), Julia Hahmann (RWTH Aachen), Antje Kröpelin (RWTH Aachen), Hendrik Merbitz (RWTH Aachen University), Sabrina Michael (RWTH Aachen), Timo Sachsen (RWTH Aachen)*

The impacts of demographic and climatic change - especially an aging population and enhanced thermal stress - are likely to transform living and working arrangements and will overburden European cities. How to adapt is a crucial question that can only be answered within an interdisciplinary approach. This paper shows results of the interdisciplinary research project City2020+. It identifies the ways microclimates in the city, health outcomes, social structure and the urban environment are related. The City of Aachen serves therefor as a

case study. Within the project the risks individuals face living and working in these conditions are assessed and new strategies are proposed based on cooperation from the fields of Medicine, Natural Science, Demography, Sociology, History, Civil Engineering and Architecture for adapting the city for future needs. City2020+ aims to generate scenarios, recommend options for urban planning measures and apply tools for planning and developing sustainable future city structures. Addressing these future challenges Aachen's social structure and the health status of its citizens is researched. A questionnaire has been developed to analyse the living and working situation, the social relationships and the heat adaptation strategies of Aachen's population aged 50 years and older. Furthermore meteorological data and future atmospheric weather patterns have been analysed. Findings approve a significant temperature increase until the end of the century that will result in prolonged dry periods and enhanced thermal stress situations during summer. Concentrating on the diminution of thermal stress situations, cold air drainage flows are identified and the amount and thickness of cold air determined. A connective study investigates the present spatial distribution of particulate matter (PM) concentrations. In addition the particulate and gaseous pollutants are toxicologically characterised in a human/in-vitro cell culture system. Influenced by outdoor temperatures and PM concentration, the indoor climate is of great importance. Building simulations are carried out with altered parameters in order to complement existing guidelines for energy-saving construction methods with planning adds for an enhanced thermal comfort in summer. To react on the described changes the interests of local actors in their different fields of operation are estimated and their problem perception and willingness of implementation of new strategies is analysed. In order to comprehend the historical handling of inhabitants, governance and urban planners with environmental conditions and climate change, archival documents allow conclusions of the perception of air and water pollution in former times. Combining these different aspects 'hot spots' within the urban area of Aachen are identified: Quarters where the thermal load, air pollution, poor ventilation, problematic building's structure and vulnerable population concentrate.

#### **SE62 - Developing Workforce Competencies for Social and Environmental Careers: The Role of Graduate Education**

*Michael Solem (Association of American Geographers)*

This poster will report findings from three interrelated studies: 1) What disciplinary and generic competences define the knowledge, skills, perspectives

and abilities expected of professional geographers? 2) How and to what extent are postgraduate academic programs in geography equipping students with competences for professional positions in different industries? 3) How are national and global trends in the economy likely to affect the demand for geographic competences and related career opportunities for geographers? The studies that will be summarized in this presentation are being conducted for the 'Enhancing Departments and Graduate Education in Geography' (EDGE) project led by the AAG with funding from the National Science Foundation.

1. Work Logs of Professional Geographers: This study gathered data over a period of six months from nearly 100 professional geographers. Each month, the study participants completed a log of their work activities (similar to a diary or brief journal entry). Participants in the study indicated obstacles that impeded task and project completion, strategies for addressing these obstacles, and employer support for professional development activities. While the large majority of respondents reported satisfaction with their weekly progress, the log study reveals that widespread and ongoing challenges faced by professional geographers include inadequate resources and funding, competing demands, time management, and interpersonal conflict. At the same time, a minority of respondents reported participation in employer-sponsored or employer-supported professional development opportunities, the most common forms of which include travel support for conference or meeting attendance and funding for training or workshops.

2. Employer Perspectives on Geography Skills. This study is based on interviews with employers in business, government, and non-profit (BGN) organizations to learn how geography is practiced. The analysis identifies the geographic and transferable skills demanded in today's workplace, and explores employers' perspectives on the career preparation of geographers. This presentation will highlight key findings gathered through semi-structured phone interviews with employers and discuss these findings within the broader context of current higher education research and priorities related to U.S. competitiveness, STEM education, and globalization.

3. Competency Development in Postgraduate Geography Programs. Two surveys collected information about the career aspirations of geography graduate students and the types of courses, advising, and professional development experiences offered by various master's and PhD programs. The surveys also measure the extent geography graduate students are being prepared in competencies valued by employers.

### SE63 - Improving crop yield simulations by taking into account effects of field heterogeneity

*Anja Stadler (University of Bonn), Matthias Langensiepen (University of Bonn, INRES), Moritz Kupisch (University of Bonn), Frank Ewert (University of Bonn)*

Crop growth models are potentially capable of calculating crop growth and yield realistically, provided they are properly parameterized, calibrated and validated using data from field experiments. Plant growth is often characterized in such models based on simplified approaches and assuming homogeneous soil properties within a field. We hypothesized that taking into account effects of soil heterogeneity on plant water and nutrient uptake in these models improves their predictive quality at the field scale. This approach is highly attractive for implementation in the context of precision farming, which is aimed at adapting crop management to spatial heterogeneities in environmental conditions. Combining precise farming techniques with spatially explicit crop modeling for decision making and scenario analyses is likely contributed to reduce the greenhouse gas emissions from agricultural areas and to optimize biomass growth and yield. The crop growth model GECROS was applied using information from winter wheat and sugar beet field trials carried out near Jülich, located in the central western part of Germany. These fields are all characterized by strong spatial variability in soil conditions and managed according to standard agronomic practice. GECROS was calibrated separately for each winter wheat and sugar beet cultivar grown on these fields by adjusting the respective parameters with the help of crop physiological measurements at point level. The soil model was parameterized for different field sample points (6-8 per field) for which measured information about soil physical characteristics was available to account for the spatial heterogeneity in soil conditions within each field. The crop growth model was then tested whether it could reproduce the observed spatial patterns of crop growth and development in the selected fields through consideration of the spatial variability in soil properties. First results show, that GECROS simulates the measured data of phenological development, biomass, leaf area index and yield under heterogeneous field conditions in a realistic way. Without the adaption of the soil model to the variable soil properties, the crop growth model is not able to reproduce the observed heterogeneity of crop growth within a field. Spatio-temporal variability in soil water distribution and its effects on nitrogen availability are likely the main factors causing spatial variable crop growth within the selected fields of the study region. Considering variable soil water transport and related nutrient dynamics in

model scaling to the field level will thus improve the predictive quality of the crop growth model at the field scale.

#### **SE64 - In search for the harbours – paleogeographical research in Ephesos**

*Friederike Stock (University of Cologne), Helmut Brückner (University of Cologne), Sabine Ladstätter, Hannes Laermanns, Martin Steskal, Ralf Urz*

Since 2008, a team of the University of Cologne has accomplished geoarchaeological and paleogeographical research in the environs of the ancient city of Ephesos. The focus of these studies is to detect the spatial and temporal shifts in the coastline during the past millennia and to clarify the paleogeographical situation of the harbours of Ephesos. In total, 72 corings up to a depth of 19 m were retrieved from geo-bio-archives. The research focuses on the harbours and anchorages which existed during the Roman and Byzantine periods. From literary sources it is known that Ephesos had several harbours during its long history. The early Iron Age harbour was located in the area of the Ayasoluk-hill; the second harbour - the so-called Koressos-harbour - has been localized in a bay close to the Roman stadium. In the Hellenistic period the bay along the western slope of the Panay'rda? became the main harbour. In Roman times a hexagonal harbour basin was constructed in this bay. Due to the steady progradation of the Küçük Menderes the harbours of the Byzantine period were shifted to the west of the city. In 288/9 BC, Lysimachos designed a new city in the area between Bülbülda? and Panay'rda?. Thus, many of the Hellenistic and later Roman buildings were erected on formerly marine sediments. By then, Ephesos had easy access to the sea; however, the definite location of the Hellenistic harbour is unknown to date. During Roman times, a prominent harbour basin was dredged; the contours are still visible today. Remains of the quay walls and of three jetties of the former hexagonal basin can still be seen in the area to the south-west of the harbour. Along with the progradation of the Küçük Menderes delta, the city became landlocked and lost its direct connection to the sea. Therefore, a harbour canal was built. Its significance is underlined by the fact that on both sides it was flanked by necropolis. This cemetery, located on either side of the artificial harbour canal, was the biggest necropolis in Ephesos and was used from the 2nd century until the 6th century AD. Our research indicates that the first phase of the canal construction dates to the 2nd/1st century BC. Until the 3rd-5th centuries it was in full use. From the 1st to the 3rd century AD inscriptions note many attempts to clean or dredge the great harbour. Although the siltation of the canal started already before the

Byzantine period it could still be used until the 8th/9th century AD. New findings suggest that the late Roman and Byzantine harbour site was shifted to the west of the mouth of Arvalya valley. Çanakgöl seems to be the remnant of this harbour whose date still needs to be confirmed. 14C ages will clarify the on- and offset of the use of this harbour site. Further to the west, at the south end of the bay of Pamucak, and at Pygela are even younger harbour sites.

#### **SE65 - Plants as indicators for archaeological find sites**

*Christian Stolz (Universität Flensburg)*

The poster presents different species of native plants and archaeophytes in Central Europe, which can be used as tracers for former human settlements and other sites of archaeological relevance. In most cases, this method is well suited for locations in forests and with a certain distance to the nearest recent settlement. In this context two different groups of plants have to be distinguished: Firstly, former crops and garden plants which are not native in the respective location and weeds which are often accompanied with those, for example spread out by seed impurities. A good example is periwinkle (*Vinca minor*; Kleines Immergrün), a former medical plant, also used for binding wreaths. Furthermore, there are soft fruits like gooseberries and red or black currant (*Ribes spec.*; Stachel- und Johannisbeeren), elderberries (*Sambucus nigra*; Schwarzer Holunder) and typical weeds like *Hordeum murinum* (Mäusegerste). Another group of plants, presumably of native origin, reacts to environmental changes by human activities, like soil compaction, nitrogen and phosphorous loads, forest lightening and changes of the soil surface by different kinds of building activities. Typical species are nettles (*Urtica dioica*; Große Brennnessel), ivy (*Hedera helix*, Efeu), yellow archangel nettles (*Lamium galeobdolon*; Goldnessel), hellebore (*Helleborus nitidus*; Grüne Nieswurz) and celandine (*Cheledonium majus*; Schöllkraut). In two different study areas in the Taunus Mts. (South-western Germany) and Schleswig-Holstein (Northern Germany) the distribution of some of these species was mapped around different cultural and archaeological monuments. The study revealed connections between the age of the monuments and the appearance of indicator plants. Furthermore, the distribution of these plants also depends of the recent vegetation and land-use in the surrounding area of the monuments. Therefore, indicator plants do not exclusively appear in such locations, but they can be also found sparsely elsewhere and, more concentrated, around recent settlements. If the age of an individual monument is known, the dissemination speed of a species per year or per century can be calculated.



### SE66 - A Confluence of Development Paradigms in the Industrial Zones of the Mekong Delta: The Case of Wastewater Management

*Siwei Tan (ZEF Zentrum für Entwicklungsforschung)*

The Mekong Delta, agriculturally the most productive region in Vietnam, is also the uncanny host to 190 industrial zones (IZs), a concrete expression of the Vietnamese dream of becoming an "industrialized and modern nation by 2020," which the Mekong Delta governments quickly and zealously implemented. But, merely a handful of the 190 IZs are actually operational; socio-economic contribution is tempered by ensuing environmental pollution, and the protracted development has led to socio-economic difficulty for the people it claims to benefit. Yet, the Mekong Delta persists in its development of IZs. This research aims to -- using the case of wastewater management in industrial zones, an excellent proxy for the tension between environmental protection and economic development fundamental to the question of sustainable development -- explain this illogical situation with reference to the development paradigms that permeate the region and the topic, and their adoption, maintenance and modification by the actors involved, who choose and interpret the paradigms, engaging in discourse, strategies, and (in)action to support their interpretations, with the effect of creating a self-reinforcing incoherence, which achieves apparent policy coherence. The field research (05/2011-03/2012) focused on an institutional analysis of industrial wastewater management, and engaged Ostrom's Institutional Analysis as a heuristic tool for semi-structured interviews with the same set of state agencies in 12 provinces of the Mekong Delta. Thereafter, 4 Hau River riparian provinces were selected for a more detailed institutional analysis, and to explore upstream-downstream dynamics; interviews extended to non-state actors such as enterprises, international projects and households. Discourse analysis was conducted of laws, regulations and provincial reports to identify the paradigms that influence policy-making of industrial development and environmental protection. Media analysis plugged knowledge gaps where interview permits were not granted. The finding with regard to industrial wastewater management is a mixed situation of legal ambiguity, fluidity and rigidity, which leads to the situation of an implementation gap. Yet, this is a resource for actors are able to reference the law to justify their inaction. Reports on the actual state of industrial development are often actually planning documents and necessarily half-truth and half-dream, but this "capacity issue" is in fact a resource for the planners who use it to support their interpretation of the paradigm of sustainable development. Because a careful consideration of the local geographical and socio-economic

conditions should suggest an embargo on the frenzy of industrial zone development, I argue that the legal ambiguity and capacity issues are actually resources for the actors in maintaining their interpretations of these exogenous paradigms.

### SE67 - Extraction of sand dune, Terga beach, West Algeria Environmental Impact, conflicts of users and management tools

*Ghodbani Tarik (Oran University), Hamidi Mansour (Oran University), Khélifa Amokrane (Oran University)*

The coastal sand lying of Terga on the western coast of Algeria is an exceptional morphological unit. It is the basis of an important flora and plays an essential role in the dynamic balance of all the coastal system at the level of this fragile area of temouchent coast. The accelerated expansion of the towns of the western region especially that of the coastal zone and the expanding demand of a very good quality of sand for construction engineering have motivated the authorities to set a quarry in Tergua . This enterprise which has expanded during the nineties has overcome heavily the maximum level of extraction allowed by the Algerian mining law. Neglecting the environmental impacts of the decision of using this non renewable resource has resulted in the deterioration of the original vegetation covert, the overload of surrounding agrarian land by the sand, the disturbance of the river Malleh as well as the emergence of conflicts and tensions among different actors. These difficult tensions cannot be solved by the law. In this poster four elements will be considered The ecological and functional role of the sand lying in the coastal zone of Terga The interaction between the high demand for sand and its high extraction The different impacts of the exploitation on the environment as well as the tensions existing among different actors The actual solutions considered and the problems of implementation on the field Main words: Algeria, coast, coastal environment, management tools, use conflicts, actors

### SE68 - Ecological and Geographical Aspects of Anthropogenic Transformations of Natural Ecosystems in the Russian Part of the Amur Basin

*Boris Voronov (Russian Academy of Sciences Far Eastern Branch)*

Anthropogenic impacts on natural ecosystems in the Russian part of the Amur River Basin (Priamurje) caused several serious ecological problems, most of them being of ecological and geographical nature. Many of them are landscape

and to a certain degree climatic transformations as well as changes of river hydrological regimes, qualitative and spatial floristical and faunistical variations including dynamic changes of areals of biotic components and particular plant and animal species, their migration routes. Large-scale timber felling and especially forest fires in Priamurje caused reduction of forest massifs and expansion of open space areas, increase of maximal summer air temperatures and decrease of minimal winter temperatures, increase of summer water temperature in mountain spawning streams and quite often their shallowing. In some areas small rivers have been completely swamped due to forest fires. Fires in mountain forests result in moving scree debris and thus cause the expansion of impoverished mountain tundra landscapes in the southern direction along the burnt-outs. Northern boundaries of coniferous-broad-leaved forests are shifting to the south. For instance, in the last 80 years the north-west boundary of coniferous-broad-leaved forests in the watershed between the Amur and Amgun rivers moved to the south-east for over 70 kilometers. Areal of many plant and animal species have completely altered, Manchurian flora and fauna in particular. Representatives of East-Siberian and Daurian flora and fauna are penetrating further south and east along the transformed landscapes. Significant landscape transformations changed and broke migration routes of many plants and animals and fragmented their areals. Extensive Amur bank reinforcement works at the Russian-Chinese border in 1960-1970-ies nearly completely blocked seasonal migrations of big mammals across the Amur, Ussuri and Argun rivers and isolated populations of these animals on each side of the border. In some cases hydropower constructions also damage migration routes and cause the reduction of some animal populations in number or even animal mortality. To prevent and mitigate negative effects of Priamurje economic developments it is not only necessary to study the existing ecological and geographical problems and find ways to solve them, but also work out future coordinated and consistent environmentally adapted measures both on national and international scale to conserve and sustainable use the unique resource and ecological potential of the Priamurje region.

### **SE69 - The Local Context of Acquiring Farmland Rights In Upland Farming Area, Japan**

*Kunimitsu Yoshida (Kanazawa University)*

In Japan, farmland played a role as the basic factor or component of a society, called 'mura, (the same settlement)' apart from its role as a supplier of economic goods. Therefore, individual farm households cannot treat their farmlands as

mere economic goods. Over time, farmlands have been treated by various entities, including individual farmers as well as social groups comprising individual farmers who are mutually involved in agriculture. This presentation aims to explain the mechanism of acquiring farmland rights in Japan's upland farming belt by focusing upon social relationships among farmers. Data on farm management, farmers' history of farming, and records of transferring farmland rights were collected for this study through interviews with all farmers in the case study area. Mechanisms of farmers' social relationships were analyzed by applying the concept of 'multiplex- uniplex' that is used in the social network approach. The case study area was Omaki and Kouwa settlements in the town of Otofuke, Hokkaido prefecture. This area was newly cleared and opened for settlement in 1950. Major agricultural enterprises in this area are upland, dairy, and vegetable farming. The average management area per farm household has increased, mainly because the existing farm households have continued farming upon the accumulated farmlands of other households that have abandoned farming. The main findings of this study are summarized as follows: 1) Various social relationships among farmers were observed behind the transfer of farmland rights. These relationships included territorial relations, kinship, attending the same elementary school, and serving together as PTA officers. Some agencies such as the Hokkaido Agricultural Development Corporation were also involved in these relationships. 2) Types of social relationships varied in the way the transfer of farmland rights overlapped. Almost all transfers of farmland rights were influenced by multiplex relationships, such as a combination of territorial relations, kinship, and school connections. On the other hand, uniplex relationships existed in transfer of farmland rights when farmers did not have these social relationships. 3) Social relationships in acquiring farmland rights expanded spatially from the scale of the neighborhood or settlement into the scale of the same district, other districts, and outside Otofuke town. Many farmers accumulated most of the farmland within their settlements, but depending on farm management conditions some late accumulated farmland were located outside their settlements. Thus, farmers' management scale increased, and a large-scale upland-farming belt was formed.

### RC01 - Oil Discovery and Environmental Impact Assessment (EIA) Administration in the Western Region of Ghana

*Kwabena Koforobour Agyemang (University of Cape Coast), Kwabena Barimah Antwi (University of Cape Coast)*

The discovery of oil in Ghana has raised a number of questions and concerns on the environmental impact of oil drilling and its associated problems such as pollution and environmental degradation. The environmental mess that has been created by some multi-national oil companies in Nigeria further raises public concern about the environmental and socio-economic impact of oil discovery. Regarding the examination of options to reduce the impact of exploration on the environment, one tool that comes to mind is Environmental Impact Assessment administration. Environment Impact Assessment (EIA) has the potential to effectively account for the activities of proponents of undertakings, identify potential impacts on the environment and determine mitigation measures. This paper examines the capability and capability of the Environmental Protection Agency (EPA) of Ghana in ensuring proper adherence to environmental standards by oil companies and other downstream oil companies in the Western Region of Ghana. It explores successes achieved and challenges in Environmental Impact Administration by the main environmental related regulatory agencies in sub-Saharan Africa

### RC02 - An Inconvenient Truth: Bangladesh is not drowning

*Md Alam (University of Rajshahi)*

An Inconvenient Truth: Bangladesh is not drowning Professor Dr. Md. Shamsul Alam Department of Geography & Environmental Studies University of Rajshahi Rajshahi 6205, Bangladesh md.alam@fulbrightmail.org & Kabir Uddin GIS & Remote Sensing Analyst ICIMOD Kathmandu, Nepal kuddin@icimod.org ABSTRACT The media blitz of Al Gore's 'An Inconvenient Truth' created a panic particularly the low lying and Islands countries due to sea level rise. Bangladesh is one such country where 80 percent of the land is below 5 meters from the MSL. The small country with a huge population is already known to the outside world for her vulnerability to natural hazards. According to the IPCC Bangladesh will lose 17% of its land by 2050 because of rising sea level caused by global warming and 30 percent of the population will be environmental refugees. There is already debate among scientist regarding the model prediction of the IPCC. Many aspects have been disregarded among which the hydro-geomorphology of the delta building processes. Bangladesh comprises the largest delta in the

world which has been built through centuries by the rivers originating from the Himalayas. Almost no research has been done on this process in the event of climate change. New data shows that Bangladesh's landmass is increasing, contradicting forecasts of the IPCC. The process of erosion, deposition and accretion are common phenomenon in the country. This study based on satellite data tries to analyze erosion, accretion and net gain/loss of land in the event of SLR due to Global Climate Change. Key words: Bangladesh, IPCC, Hydro-geomorphology, erosion, accretion

### RC03 - Microfossils in sandy tsunami deposits from Thailand – a tool to assess the magnitude and transport processes of prehistoric tsunamis

*Dominik Brill (Universität zu Köln), Anna Pint (Universität zu Köln), Helmut Brückner (Universität zu Köln), Klaus Schwarzer (Christian-Albrecht Universität zu Kiel)*

On December 26, 2004 the west coast of Thailand was heavily affected by the Indian Ocean tsunami, generated by a mega-rupture of the Sunda Fault. Due to the lack of historical data, sedimentary evidence from geo-archives provides the best opportunity to improve the knowledge of recurrence and impact of potential predecessors. In this context, the microfaunal composition of tsunami deposits may provide valuable information about the sedimentary fingerprint of a tsunamite, revealing (1) the source of the dislocated sediment, (2) its transport distance, and (3) the dominating transport processes in the tsunami wave. To achieve this, the microfossil assemblages of selected tsunami layers were analysed with respect to their similarity with material from potential source areas, the ecological significance of incorporated species, and the preservation state and size sorting of their tests. The samples originate from onshore tsunami deposits from the coastal plain of Ban Bang Sak, SW Thailand, where sand sheets of the 2004 Indian Ocean tsunami (event A) as well as potential palaeotsunamis, which were dated to 500-700 (event B) and 1200-2000 cal BP (events C), respectively, have been identified. The microfaunal composition of these sand sheets was compared to that of reference deposits from the inner shelf, taken at water depths of -62 to -45 m, as well as from the littoral zone.

**RC05 - Formation of the Russian-Kazakh border relations***Tatiana Denisova (RAS)*

Russia has land and maritime borders with eighteen states with total length of 60,932 km. A considerable part of the subjects are near-border and more than 13 thousand kilometers of the State border are new, formed after the collapse of the Soviet Union. The longest land border in the new Russia (RF) is border with Kazakhstan (RK) - 7513 km., it adjoins 12 of 86 subjects of the RF and 7 out of 14 regions of RK. There are 18 rail and 30 road checkpoints. The possibility of conflicts or adverse situations in the border areas is associated with cross-border provision of natural objects and resources previously shared transport, and necessity of foreign country's economic and social infrastructures usage. Natural resource potential of frontier areas is considerable. It includes: oil and gas, shale, coal, phosphates, and chromites, iron and copper ores, construction materials, salt, basins of the Irtysh and Ural rivers, forest and biological resources, a variety of agro-climatic conditions (That is favorable for sheep and dairy cattle breeding, crop cultivation in the culture of cotton to durum wheat). Such a variety of cross-border natural resources contribute to the placement of various industrial and engineering units of the same type of industry in both countries, such as mining and mineral processing (Altaysky kray and East Kazakhstan region), which in turn required the creation of a common transport (southern railway branch, roads with intersections in the cities of Uralsk, Petropavlovsk, Pavlodar, Semipalatinsk) and energy (electric-power transmission Gornyyak - Ust-Kamenogorsk - Pavlodar) infrastructures. After formation of two independent states, industrial technological chains were broken. Plants remained without raw materials and were forced to stop production, that led to a number of economic and social problems: reduction of income in the region, rising unemployment, out-migration. The transport system also has been broken. Part of the federal highway M51 Chelyabinsk - Kurgan - Omsk - Novosibirsk passes through the territory of Kazakhstan now. There are railroad's segments that are shared for the West Siberian, South Urals, and Kazakhstan railways. Passport and customs control should be passed while crossing the border. All this leads to tensions in the border areas of both state. The most acute problems occurs in the mineral resources and water usage. In the latest ten years more attention has been paid to the formation of inter-state sources of law and linkages that were lost in the 90s of XX century. At the present time, the relationship are determined by the Agreement between the Government of the Russian Federation and the Republic of Kazakhstan on the interregional and near-border co-operation from 7 September 2010.

**RC06 - Susceptibility Analysis of Mass Movements in the Micro Basin of Ribeirao Máximo in the County of Luis Alves, Santa Catarina, Brazil***Elisa dos Santos (Santa Catarina State University - UDESC), Maria Paula Marimon (Santa Catarina State University - UDESC), Neusa Maria Mafra (Rio de Janeiro State University - UERJ)*

This research is being developed at the Master's Program in Land Planning and Social and Environmental Development of Santa Catarina State University, and has as the study area the micro basin of Ribeirao Máximo which is located at the southwest of Luis Alves County, with coordinates 26°43'23.90" and 26°47'13.20" S, and 48°53'10.95" and 48°57'32.23" W. The main objective of the study is to know the conditioners of mass movements to determinate the susceptibility areas and contribute with effective parameters to the local land planning. The Ribeirao Máximo is a tributary of the Luis Alves River, and it flows into Itajaí-Açu River, an important drainage basin in the Atlantic slope of Santa Catarina State. The Luis Alves County has the history of mass movements, and suffered strong social and environmental impacts because of the 2008 disaster. The studies about mass movements and its conditioners require an integrated environmental approach based on the understanding of the existent relationships among climatic, geologic, geomorphologic, pedologic, and anthropic characteristics, which contribute to initiate mass movements, marked on the landscape by highly visible erosion features. The proposed methodology involves the systematic use of field, lab and theoretical work. The field and lab methodology is based on local and regional geologic surveys, recognizing structural features, geomorphologic survey, including the analysis of erosion on the mass movement features, and field and laboratory pedologic survey, through morphologic and physical-mechanical soil analysis. Some factors were identified as the conditioners of mass movements in the study area: the significant relief dissection, the rupture of slope sections, the areas of depression in high altitude segments of slopes, the lithologic diversity, and the strong structural control of the Luis Alves Complex. This complex is dominated by granulitic mafic gneisses. In addition, the pedologic characteristics show a predominance of colluvial soils and strong clefts between the horizons. The theoretical methodology is based on Geographic Information Systems (GIS), from digital elevation model (DEM) analysis, enabling a more accurate spatial approximation to the physical characteristics of the relief. This enables the application of many algorithms and hydrologic equations to better define the behavior of the water on the relief. The topographic outcomes obtained from this methodology that are relevant and

applicable to the study in question are: shape of the terrain, degree and length of declivity, orientation of slopes, vertical and horizontal curvature, flow direction and accumulation, networks and drainage basins, the power flow rate, moisture content or topographic index, distance to the drainage, and time of the output flow.

#### **RC07 - Landslides instrumentation and monitoring in volcanic terrains in Mexico: the case of Teziutlán, Puebla**

*Ricardo Garnica (the National Autonomous University of Mexico (UNAM)), Irasema Alcántara Ayala (National Autonomous University of Mexico (UNAM))*

LANDSLIDES INSTRUMENTATION AND MONITORING IN VOLCANIC TERRAINS IN MEXICO: THE CASE OF TEZIUTLÁN, PUEBLA As a result of the mountainous character of Mexico, landsliding is one of the most significant hazards in Mexico. Since the beginning of the twentieth century, landslides disasters have claim hundreds of lives and economic impact has increased dramatically. Consequences are quite frequently worsened by the high vulnerability of populations living in areas of risk. It would be practically impossible to mitigate the effects of landsliding by using structural measures due to costs and effectiveness. Therefore, the establishment of non-structural strategies to mitigate landslides effects can be regarded as a realistic possibility to reduce the vulnerability of population. In this work, we present some preliminary results of the methodology used to set up an instrumented slope to monitoring potential landsliding on a volcanic terrain in the municipality of Teziutlan, Puebla. The main goal of the project is focused in designing and establishing a community-based warning system to increase the level of resilience of the Mexican society.

#### **RC08 - Comparative assessment of landslide susceptibility using Logistic Regression and Analytic Hierarchy Process (AHP)**

*Adrian Grozavu (Alexandru Ioan Cuza University), Cristian Patriche (Romanian Academy), Mihai Ciprian Margarint (Alexandru Ioan Cuza University of Iasi)*

Landslide susceptibility assessment constitutes an important component within the landslide risk equation, very useful for improving the prognosis of such phenomena. In order to achieve adequate spatial models for landslide susceptibility assessment this study aims to compute and compare two landslide susceptibility maps, derived from multi-criteria analysis. The analysis focuses on a sector of Ia'i Cuesta, from Moldavian Plateau (Romania), where

natural environment along with human influence constitutes a favourable context for landsliding. Two methods namely, the logistic regression as a quantitative method and the analytic hierarchy process (AHP) as a semi-qualitative method were applied. In a first stage, it was performed an inventory of stabilised (old), semi-stabilised and active landslides, using ortophotoimages (from the year 2006), topographical maps (1:25,000, 1:5000) and terrain verifications, comprising a total number of 155 landslides with a total surface of 3380 ha and representing 24.8% of the study area. During the next stage of the analysis it was obtained the digital elevation model (DEM) and created a GIS database comprising the potential factors controlling the landslide process: slope, slope height, aspect, mean, plan and profile curvature, distance from drainage network and land use. In order to acquire data from raster layers and perform the statistical analysis a total number of 2990 equally spaced grid points were generated. Furthermore, a stepwise procedure and a tolerance test (TOL) were applied to select relevant variables from the above mentioned 8 input parameters, these filtering procedures indicating that landslides occurrence is best explained by terrain slope and land use and secondary by distance from drainage network, plan curvature and terrain aspect. Finally, two landslide susceptibility maps were achieved by both the logistic regression and the AHP approaches. The comparison of landslide susceptibility map with actual landslides spatial distribution shows that 76.4% of the landslide area and 75.2% of the landslide-free area was classified correctly by logistic regression, with an overall accuracy of 75.8%. In the case of the AHP, the results show that 68.2% of landslide area and 77.8% of the landslide-free area were classified correctly, with an overall accuracy of 73.0%. In view of our results, we may conclude that the high percentages of overall accuracy and of the correctly classified landslide area and landslide-free area, achieved for both the logistic regression and the AHP approach, recommend both methods as suitable for landslide susceptibility analysis and mapping at large scale. Nevertheless, the logistic regression approach gives slightly better results compared to the AHP approach.

### RC09 - Flood In South Vietnam: Case study on Dong Thap province; Flood Mitigation Management

*Thanh Van Hoang (Feng Chia University)*

### RC10 - Natural Risks and Anthropogenic Impacts on Big Rivers in East Asia

*Alexey Makhinov (Institute for Water and Ecology Problems), Shuguang Liu (Tongji University), Vladimir Kim (Russian Academy of Sciences Far Eastern Branch), Alexandra Makhinova (Institute of Water and Ecological Problems FEB RAS)*

The Amur and Yangtze rivers are not only the biggest rivers in East Asia but have rather many similarities. Their basins are alike as stretching out in the latitudinal direction. Their biggest tributaries belong to the middle part of the rivers, which in both cases is the widest compared to the river upper and lower reaches. The areas of Amur and Yangtze basins are nearly equal (1 855 and 1 808 thousand square km respectively). Their geological structures and reliefs are homogeneous. Their hydrological regimes are of far eastern type of annual distribution of water runoff. These facts indicate that erosion and accumulation processes are more active in the Yangtze River compared to the Amur. Similar natural risks for economic activities in the Amur and Yangtze river valleys are caused by instability of seasonal river water regimes, summer-autumn catastrophic floods with several flood-wave peaks per years, interchanges of several-year periods of high-water and low-water content in the river, water regime transformations due to global climate changes. Plain reliefs of both rivers and abundant easily-washable loose deposits make river-bed deformations highly dynamic, especially in the river lower reaches. Anthropogenic impacts include river runoff regulations due to the construction of flood- and erosion-preventive facilities, as well as hydropower stations on the Amur and Yangtze rivers and their tributaries; water turbidity increase; forest massif reduction; forest fires and agriculture expansion in the river basins. In the AmurBasin active river-bed transformations are observed in the areas of big tributary junctures and intensive economic activities. These transformations have a well-marked local character. In the Middle and Lower Amur, where the mainstream is subdivided into many channels, the annual bank erosion reaches 10-20 meters. In the very Amur lower reaches its channel is deep, strait and stable. In the YangtzeBasin most active anthropogenic impacts on river-bed processes are observed in the river low reaches and its estuary. The main river stream here is divided into numerous sub-channels because of extensive bank reinforcements in the river

basin (36 000 km). The Yangtze river-bed undergoes most intensive transformations in areas of radial mainstream divisions. The banks here are washed up at the rate of 80-90 km per year. The Yangtze River peculiarity is that most intensive river-bed transformations occur in the river lower reaches. Intensive erosion and accumulation processes in the Amur and Yangtze rivers cause high risks for river navigation and significant problems for economic activities there, such as the decrease of river water intake, the stability of back reinforcement constructions, etc. These processes are extremely important for river environment as they affect the formation conditions of water, thermal, ice and hydrochemical regimes of the Amur and Yangtze rivers.

### RC11 - On fuzzy and fixed paleo-boundaries in Poland

*Roman Matykowski (Adam Mickiewicz University)*

Over the last 150 years, Poland's present-day territory has been cut by many state boundaries that are now non-existent, e.g. those between Russia, Germany and Austria-Hungary until the First World War, or between Poland and Germany in the years 1921-1939. After their formalised (political, customs, sometimes also administrative) functions had ceased, informal spatial barriers have often developed in the given borderland, both in its material culture (e.g. the so-called cultural landscape) and in the system of values, stereotypes and emotional relations of its inhabitants. Naturally, such borderlands in Poland's inner structure have become an object of study by socio-economic geographers as well as scholars representing other social sciences. The political boundaries that do not exist any longer but have left a trace in the cultural landscape are often termed a relict boundary, or a paleo-boundary. Since they sometimes persist in social awareness only rather than in any material form, they are also called symbolic boundaries. The aim of this analysis is to determine the degree of fuzziness or endurance of one of such boundaries in Wielkopolska and Silesia (the former German-Russian boundary until the First World War), along selected sections. Differences in social behaviour patterns of the inhabitants of the borderland on both sides of such a symbolic boundary can be analysed on the basis of, e.g., (a) marital links (or the place of residence of a married couple), (b) electoral behaviour, and (c) social ideas about the residents of the other side of the borderland.

## RC12 - Managing Evacuation in Ngargomulyo Municipalities: An Example of the Merapi Volcanic Crises

*Estuning MEI (Université Paris)*

Ngargomulyo, located in the western part of Merapi, is one of the most areas prone to volcanic hazards. According to the recorded history, this municipality often suffered by Merapi eruptions. The latest eruption, classified as subplinian eruption, occurred on November 2010. This eruption caused 353 victims, 150 injured people, more than 320,000 people being evacuated, and hundreds of houses damaged by the pyroclastic flows. Even though Ngargomulyo was not affected by the pyroclastic flows and surges, it is important to study this area in order to present and evaluate the evacuation management during the volcanic eruption. The methods used in this study include historical data collection regarding the previous eruptions of Merapi, notably in 1994 and 2006; and the pre-, syn-, and post-crisis phases of the 2010 eruption. Participatory three dimensional mapping was also used as a tool in this study to facilitate the dialogue between stakeholders of disaster risk reduction and the community in determining the evacuation routes and its management. In this study we would like to highlight that working with the community to face with disaster is the ideal solution to minimize the gap between the government, scientists, non-governmental organizations and the community itself.

## RC13 - Some features of the storm on the Black sea in June 2011

*Stanislav Myslenkov (Lomonosov Moscow State University), Victor Arkhipkin (Lomonosov Moscow State University), Galina Surkova (Lomonosov Moscow State University), Sergey Dobrolyubov (Lomonosov Moscow State University), Klaus Peter Koltermann (Lomonosov Moscow State University)*

Based on modelling, reanalysis data and coastal observations we trace the origin and development of a storm on the Black Sea in June'11 near the Russian coast. This storm was not extreme, but destroyed a number of recreational facilities in the coastal zone, transformed beaches and caused various adverse effects. Observations were obtained by wave recorder Log\_aLevel and an automatic weather station DavisPro (AWS), both mounted at the end of the 150m long pier in the Rybatskaja Bay near Gelendzhik. The wave sensor was set at a height of 5m above the sea surface (measurement resolution 5Hz). The AWS sensors were set at 7m above the sea level (measurement resolution 5 min). We used the spectral wave model SWAN applied in two steps: 1) run of SWAN for the entire Black Sea with a 5x5km bathymetric grid and the input of the wind

speed and direction renewed every 6h from the NCEP/NCAR reanalysis; 2) a run carried out for selected coastal areas at the north-east part of the Black Sea where our sensors were installed. This run is forced by the AWS wind speed, for the local bathymetric non-structured high resolution grid. Parameters of storm waves on the open boundaries of the integration area are specified from the first run. The synoptic situation at the end of June'11 is a fairly typical case when the probability of the storm over the Black Sea is rather high. Starting from June 22 surface atmospheric pressure over the south of European Russia and the Black Sea is slowly decreasing. On June 26-27 a cyclone, small in size, but deep and high, appears centered over the Crimea. It remains almost stationary. The sharp increase in surface wind speed over the western part of the Black Sea is observed on June 25-26. June 26th the zone of high wind speeds (>14-16m/s) is distributed over the whole sea. The location of the cyclone center over the Crimea results in a pronounced western component in the direction of the wind in the southern part of the cyclone over the Black Sea. The fast increase of the wind speed over the north-eastern part of the Black Sea starts June 26. It reaches maximum values at mid-day on June 27. Gusts at Rybatskaja Bay are 19 m/s (AWS data). Model results for significant wave height in the Black Sea exceed 2.5m for the 26th June and its highest value (4m) was at night on June 27. The area of the highest waves is located at all times between the Crimea and Turkey. The largest storm area (with heights >2.5m) is 169000 km<sup>2</sup>. The predominant direction of waves are from W and WSW (the same as the wind dir.), with a maximum wave period 8s. Calculations show that at the Russian coast the greatest magnitude of significant wave height reached 2.5 m. Modeled waves parameters are in a good agreement with observed data and we are confident to use the SWAN model as tool for storm risk assessments at the Black sea coast of Russia. The work is done in Natural Risk Assessment Lab. under contract G.34.31.0007.

## RC15 - Roles of the Neogeographer and Issues of Information Sharing to Respond to Disasters: A Case of the Crisis Mapping Project in Japan

*Toshikazu Seto (Ritsumeikan University), Yuichiro Nishimura (Nara Women's University), Haruyuki Seki (Georepublic Japan), Taichi Furuhashi (MAPconciierge)*

The Great East Japan Earthquake on March 11, 2011 caused catastrophic damage in a wide range of Japan. Although the traffic and communication infrastructure were interrupted, people could share information about which area was damaged and how by using mobile Internet and social media. That means

that, to share disaster-related information, it was the first time people widely used Free and Open Source Software for Geospatial (FOSS4G) tools such as OpenStreetMap (OSM) and Ushahidi in Japan what we call a Crisis Mapping Project. This paper investigates how the Crisis Mapping Project went in Japan, i.e., how quickly and in what scale geospatial information came to be shared in response to the earthquake. We also analyze what kind of information people actually exchanged in which area the information's spatial and temporal process, based on the date submitted by those who suffered and people in the surrounding areas. As a case study, this paper focuses on sinsai.info, information-supporting activity through the web using the Ushahidi platform with OSM map interface. A web mash-up, Ushahidi was originally built in response to the 2007 post-election violence in Kenya. While this platform had been localized in Japan even before the earthquake, developers hardly utilized it. Since March 11, 2011, however, many volunteers and neogeographers, many of whom IT professionals in the geo-location industry, organized their activities, quickly developing Ushahidi's various functions, verifying reports of more than 10,000, and translating them into English for foreigners living in Japan. This fast development derived from the facts that the platform was open source software, and that information was also open data. The sinsai.info actually collected reports via Twitter and shared information through the API, and was embedded in other web services. Moreover, in terms of activity management, by using cutting-edge SNS such as yammer and Lingr, members in remote locations could effectively exchange and share their activity records, and several features independently developed in Japan were fed back through github. Still, there are a couple of important issues to be discussed for Crisis Mapping Projects. One is how to use information most effectively in disaster-stricken areas. For this, we need to analyze what kind of data was collected at the time of emergency, responding to the disaster. Another issue to be discussed is the activity's participants and organization. Based on the activity this time, we need to be prepared for the next disaster, promoting the activity and educating neogeographers so that they could contribute more.

#### **RC16 - Diabetic foot In Germany – a market analysis towards comprehensive integrated care of statutory health fund members of AOK Nordost**

*Heike Wittmann (AOK Nordost)*

**Aims:** Diabetic foot syndrome (DFS) is one of the most neglected complications associated with diabetes. In 1989 the World Health Organization (WHO) called

upon the world community to reduce by half the rate of lower limb amputations as a consequence of diabetic gangrene within 5 years. This aim has not yet been achieved. In Germany alone, more than 30.000 diabetics undergo lower limb amputations every year. In the federal state of Brandenburg, as in many other German states, DFS care still demonstrates substantial deficits. The pathophysiological mechanisms underlying DFS are complex and multifactorial, including neuropathy, ischemia and infection. Applying evidence-based multidisciplinary treatment results in a decrease in lower limb amputations. Several studies show that a cross-sectoral and multidisciplinary approach, including prevention, patient education and multi-factorial care (in- and outpatient care, podiatrists, orthopaedic shoemakers, etc.) in the treatment of the foot ulcers reduce amputations by 45 to 85%. **Method:** Since the introduction of the Statutory Health Insurance Modernisation Act, health funds in Germany are required to initiate effective programmes by so-called integrated health care contracts. In order to offer efficient programmes it is necessary to identify diabetics with foot problems according to different grades of injury and select adequate providers accordingly. Analysing the internal claims data enables health funds to define priorities, conceive correctional measures and develop optimal strategies to guarantee a qualitatively higher level of comprehensive DFS health care that is at the same time cost-effective. Using the topographical software the user is able to analyse the collated data, and visually demonstrate and present health care situations in a geographical context. **Results:** The anonymous analysis of 569 patients in 2006 showed 650 cases of diagnosed diabetes (ICD-coding E10-E14) consisting of 313 major and 558 minor lower limb amputations as well as 46 relapses. **Conclusion:** The introduction of an integrated care contract with a specialized diabetic foot clinic enabled a reduction in major lower limb amputations from 6.8 % in 2006 to 2.9 % in 2010.



The logo is a circular emblem. The top half is white and contains a dark grey silhouette of a mountain range with two prominent peaks. The bottom half is dark grey and contains the text 'IGC' in a bold, sans-serif font, with 'COLOGNE 2012' in a larger, bold, sans-serif font below it, and 'DOWN TO EARTH' in a smaller, bold, sans-serif font at the bottom.

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SPECIAL SESSIONS

Abstracts

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SPS 01-01 CNFG - La valorisation d'un savoir géographique dans l'espace francophone

*Chair: Jules Lamarre*

#### Introduction

*Jules Lamarre*

### SPS 01-02 - CNFG - Politique publique et territoires urbains dans l'espace francophone

*Chair: Edith Mukakayumba, Christian Schulz, Anne-Peggy Hellequin*

#### Introduction

*Edith Mukakayumba, Christian Schulz, Anne-Peggy Hellequin*

### SPS 02-01 - International School of Applied Geography in Saint-Dié-des-Vosges : when leadership needs maps!

*Christian Pierret (Festival International de Géographie de Saint-Dié-des-Vosges)*

La 23ème Édition du Festival International de Géographie de Saint-Dié-des-Vosges aura lieu du 11 au 14 octobre 2012. Cet événement international unique en son genre réunira au cours de cette nouvelle édition les meilleurs experts des sciences humaines, des auteurs, des diplomates, des chefs d'entreprise et des gastronomes autour d'une thématique universelle :

« Les facettes du paysage – Nature, culture, économie »  
Pays invité d'Honneur : la Turquie

Le Festival accueille cette année:

Mireille Delmas-Marty: Membre de l'académie des sciences Morales et Politiques, Professeur au Collège de France, Présidente de la 23ème édition du FIG.

Jean-Pierre Rioux : Historien, Président du salon du livre Amerigo Vespucci.

Régine Deforges : Auteur, Grand Témoin du 23ème FIG.

Erik Orsenna : Auteur, Membre de l'Académie Française, Invité d'Honneur du Salon du Livre.

La géographie est la science humaine offrant les meilleures perspectives de compréhension du monde, des rapports sociaux, des enjeux stratégiques et d'avenir. La fabrique et la genèse des paysages seront au cœur des débats. On s'interrogera aussi bien sur le « beau » paysage que sur le paysage « ordinaire ». Les valeurs du paysage, qu'elles soient environnementales (nature/culture; services éco-systémiques), économiques (tourisme, immobilier), culturelles ou sociales seront évoquées. L'aménagement du territoire et l'impact paysager seront au cœur des débats : comment construire, aménager, gérer les paysages contemporains aussi bien au plan local qu'à l'échelle mondiale. Le rôle des acteurs et des réglementations sera abordé ainsi que celle de la gouvernance paysagère. Les paysages virtuels et les paysages du futur (les jeux vidéo et leur utilisation du paysage), la géo-localisation et la géo-visualisation fournissent également nouvelles représentations géographiques. D'autres analyses de paysages moins communs (nocturnes, sous marins) sont attendues. La Turquie, pays invité d'honneur, centralisera les réflexions autour de sa position géopolitique, de la question du modèle turc mais également de son dynamisme.

## SPS 03-01 - Geographica Helvetica

*Chair: Benedikt Korf*

### Coping with the Three S. Where Is Spatial Justice?

*Jaques Lévy (École polytechnique fédérale de Lausanne)*

Geography has changed a lot since the 1960s. By and large, it can be argued that this discipline has left its isolationist paradigm, established multiple contacts with other kinds of knowledge, and overcome its long self-landlocking attitude. Geography has lost its epistemological exceptionalism, but is this enough? Social sciences, are commonly threatened by methodological nationalism and, more generally, by methodological corporatism, that is the corruption of a scientific approach or project by any kind of other social alignment that undermines its capacity to develop a free, autonomous thought. Has geography escaped these pitfalls? To try and answer this question, we can specify the particular *raison d'être* of geography among scientific domains. As a social science of space, geography has to manage these three s: society, space, and science. When they have forgotten society, geographers have created the myth of 'general law of space', whose effective outcomes turned out to be of a very limited interest. When they have neglected space as a thick, thinkable dimension of the social world, they have become sociologists or economists and, often, poor sociologists or economists. In front of this non-dissociable package, the aggregates we can call in a simplistic way 'North American geography' and 'Francophone geography' have shown two slightly different variants. While the first one showed a very open, even porous attitude to any kind of social concern, francophone geographers have been more reluctant on this point and have devoted most of their energy to place their analyses in a more autonomous theoretical perspective. In both areas, however, space, that is: innovative scientific propositions on social space, has not particularly taken advantage of this intellectual conjuncture. In this scope, the issue of spatial justice is a stimulating topic. The adjunction of the adjective 'spatial' to a supposed-to-be non-spatial justice raises number of epistemological and theoretical problems geographers are just beginning to tackle. The risk here is to simplify the answer to one or more of these questions: Who defines what is just, and how? In what extent could space be something else than a neutral container of un/just items? Could geographers' work bring a specific contribution to the public debate on justice? Exploring this study case, it will be contended that if the three s do not operate together, we can seriously put in doubt the cognitive usefulness of geography.

### Discussant

*Olivier Graefe (Institute of Geography of Fribourg)*

## SPS 04-01 - EUGEO - 'State of Geography in Europe'

*Chair: Henk Ottens*

### Introduction

*Henk Ottens*

## SPS 06-01 - Quelles sont les sources informationnelles dans l'espace francophone pour traiter du risque?

*Chair: Yvette Veyret, Jean-Marie Théodat*

### Introduction

*Yvette Veyret, Jean-Marie Théodat*

## SPS 09-01 - IGU project: Sustainable cities: results from a Chinese pilot project and the way forward

*Chair: Ton Dietz*

### Introduction

*Ton Dietz*

## SPS 10-01 - The IGU-Initiative for an International Year of Global Understanding (IYGU)

*Chair: Ronald F. Abler*

### Presentation of the IGU-Initiative IYGU

*Benno Werlen (University Jena)*

### The global significance of UN-International Years – The UN-International Year of Mountains 2002

*Bruno Messerli (University of Bern)*

### The impact of IYGU for human geography

*John Pickles (University of North Carolina)*

### The role of IGU-National Committees and the contributions of geographers world wide

*Vladimir Kolosov (Russian Academy of Sciences)*

### Discussion

*Ronald F Abler (International Geographical Union)*

## SPS 12-01 - Plenary Session - Applied Geography in the 21st Century: Practice Relevancy of Geography in Politics, Economy and Society

*Chair: Rudolf. Juchelka*

### Introduction

*Rudolf Juchelka*

Applied geography, that is implementing geographical findings into politics, economy and society, forms the third central pillar within the system of geography, apart from general and regional geography. Since the introduction of Bachelor and Master degree programs, its practical and planning oriented perspective has contributed substantially to the public perception and external presentation of the subject. During the plenary session which opens with an introductory motivational speech, the acting chairman of the German Association of Applied Geography as well as academic and practical representatives working in applied geography will discuss the current significance of applied geography and necessary future emphases.

## SPS 12-02 - Plenary Session - Geographers and their Job Markets – International Career Perspectives for Bachelor- und Master-Students

*Chair: Rudolf. Juchelka*

### Introduction

*Rudolf Juchelka*

The job market for geographers has been – not only since the introduction of Bachelor and Master programs – subject to numerous changes regarding content within universities and to qualification requirements on the part of the employers. Certain trends are responsible for cyclical deviations which on the other side are equalized by long-lasting basic qualifications. Thus, the new Bachelor- and Master programs also aim at an internationalization of study options and the subsequent occupational fields. The German Association of Applied Geography wants to illuminate the interface between academics and vocational practice from the perspective of a trade association. During the panel discussion relevant current trends and findings of the geographical job market research will be presented and discussed

## SPS 12-03 - Geography and Requirements of International Cooperation

*Chair: Burghard Rauschelbach*

### Introduction

Burghard Rauschelbach (DVAG)

The workshop discussion gives an insight in the practice of project work and advisory services in international cooperation. Well known experts with international experience in the tourism sector and regional economic development present examples on project and policy level, and show how international cooperation works. An experts' panel will discuss the market requirements for international advisory services in fields, which can be allocated to applied geography.

### Across border! The role of development cooperation in transboundary planning, using examples from programmes in East-Europe and Africa

*Manuel Junck, (Programme Tourism and Sustainable Development, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (German International Cooperation), Eschborn)*

### Berlin: Proving effectiveness! Measuring tourism-induced cash flows, using the example of a project for the reduction of regional disparities in Montenegro

*Thomas Frommhold (mas| contour - project leader and advisor)*

### Bonn: Responsible! Corporate responsibility as an instrument for the conservation of biodiversity

*Stefan Hörmann (Business and Biodiversity, Global Nature Fund, Senior Programme Manager)*

### Seefeld: Promoting awareness! International tourism for a sustainable and socially responsible development

*Birgit Steck (Institute for Tourism and Development - Managing Director)*

### Panel and plenary discussion: requirements of geographical knowledge and know-how for international tasks

## SPS 12-04 - DVAG-Job Market Presentation - „From Study to Job“ – Practical Tips from DVAG for Geographers entering a Career

*Chair: Rudolf Juchelka*

### „From Study to Job“ – Practical Tips from DVAG for Geographers entering a Career

*Rudolf Juchelka*

Particularly for students at the beginning of their study program as well as during their examination phase the picture of what comes after academics is often blurry and intransparent. However, it is especially important during this time to carefully plan an optimal later transfer from the university to the job and to set the respective course in order to achieve this.

In a deliberately open and free discussion and exchange atmosphere – all questions are welcome ! And with no preassigned structure – the German Association of Applied Geography would like to share its longtime experience by giving practical tips for entering into a career.

## SPS 13-01 - Facets of Contested Geographies: Negotiating lieux de mémoire in Transnational Contexts

*Chair: Dietrich Soyez, Ruth Fincher*

### Rethinking belonging through memory-work: Towards a place-based ethics of care

*Karen Till (University of Ireland)*

In the interdisciplinary field of memory studies, attention has been paid to different forms of testimony at personal and social levels as tied to human rights particularly in societies that have experienced state-perpetrated violence. Yet what is under-researched is the significant ways that places are part of the intergenerational memories of loss, displacement, trauma and inheritance. As I will argue, those who have experienced and inherited the 'rootshock' of displacement and trauma care for the very places that remain haunted by what Edward Casey describes as the 'unresolved remainders of memory'. Places are considered as a kind of meta-subject and witnesses to pasts but also offer communities the possibility of care. In this talk, using a range of different case studies, I examine this intergenerational, social and transnational approach to memory-work which

is based upon what I call a ‘place-based ethics of care’. By maintaining, continuing, and repairing places and selves through place, pathways of possibility based upon multiple pasts offer a different model of belonging and rights, one based on inhabitation and memory-work, rather than on territory or blood.

### Place memory and cultural trauma in a transnational context

*Nicholas Entrikin (University of Notre Dame)*

In the thirty years since Pierre Nora wrote his influential essay on memory and history, it has become much more common to see places of memory as sites of active construction and conflict rather than as passive and natural secretions of sentiment. This shift is evident in recent work on collective memory and cultural trauma that examines the successful cultural narratives constructed around an event that give it shape in the collective imagination. The narrative construction of places of trauma occurs generally within national contexts. Transnational memories of trauma are typically seen as thin and incomplete and unable to effectively resonate beyond national borders. However, if we see transnational memories as simply another set of constructed memories then the discussion shifts from matters of “cultural insensitivity” to questions of how such memories are constructed and contested in transnational contexts and how the meaning of place shifts in relation to these narratives.

### Battles of history, lieux de mémoire and identity building in the post-Soviet space

*Vladimir Kolosov (Russian Academy of Sciences)*

Benedict Anderson wrote that “the contemporary culture of nationalism does not have more inspiring symbols than monuments and graves of the Unknown soldier”. National or ethnic identity is shaped by different symbols – historical narratives, real or invented national heroes, key events and sacred places (lieux de mémoire), regular ceremonies, etc. An individual needs markers distinguishing “them” from “us”, both in space and time. In “animating” history and geographical space such markers strengthen the ties between the elements of the geopolitical triad “territory – identity – boundaries”. The disintegration of the Soviet Union provoked in its successor states a crisis of identity, which can be defined as a period when ethnic or other region-specific sub-national segments of a society create obstacles to national unification and the identification with a certain political community. As a result, a considerable part of the population did not or does not recognize yet the boundaries of the territorial state as a legitimate political unit. This crisis of identity is due not only to the multi-ethnic character of almost all successor states of the Soviet Union, but also to the variety and the heterogeneity of the ethnic identity of the titular peoples. Trying to forge and to cement a new political identity, post-Soviet states established lots of new symbols and ceremonies, created new sacred places. However, the replacement of old imperial and Soviet symbols is not an easy and quick process. Old

monuments, museums and a good part of geographical names often remain intact. Old and new sacred spaces co-exist and form surprising combinations. The author considers, first, the relations and the role of the sacred places created before 1917, during the Soviet period and after the collapse of the USSR, and their interpretation by various age, social and ethnic groups. Second, he investigates and compares the types of new, post-Soviet sacred places in different countries – Russia, Ukraine, Moldova and Tajikistan. These new places may incarnate ethnic, religious, linguistic, regional and civic kinship. Typically, they represent the imperial and the Soviet past as a continuous struggle of the titular group for freedom and self-determination. National or regional history is viewed as a tragic sequence of battles against external enemies which generated a great number of heroes fallen in the uneven fight. The state tries to perpetuate the collective memory about its most glorious periods, usually in the Middle age. The names of national heroes become regional or local brands, the intrinsic parts of a country’s or a region’s image. In some post-Soviet countries, the politics of memory has resulted in a meta-narrative that categorizes them as nations-victims by integrating all central historical events of the twentieth century, from the civil war to the Chernobyl disaster. A particular attention is paid to the case of unrecognized states – Transnistria, Abkhazia, South Ossetia and Nagorno Karabakh. Three of them are multi-ethnic, and therefore, their political leaders have to create or to reinvent the sacred places which should be symbolic for the titular group in stressing its distinctions from the mother state and at the same time shared by other groups. The central place belongs to the sacred places related with recent civil wars and conflicts with the mother-state. Sociological polls show that for a large part of Russian, Ukrainian and Belorussian citizens the victory of the Soviet Union in World War Two is an important element of identity and the most positive souvenir about the common past. Today, it became a subject of nostalgia. In Russia and Belarus and currently in Ukraine central authorities try to integrate it in the new historical narrative and in the process of identity building. At the same time, post-communist elites in Eastern Europe have difficulties integrating old Russian/Soviet and particularly war memorials into their new national landscapes of memory. On the one hand, the nationalization of history turns these memorials into disturbing symbols for alternative narratives. Moreover, Russian and Soviet memorials are often considered as signs of Russian geopolitical influence. They become sites of discontent, protest and provocation. Local Russians struggle for symbolic recognition, for their right to be represented in the national landscape of memory. Their problem is that their symbolic resources contradict the new narrative of national history. In conclusion, the author discusses the notion of historical reconciliation. Using some positive examples, he analyzes a possible role of sacred places in this process.

### Suomenlinna/Finnland: From a Fortress to a Tourist Resort

*Markku Löytönen (University of Helsinki)*

### SPS 14-01 - Guide to Getting Published - supported by EMERALD Group Publishing Ltd.

*Chair: Sarah Baxter*

#### Introduction

*Sarah Baxter*

### SPS 15-01 - IGU Dogan Foundation Awardee Lecture

*Chair: Ronald F. Abler*

#### Introduction

*Ronald F. Abler*

### SPS 16-01 - Westermann-Forum

*Chair: Reiner Jüngst, Managing Editor, Geographische Rundschau*

#### Film Show Sequences from the Documentary “Germany from the Air”

*David Lanegran (Macalester College)*

The film was produced for ZDF television and is distributed by Universum-Film, Munich.

#### Evolution of an Industrial Frontier and an Industrial Core: The Case of Minnesota's Iron Ranges and Detroit

*David Lanegran (Macalester College)*

This case study will examine the changing social and economic geography of the iron mining and related steel and auto industries in the Great Lakes Region of the United States. After tracing the establishment, growth and globalization of the iron ore mining industry in Minnesota we will examine related patterns of growth and decline in one of the primary markets for iron ore, the auto industry in Detroit. Special emphasis will be given to current efforts to reuse abandoned landscapes in Detroit.

### SPS 17-01 - Applied Environmental Economic Geography and Sustainable Development and Planning

*Chair: Christian Schulz, C. Patrick Heidkamp*

#### Panel

*C. Patrick Heidkamp (Southern Connecticut State University)*

*Robert Krueger (Worcester Polytechnic Institute)*

*Roger Hayter (Simon Fraser University)*

*Boris Braun (University of Cologne)*

### SPS 19-01 IGU project: Geographical Journals: A world overview 2012

*Chair: Ton Dietz*

#### Introduction

*Ton Dietz*