

Symposium: Beach management

On 22 September, the Climate Alliance Kiel Bay held a symposium on beach management in Schönberg. Wilfried Zurstraßen, the mayor of the municipality of Schönberg, greeted the participants with a moving speech on the necessity of beach management adaptation to the changing climate. Other local firsthand reports, lectures on technical and biological specifics of beach management as well as perspectives from

the tourism sector informed over 60 participants about the most recent insights on climate-adapted management of beaches on the German Baltic coast.

The organizer of the event, Sandra Enderwitz of the Geographical Institute of Kiel University, interviewed two of the speakers on current problems and approaches to solving them (see the following interviews).



The coast at Schönberg

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Acceptance through good arguments

Interview with Dr. Dirk Schmücker

The Institute for Tourism and Recreational Research in Northern Europe GmbH (N.I.T.) is a research institute that investigates issues pertaining to tourism and related subjects. In consultancy projects, tourism concepts are developed on the basis of this research. At the symposium in Schönberg, Dr. Dirk Schmücker of the N.I.T. described the way tourists perceive the beaches.



Dr. Dirk Schmücker at the Schönberg Symposium

Dr. Schmücker, how valuable are the beaches for Baltic Sea tourists in Schleswig-Holstein?

The beaches are a very influential criterion on choosing Schleswig-Holstein as a vacation destination. Based on sources such as the guest surveys for Schleswig-Holstein or the national-level "Reiseanalyse" (travel analysis), one notices an 80-60-20 model: about 80% of visitors to the North or Baltic Sea use the beaches, for about

...to be continued on page 2

Regional Activities

60% of them the beach, the sea and swimming are deciding factors for choosing a trip to Schleswig-Holstein and 20% of vacationers to Schleswig-Holstein would describe their vacation principally as a beach vacation. That alone is quite a lot, but only moderate when compared to other destinations such as the Mediterranean. In other words, the beach is indeed very important for Schleswig-Holstein, but by no means the only attraction. In particular, it is families with children that are attracted by beaches, especially on the Baltic Sea.

What characteristics should a beach popular among tourists have?

As a rule, Schleswig-Holstein's beaches are not simply isolated natural beach locations but also have quite a lot of infrastructure and services. As opposed to some neighboring European countries, a certain amount of facilities and equipment, such as beach chairs or a snack bar, are the standard. In Schleswig-Holstein, a total of approx. 170 beaches and sections of beaches are marketed to tourists, about 100 of which are on the Baltic coast. Among these, almost 90% rent out beach chairs, about half have a Lifeguard Association (DLRG) station and a third, at least, are accessible for the disabled. But these services come at a price, which is usually collected in the form of a visitor's tax by local municipalities. This often leads to rather unpleasant circumstances, as the visitor, looking forward to the peace and relaxation the sea provides, must first

work his or her way past signs requesting payment or ticket machines, only then to be checked again by "Bay Watch Teams". However, the tourists are mostly quite content with the beaches and the swimming opportunities, and some responsible for tourism in other regions, like Denmark, are growing envious of the "serviced beaches" in Schleswig-Holstein.

Climate change is not only causing developments with positive associations, such as a longer summer season. Other consequences include increased amounts of algae and sea grasses as well as massive sand loss due to strong storm events. In your opinion, will these phenomena harm the tourist industry?

We already mentioned the visitor's tax that the cities collect. With these funds, an important service aspect is secured: the cleaning of the beaches. A clean beach is a "hygiene quality." This term refers to characteristics that don't necessarily make the beach visitors more content but whose absence would certainly lead to discontent among visitors. If the increasing presence of washed ashore algae and sea grasses cannot be successfully done away with, the guests will certainly be less satisfied at the so called "licensed" beaches, where visitor's tax is collected. The same in turn holds true for beaches where the sand is lacking. Whenever the expectations of beach visitors are not fulfilled, there will be dissatisfaction. These expectations stem

from many different sources: from photos or accounts or because it was like this or that last year. Or simply because you've paid money for something and expect it to be o.k..

Scientists and nature conservationists recognize an opportunity in the restoration of particular sections of coast to slow down erosion of beaches – From the perspective of beach visitors, would this be a sensible measure to take?

Certainly not for everyone and certainly not everywhere. In other words: yes, by all means for certain target groups in the right locations. Restoration generally means initially limiting the extent to which the beach can be enjoyed for a short while: to get to the water, one might first have to go through deposits left behind on the beach that are either sharp and pointy or slippery and often don't smell good. Maybe some parts of the beach won't even be accessible any more. If a beach visitor is not prepared for these restrictions, it takes good arguments to convince him/her that these restrictions are necessary. Among certain groups of visitors, this can be successful by means of targeted information. We know from surveys that an understanding of the point of a given measure considerably expedites its acceptance among tourists. So we could think about a differentiated system. Then, selective beach restoration projects might not only be tolerated but even evaluated positively by beach visitors.

Artificial reefs as a win-win option

Interview with Dr. Kai Ahrendt

Because of accelerated beach erosion due to climate change, negative consequences for tourism are expected, which will be set in motion by modified currents and more frequent extreme weather events. Dr. Kai Ahrendt, Chairman of the German Foundation for Coastal Protection (SDK), with his Company for Environment and Coast, is currently researching to what extent underwater reefs can slow down this process.

Dr. Ahrendt, what exactly is an underwater reef?

On many sections of the Baltic Sea coast, there are natural sand reefs in the inner nearshore, which are sediment deposits that rise several decimeters to a few meters above the sea floor. Any swimmer who ventures a bit farther into the water knows this piled up sand as "shallows" where, for instance, waves break before they come in



Dr. Kai Ahrendt at the Schönberg Symposium

to shore. One can also create these reefs artificially by bringing similar material into the same area. The material could be stones or also so-called geotextiles.

Have there already been successful attempts at building such artificial reefs?

As far as I know, such measures have not yet been undertaken in German coastal waters. In other countries, however, such as on the Australian coast, reefs made of geotextiles have already been tested successfully.

Do you think artificial reefs are a wise measure to protect the coasts and beaches of Schleswig-Holstein on the Baltic Sea?

Such artificial reefs certainly lessen the energy of the waves before they reach the beach, with the result that the incoming energy and, therefore, the sand transport in the actual beach area is reduced. In so doing, the retention period of the sand in this beach section will be higher. But this measure is by no means a "magic structure," since these structures themselves don't produce any sand, which in turn means that sand remains lacking in certain spots anyway.

As part of the project „Future Beach Management“ („ZukunftsManagement Strand“), initiated by the Climate Alliance Kiel Bay, a study on the feasibility of this idea will be conducted and should shed some light on this issue. What results do you hope to see from the study?

Through numerical models, trends concerning how such structures take effect can be determined. Most importantly, this serves to determine the most advantageous configuration of these structures, such as the optimal height, distance, morphological characteristics, position to the coastline, etc., taking into account possible rises in water levels or modifications in wind fields. In addition, these structures can be developed into diving areas or feeding grounds for fish etc., through intelligent design. In so doing, so-called win-win situations would emerge, and not only coastal protection, but also the tourism and the ecological state of the region would profit from it.

The significance of regional networks for developing adaptation strategies

The main idea behind the promotion of regional climate networks is to tap into the yet unutilized potential of local stakeholders and thereby solve problems collectively.

A central tenet of networking is that more can be accomplished in cooperation with others than through individual actions. However, a basic requirement for creating a network is that it must provide those involved with observable benefits.

The RADOST project team continuously consults with administrative officials (from state agencies and other governmental bodies in the fields of environmental protection, agriculture and rural areas, water management, flood prevention and coastal protection) and carries out discussions with mayors of cities and communities, representatives of regional economic development, environmental protection representatives and rural special interest groups, among others, concerning regional adaptation strategies on the German Baltic

Hansa Sail Business Forum – Bringing together stakeholders of the Baltic Sea region

As part of the 20th Hansa Sail of the Hanseatic City of Rostock, the economic initiative committee arranged the 10th Hansa Sail Business Forum on 5 August 2010. The platform for political meeting was held under the slogan "20 years of Baltic Sea Cooperation – 20 Years of German Unity – A Success Story for Mecklenburg-Western Pomerania".

Around 250 stakeholders from the realms of economics, academics and politics discussed possibilities for stronger networking in the Baltic Sea region and a new Baltic Sea strategy. Till Backhaus, Minister for agriculture, environment and consumer protection of Mecklenburg-Western Pomerania, focused on coastal protection as a prerequisite for economic development in the Baltic Sea region. The Minister stated that, in order to face climate change and its impacts,

coast. The information garnered there is discussed at conferences, in theme-oriented workshops and in working groups with regional stakeholders. In addition, concrete adaptation measures are discussed, and know-how concerning adaptation measures from the German coastal regions as well as positive and negative experiences in implementing specific measures and projects are exchanged.

In general, regional stakeholders view climate change on the German Baltic coast as an important and relevant topic, especially in connection with coastal/flood protection and ecology. Other important topics in relation to climate change are socio-economic in nature: in particular, aspects such as tourism, infrastructure and unemployment. Communication of research results on climate change that is tailored to the needs of local stakeholders is of great significance for cultivating guiding principles, strategies and action plans for adaptation measures.

The next regional RADOST workshops will take place on 4 November in Neu Brodersdorf and on 1 December in Timmendorfer Strand (see "Events" p. 8)



Minister Backhaus talking to stakeholders of the Baltic Sea region

adaptation strategies must be developed that are supported by science and research. As an example, the Minister mentioned the development of future-oriented adaptation strategies, as practiced in RADOST, which take tourism, the maritime economy, ports and other economic sectors into account.

Regional Activities

Network Building: Getting regional stakeholders on board

An internal RADOST workshop on regional network building took place on 8 and 9 July 2010 in the Baltic Sea resort town of Zingst, with Mayor Andreas Kuhn as host. The event dealt with how to apply network building concepts in the region and how to formulate network goals and paths to implementation. Mayor Kuhn elucidated possible advantages of network building and the expectations associated with it from the perspective of a regional decision maker. He emphasised that climate change adaptation needs to be addressed within

an overall framework for sustainable tourism development and that considerations of climate protection play a prominent role, also from the vacationers' perspective. A new, climate-friendly transportation concept is regarded as a priority for the region of Fischland-Darß-Zingst. The reconstruction of no longer existing train connections as well as Park-and-Ride options would bring about a substantial reduction in carbon dioxide and other car exhaust gases and allow further innovative mobility concepts to be tested.

The mayor expressed his interest in the "Climate Pavilion" concept, which will soon be implemented in the Kiel Bay, another RADOST focus area. This initiative by the community of Schönberg aims to familiarise both vacationers and locals with the possible regional consequences of climate change. If Zingst also adopts this concept, this would be a good example of the potential of network projects like RADOST to develop ideas, support their implementation and spread these ideas in the region and beyond.

Investing in beaches – Adaptation activities in Kühlungsborn

While the debate on adaptation to climate change usually centers around obstacles and costs, it is becoming increasingly important to discuss solutions that take advantage of economic opportunities and are useful for engaged stakeholders from business, government and civil society. For this purpose, a pioneering spirit is required. The city of Kühlungsborn illustrates what form measures may take that simultaneously enhance the economic potential of a locality and increase its adaptability to climate change.

The seaside resort Kühlungsborn is one of about 80 partners currently participating in the RADOST network. With 3,150 meters in length, Kühlungsborn has the longest seafront in Germany. Its sandy beach stretches over 6 kilometers and is one of the most severely impacted stretches of mainland coast in Mecklenburg-Western Pomerania, as studies on sea conditions, water level, currents and sediment transport have shown. The beach is a high priority for the



Beach in Kühlungsborn

tourism economy and is therefore the most important economic asset for this Baltic Sea resort town. Surveys of vacationers and guests show that the quality of the beach plays a decisive role in choosing a vacation destination. A wider beach not only reduces overuse of the beach in times of high visitor frequency but also serves to protect inhabitants of adjoining areas from extreme weather events such as storm surges and keeps existing coastal protection structures from destruction.

For the municipality therefore, the question of what methods should be used to widen

the beach area in a long-lasting and near-natural way is of great importance. The cost-effectiveness of such measures for the local administration and the tourism industry has been a central consideration in the deliberations. The measures finally decided upon involve a substantial financial contribution by the municipality itself. It was of particular importance that the concept combines short-term measures – such as creating a sediment deposit through beach replenishment – with long-term measures such as lengthening groynes and the construction of a breakwater to curb the sea-state energy. This approach conforms with the strategy of Mecklenburg-Western Pomerania concerning built-up coastal sections and therefore receives financial support from the Federal State. The RADOST partner Staatliches Amt für Landwirtschaft und Umwelt Mittleres Mecklenburg (State Agency for Agriculture and Environment of Central Mecklenburg – StALU MM) will also give technological support to the measures.

Conference on extreme weather events

Extreme weather events were the main focus at the second adaptation conference of the Federal Environment Agency (UBA), held together with the German National Meteorological Service on 2 and 3 September 2010 in Dessau. In various lectures and extensive discussions, the appropriate

ways for making statements on extreme events as well as for handling such events were debated. At the KLIMZUG-projects' joint stand, Christian Schlamkow (University of Rostock) gave a presentation on preliminary results on storm intensities and their influence on the sea state and

the changes in sediment transport capacities on the German Baltic coast. It was shown that, according to some specific climate scenarios, somewhat substantial changes in sediment transport capacities can be expected.

International Activities

RADOST contribution to the UN Climate Change Conference in Cancún

Through its coordinator, Ecologic Institute, RADOST will have a strong presence at the UN Climate Change Conference in December 2010 in Cancún (Mexico). The activities will be in line with objectives of the Nairobi Work Programme (NWP), which addresses climate change impacts, vulnerability and adaptation as part of the United Nations Framework Convention on Climate Change. In addition to a RADOST side event, an interview for the "Climate Change Studio" is planned, which will be available at the conference's website.

The side event, entitled "Stakeholder-based approaches to climate adaptation in coastal regions," will introduce current examples for the development of adaptation strategies in cooperation with regional stakeholders in various coastal regions of the world.

New Project: RADOST Partners broaden regional availability of climate data in Baltic Sea countries

Efforts are underway to make climate data in the Baltic Sea region more easily accessible. As part of a project supported by the International Bureau of the German Federal Ministry of Education and Research (BMBF), from November 2010 on, exchange between representatives of science and practice from Germany, Poland, Sweden and other Baltic Sea countries will be strengthened.

To this end, Ecologic Institute and the GKSS Research Centre Geesthacht, supported by other RADOST partners and in cooperation with the University of Szczecin in Poland and the Swedish Meteorological and Hydrological Institute, will be organizing joint activities of international scientists that will take place in Germany and Poland.

The project serves to foster the exchange between providers and users of climate

data. Its goal is to improve the supply of processed data, in order to support climate change adaptation among public and private stakeholders. Discussions will focus on the benefits and potential of existing information tools from the users' point of view as well as possible conceptual improvements and international expansion of existing instruments. The internet-based North German Climate Atlas of the North German Climate Office will serve as one basis model and could be extended to other countries of the Baltic Sea region. Although highly developed climate service tools are available in, for instance, Sweden, in other countries, like Poland, climate data are more fragmented.

Summer School "Climate Change in the Baltic – From global problems to local adaptation"



Summer school participants in Warnemünde

From 6-17 September 2010, a Summer School entitled „Climate Change in the Baltic – From global problems to local adaptation“ took place at the Leibniz Institute for Baltic Sea Research in Warnemünde. Nineteen students and young scientists from 13 different countries gained insights

into the ecologic and economic effects of climate change. In addition to learning about technologies in physical and ecosystematic models, the participants also took part in several role plays, developed a film on climate change and held discussions on regional differences in the effects and

handling of climate change world-wide. Simultaneously, the University of Rostock also held a Summer School on "New Developments and Perspectives in Aquaculture". The students gained yet another opportunity to exchange ideas through joint evening events between the two summer schools. Lina Kliucininkaitė, a participant from Lithuania, described her experience at the summer school:

Why did you participate in the Summer School?

I joined RADOST last spring to write my Master's thesis under the supervision of Dr. Kai Ahrendt. The topic of my thesis is to model an artificial reef for the Probstei coastline and to study its impact on changes in sediment deposits. The topic of my thesis and my participation in RADOST were the main reasons why I decided to take part in the Summer School. I was looking for additional and at the same



Summer school participant Lina Kliucininkaite

time novel ideas to approach my Master's thesis and to come up with innovative solutions. Moreover, I wanted to deepen the knowledge that I gained during my Master studies at Kiel University.

What expectations did you have for the summer school? Were they fulfilled?

I expected that this Summer School would generate new ideas on how climate change impacts, especially storm surges, the rise in sea level, etc. could be implemented for both my Master's thesis and the RADOST project. I was looking forward to seeing how modeling can be applied in order to show climate variations and changes in the Baltic Sea region and learning how to solve technical problems such as filling gaps in data for modeling. I expected to gain new experience working with both international and German students through sharing different aspects and approaches. Most of my expectations were met, and I believe it was only the beginning, since I made contacts with many young scientists working on different research topics. They might be able to help find answers to questions that may arise during my Master's thesis or later, as projects nowadays are based on an interdisciplinary approach. Furthermore, I got to know some people involved in the RADOST project who were willing to answer questions I had regarding my Master's thesis topic.

What is the most important insight that you will bring home with you?

Climate change aspects must be approached in an interdisciplinary way. We can't use just one measure to come up with a conclusion or even a solution to this issue.

What aspects of the Summer School can you apply in RADOST?

Personally, I am going to use information about water level and climatic changes and variation in the Baltic Sea to improve the design of artificial reefs. Also, all information about modeling (lectures as well as practical applications) will contribute to solving data problems which I face when conducting flow and geomorphologic modeling. The introduction to coastal protection aspects and a coastal field trip gave me a better overview of what has already been done to protect German Baltic coastal areas. This will help us to come up with new coastal protection solutions such as submerged breakwaters or artificial reefs.

The Summer School 2010 was financed and organized by the Leibniz Institute for Baltic Sea Research Warnemünde (IOW), the Alfred Wegener Institute for Polar and Marine Research (AWI), the GKSS Research Centre in Geesthacht, the GKSS Förderungsgesellschaft and EUCC – The Coastal Union Germany. The projects RADOST and BaltCICA also supported the programme. Not only was RADOST represented at the summer school through Lina Kliucininkaite, but also the project KLIMZUG-NORD was represented through a Ph.D. student.

Publications

Bathing water quality in the Baltic Sea at higher water temperatures

The Leibniz Institute for Baltic Sea Research Warnemünde (IOW) is tackling the issue of bathing water quality as part of RADOST and is applying simulation models that enable risk assessment and also support public authorities in their management of the issue.

The monitoring of bathing water quality in the European Union has been regulated by law since 1976. Tests were made on beaches every 14 days to check, in particular, for total and fecal coliform bacteria. Since 2008, additional monitoring in Germany has been conducted in accordance with the new EU directive. Here, the focus is *Escherichia coli* and enterococcus bacteria, both of which are found in the human digestive tract. The presence of these bacteria in bathing waters is an improved indicator for fecal and waste water contamination and therefore helps to assess the level of harmful pathogens such as viruses and salmonellae. Climate change will intensify the situation, since increased water temperatures improve the chances of survival for such organisms.

G. Schernewski, E. Fischer, T. Huttula, G. Jost & M. Ras (submitted): Model tools to support bathing water management: *Escherichia coli* bacteria in a Baltic lagoon. *Journal Coastal Conservation*.

Publications

Community-based adaptation in the Balaton region

Livia Bizikova, László Pintér (2009): Community-based adaptation to climate change Investigating Stakeholder Decision Priorities for Adapting to Climate Change in the Lake Balaton Recreational Area of Hungary. International Institute for Sustainable Development.

This report provides a summary of the outcomes of a series of capacity-building workshops conducted in Hungary's Lake Balaton region. The main purpose of the workshops was to discuss local stakeholders' past and present decisions about adapting to climate change in the broader context of other forces of global and local change. Four workshops were conducted in three towns around Lake Balaton: Siófok, Keszthely and Balatonalmádi. Tourism is the main source of income for small businesses and municipalities in the towns around Lake Balaton. Recent changes in weather patterns during the main tourist season (and beyond) increased the interest of regional actors, including the Lake Balaton Development Coordination Agency, in investigating local vulnerabilities, adaptation options and the capacities needed to successfully tackle the local impacts of climate change. Building on the results of the four workshops, the report gives recommendations that focus on promoting the reintroduction of traditional local knowledge, supporting the conservation of water and other environmental resources, diversifying tourist attractions and services, and adjusting current development priorities and legislation to create a suitable framework for the implementation of adaptation measures.

Coastal protection under changed climatic conditions

Considering the predicted changes in climate on the Baltic Sea coast, coastal protection in this area will face new challenges if it is to maintain the current level of protection. With water levels rising and hydrodynamic forces on the coast increasing, the middle and long-term application and efficacy of common coastal protection structures and concepts becomes an important question. A technical article in the



Dune next to the resort of Ahrenshoop

journal "Wasser und Abfall" (Issue 6, 2010) illustrates which conditions must first be met in order to properly design protection structures on the coast of Mecklenburg-Western Pomerania against storm surges. It is actually quite difficult to go from measuring to dimensioning. In the past months, the Department of Coastal Engineering at the University of Rostock (URCE) has been working meticulously on the preparation and evaluation of water gauge data for the Staatliches Amt für Landwirtschaft und Umwelt Mittleres Mecklenburg (State Agency for Agriculture and Environment of

Central Mecklenburg – StALU MM). For the gauges in Wismar and Warnemünde, these data could be traced back all the way to the year 1848 and 1855 respectively. Changes in water level that are caused in the short term by storm surges and low tides form the basis for determining parameters for the dimensioning of coastal protection structures and are used for medium and long-term trend predictions of climate-related influences. Knowledge of environmental conditions also includes other parameters like wind and sea behavior as the basis for

determining hydrodynamic parameters for functional and constructive measurements. In addition, the use of statistical distributions, i.e. the calculation of measurement parameters with defined occurrence probabilities – such as floods with a statistical occurrence of one in 100 years – is playing an increasingly important role.

Sommermeier, Knut; Schlamkow, Christian (2010): Küstenschutz unter veränderten klimatischen Bedingungen an der Küste von Mecklenburg-Vorpommern. Wasser und Abfall 2010, Issue 6, p.10-16.

What's next?

Workshop "Ecosystem Wind Park"

4 November 2010, Rostock/Neu Broderstorf, Germany
www.klimzug-radost.de/termine/workshop-oecosystem-windpark

Conference "Climate adaptation in the Nordic countries: Science, Practice, Policy"

8 – 10 November 2010, Stockholm, Schweden
www.nordicadaptation2010.net/

dynaklim-Symposium 2010

9 November 2010, Essen, Germany
www.dynaklim.de/dynaklim/index/news/01_2010_symposium.html

KLIMZUG Workshop:

Climate change impacts on agriculture

10 November 2010, Braunschweig, Germany
www.klimzug-radost.de/termine/klimaauswirkungen-landwirtschaft

Conference "Coping with Uncertainty"

15 – 17 November 2010, Stockholm, Schweden
www.esa-esn.szie.hu/2009/06/coping-with-uncertainty.html

Conference "Adapting to the changing climate"

23 – 24 November 2010, Brussels, Belgium
www.lne.be/en/2010-eu-presidency/events

Workshop "Coastal protection"

1 December 2010, Timmendorfer Strand, Germany
www.klimzug-radost.de/WS-Kommunaler-Kuestenschutz

United Nations Climate Change Conference (COP 16)

29 November - 10 December 2010, Cancún, Mexico
www.cc2010.mx/en/index.htm

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