

## *Hydrological Extremes in Small Basins-The 12th Biennial Conference of the Mediterranean Network of Experimental and Representative Basins (ERB)*

*Cracow, Poland, September 18-20, 2008*

The Mediterranean Network of Experimental and Representative Basins (ERB) is an open association of hydrologists from twenty European countries carrying out their research in well-instrumented, small drainage basins. The ERB was recommended by the European Council and established in 1986. The main objectives of the network are:

- to establish and maintain relationships among member countries and research teams by means of information exchange, mobility, and regular conferences;
- to initiate and enable co-operation among members and other organizations;
- to maintain databases of small-scale research and experimental basins.

It is much easier to comprehend and follow the complex hydrological processes that influence river dynamics, flood formation, low flows, and their consequences in small basins than in large ones. Generally, large basins have many more hydrological factors, and they are more spatially dispersed. A similar pattern applies to the physical and chemical characteristics of water arising from factors of a different nature: geological, climatic, and anthropogenic. Small research basins occur in various climatic and plant cover zones, with different geological characteristics and geomorphology. Some of them represent pristine environments, whereas others have environments that have been strongly changed by farming practices

or urbanization. Hence, the scope of hydrological research in small basins is very wide: from surface-water and ground-water monitoring to studies in runoff generation, hydrological and environmental modelling, biogeochemical processes, hydrological extremes, uncertainties in data and model concepts, effects of natural and man-made changes, erosion, sedimentation, hill-slope processes, and so on.

Biennial conferences are one of the forms of the ERB's activities. The first was held in 1986 in Aix en Provence (France). It was followed by conferences in Perugia (Italy), Wageningen (The Netherlands), Oxford (UK), Barcelona (Spain), Libice (Czech Republic), Ghent (Belgium), Demanovska Dolina (Slovakia), Turin (Italy), and Luxemburg (Luxemburg). The last conference in September 2008 took place in Cracow (Poland) at the Institute of Geography and Spatial Management of Jagiellonian University. The conference theme focused on hydrological extremes. The rising intensity of extremes has been connected with global environmental changes during recent decades. The topics discussed were: predictions of stream-flow response in controlled and uncontrolled catchments, the calibration of hydrological models, hydro-chemical and geomorphological responses to the extremes, interactions between surface-water and ground-water, extreme value statistics, and

model data-time-step dependency on basin characteristics. As usual, one of the sessions was devoted to new ideas in hydrological research. The conference started with the address by the ERB International coordinator, Piet Warmerdam of the Wageningen University (The Netherlands), who briefly reviewed the ERB's objectives. Then the Director of the Institute of Geography and Spatial Management in Cracow, Boleslaw Domanski, presented a short introduction to the history of the Jagiellonian University, where the first chair in geography in Central Europe was founded in 1849.

The first session (Prediction of Hydrological Response based on Different Quality Measurement Data) was chaired by Andreas Herrmann of the Technical University Braunschweig (Germany). The presentations concerned the modelling of hydrological extremes using gauge and radar-driven model predictions, the methods of delineation of small basins prone to flash floods, the importance of accurate catchment-averaged evapo-transpiration for flood forecasting and extreme flood simulation using two-dimensional hydraulic model, engineering perspective of flood protection using dry-dams, and the use of isotopic tracers in studying hydrological response in small catchments.

The second session (Hydrological Model Calibration for Extreme Conditions) was chaired by Joao de Lima of the University of Coimbra (Portugal). The presentations concerned river flow modelling under different catchment conditions: glaciated, urbanized, mountainous, forested, and granitic. Also, a deterministic-stochastic model for the area of the former USSR's basins situated in different climatic zones was presented.

The third session (Hydro-chemical and Geomorphological Response to Hydrological Extremes) was preceded by the keynote lecture by Maciej Zalewski of the European Regional Centre for Eco-hydrology (Poland). His lecture was focused on the implementation of ecological biotechnologies in integrated water resources management. It



was followed by five presentations on hydro-chemistry dynamics under extreme conditions in basins of different land-use. One of them dealt with sediment transport during river flow extremes. Another one was devoted to threshold values of rainfall causing surface runoff and sheet erosion on slopes. This presentation was also an introduction to the next day's field excursion to the Jagiellonian University's Research Station in the Carpathian Foothills. The last presentation of the session concerned sea-water intrusions and their influence on lake-water chemical composition on the Baltic Sea coast.

The fourth session (Extreme Value Statistics) took place on the second day of the conference and was chaired Piet Warmerdam. The session consisted of three presentations only. They were focused on the statistical characteristics of extreme events, especially during the low flow periods. Four presentations were delivered during the next session (Surface-water-Ground-water Interface under Extreme Conditions) conducted by Daniel Viville of the C.N.R.S (France). The keynote lecture by Zbigniew Kundzewicz of the Polish Academy of Sciences concerned the prediction and scenarios of changes in water circulation affected by the climate change. Other lecturers presented the results of studies on the interaction among the rainfall, groundwater levels, and runoff formation. Over sixty posters were presented during the poster session. For two hours, the authors had the opportunity to discuss the research results with other conference participants. The result of the best poster competition was announced by the Conference Scientific Committee. Scientific value, well-considered design, clarity of figures and descriptions, and general aesthetic impression were taken into consideration. The poster entitled 'Multi-temporal Analysis of Land Cover Change for Flood Discharge Studies in the Nyando River Basin using Land-Sat Images', presented by Olang Luke Omondi and co-authors of the BOKU University (Austria), was judged to be the best on display. The authors received a diploma and a set of reproductions of old maps from the map collection of the Jagiellonian University Library.

After the poster sessions, the participants made a half-day excursion to the Research Field Centre of the Jagiellonian University (JU) in Lazy (in the Carpathian Foothills) and its experimental basins. Despite the cold



and rainy weather, the participants explored the meteorological station, the stream-gauging site, and soil erosion experimental plots. Wojciech Chelmicki (JU) explained the history of hydrological research in the Carpathian Foothills. An outline of the environmental and hydrological issues of the area was given by Janusz Siwek (JU). The methodology of soil erosion measurements was outlined at the site by Jolanta Swięchowicz (JU). Finally a brief summary of studies of streamwater chemistry and water circulation during flood events was given by Joanna Siwek (JU). The field-trip ended with a conference dinner served at the Royal Castle in Niepolomice near Cracow. During the dinner there was an opportunity to thank Piet Warmerdam for his six-year service as ERB International Coordinator. The new coordinator, Ladislav Holko of the Slovak Academy of Sciences, was introduced to the ERB members.

On the third day, the prediction of streamflow and streamwater characteristics during extreme events was strongly emphasized. The session 'Extreme Flow Prediction in Ungauged Basins' conducted by Joanna Pociask-Karteczka (JU) started with the keynote lecture by Ian Littlewood (United Kingdom). He described progress in the methodology of the unit hydrograph based models and their application to engineering and environmental hydrology. The last two sessions, conducted by Wojciech Chelmicki and Ian Littlewood, gave an overview of new ideas and developments in small-basin research. The presentations concerned

engineering structures and water management systems in small basins, the methodology of natural tracers in water and suspended sediment circulation, and the application of neural networks to river-flow modelling during floods. The conference concluded with the ERB General Assembly conducted by Piet Warmerdam and the new ERB International Coordinator, Ladislav Holko. The place and date of the next ERB Conference was announced: Austria, 2010.

A book containing the abstracts of the oral and poster presentations was published and may be downloaded from the conference webpage (<http://www.geo.uj.edu.pl/erb2008>). The Proceedings of the Conference, based on the oral presentations, will be published in 2009 in the IHP-UNESCO Technical Documents in Hydrology. The papers based on the keynote lectures will be published in late 2008, in the journal of the *Folia Geographica*, series *Geographica-Physica*. The Proceedings based on the posters will be published in the same journal in 2009. The organizers wish to thank the keynote lecturers for their valuable contribution to the conference, and UNESCO for the financial support granted to some young researchers participating in the event.

**Wojciech Chelmicki and  
Janusz Siwek**  
Jagiellonian University, Institute of  
Geography and Spatial Management  
7 Gronostajowa str.  
30-387 Cracow  
Poland