

Preface

Since UNESCO launched the International Hydrological Decade (1965–1974) many hydrological research basins have been established, focusing on investigations of hydrological processes at a basin scale. Only in well-defined small basins with high-quality measurements, can the complexities of combined physical, chemical and biological processes be adequately investigated. Small hydrological research basins provide inter-disciplinary observatories, thus contribute, e.g. with high-quality long-term data, to studies aiming on the understanding of impacts of environmental changes, and to strategy development for water and land-use management. Furthermore, the knowledge thereof gained will provide key insights for the improvement of pollution control. A strengthened network of hydrological research basins would help to facilitate the synthesis of research required to meet future challenges in water resources management and ecology in a changing environment.

This was perceived by the participants of the International Workshop on *Status and Perspectives of Hydrology in Small Basins* held in Goslar-Hahnenklee, Germany, 30 March to 2 April 2009. They discussed a wide range of benefits from a strengthened small basins network, and adopted as one result the **Braunschweig Declaration** on “*The need for a global network of long-term small hydrological research basins*”. The Declaration, that will be also made available to concerned organisations, associations, institutions and stakeholders, is presented at the end of this publication. In these proceedings, the scientific oral and poster presentations that were held and discussed during the workshop are summarized. A second publication by S. Schumann, B. Schmalz, H. Meesenburg & U. Schröder (eds.) 2010 “*Status and Perspectives of Hydrology in Small Basins. Results of the International Workshop in Goslar-Hahnenklee, Germany, 2009 and Inventory of Small Hydrological Research Basins*” appeared in the *IHP/HWRP-Berichte 10* (Koblenz, Germany) and summarizes the discussions and results obtained in the working groups.

The Workshop was held on the occasion of 60 years of hydrological measurements in the four small Bramke research basins in the Upper Harz Mountains, Germany. They were established in 1948, under extremely difficult financial and logistic conditions, by deeply committed researchers from the forestry administration and the Research Centre (today: Federal Institute) of Hydrology who concentrated in succession on questions of forest hydrology. This era was followed up by the implementation of miscellaneous projects of various universities, institutes and agencies during the following decades.

Similarly, a great number of small basins are monitored under various research aspects in many countries. These investigations contributed to the attainment of aims of the IHD and the IHP. In the framework of IHP, small basin research in Europe is implemented in the IHP-FRIEND cross-cutting component, here especially the Northern European EURO FRIEND Project 5 “Catchment Hydrological and Biogeochemical Processes in a Changing Environment”, and Mediterranean MED FRIEND. Additionally, European FRIEND research groups are linked up under the Euromediterranean Experimental and Representative Basin Network, ERB, and under the IAHS PUB initiative.

The Workshop served as a platform to assess the aspects of *where do we stand?* and *what are we heading for?* in the operation and research in small hydrological basins. In the first place it aimed at highlighting the hydrological research results and benefits to hydrology at large that were derived from the knowledge gained in small basins. Based on these deliverables, work focused on questions concerning the need for further operation of small research basins and their role in hydrological research to meet future challenges. Hence, the Workshop consisted of paper and poster presentations with discussion of the results in plenary sessions, and of working group activities.

The Workshop was convened jointly by the Department of Hydrology and Landscape Ecology at the Technical University Braunschweig, Germany and the German National Committee for the IHP of UNESCO and the HWRP of WMO in cooperation with the EURO FRIEND Project 5, the MED FRIEND and the ERB, and organised jointly with UNESCO/IHP, WMO and IAHS. The Workshop was limited to 70 participants and was attended by researchers from 24 countries. Participants were actively involved by presenting a paper or poster attached to the plenary sessions and working group meetings. Moreover, all participants took part in one of the working groups, developing answers and contributions to questions on the necessity of the operation and research in small hydrological basins, as well as on future contributions to research and knowledge in hydrology. The working group results were presented and discussed in the plenum during the final session of the Workshop. They formed the basis for the Braunschweig Declaration, and are reported in full in the *IHP/HWRP-Berichte* already mentioned. In advance of the Workshop the organisers developed a poster template heading for a special poster exhibition to provide information about all the small basins represented at the workshop. In total 38 research basins were finally displayed using the same poster template format. Meanwhile a digital inventory of those basin posters has been established as another main outcome of the Workshop. It is available to the public at www.euro-friend.de.

These proceedings include 46 peer-reviewed full oral and poster papers as one most important scientific product from the Workshop. They are arranged according to the sequence of the four main topics at the Workshop: (1) presently operated small hydrological research basins; (2) fundamental hydrological research results drawn from studies in small basins; (3) hydrological processes knowledge drawn from studies in small basins; and (4) importance of hydrological data and results from small basins for hydrological modelling.

The editors are grateful to their co-editors, to the reviewers and to authors for their cooperation and patience during the whole editing process. Mrs Dagmar Kronsbein of the German IHP/HWRP Secretariat at Koblenz has commendably improved the English language of most papers, well supported by Mr Ulrich Schröder who monitored the scientific assertion. The support of Mrs Karen Prilop of the Department of Hydrology and Landscape Ecology of the Technical University Braunschweig is acknowledged with appreciation for formatting and re-formatting papers. The organisers of the Workshop and the editors of these proceedings are very thankful to IAHS Press for including this volume in the Red Book Series and are grateful to Penny Perrins and Cate Gardner for all their efforts and technical support.

Andreas Herrmann & Sybille Schumann

*Institute of Geoecology, Department of Hydrology and Landscape Ecology,
Technical University Braunschweig, Langer Kamp 19c, D-38106 Braunschweig, Germany*

The workshop organisers express their sincere thanks to all those who assisted in the organisation of the workshop. The members of the International Advisory Board deserve special mention:

Keith Beven, UK

Michael Bredemeier, Germany

Siegfried Demuth, UNESCO/IHP and IAHS/ICSW

Zbigniew W. Kundzewicz, Germany/Poland

Jeff McDonnell, USA

Laurent Pfister, Luxembourg

Stefan Uhlenbrook, The Netherlands

Piet Warmerdam, The Netherlands

Furthermore, the working group leaders merit sincere thanks:

Keith Beven, UK

Michael Bredemeier, Germany

Francesc Gallart, Spain

Ladislav Holko, Slovakia

Ian Littlewood, UK

Hilary McMillan, New Zealand

Henning Meeseburg, Germany

Laurent Pfister, Luxembourg

Britta Schmalz, Germany

Sybille Schumann, Germany

Stefan Uhlenbrook, The Netherlands

Piet Warmerdam, The Netherlands

All papers in this volume have been reviewed, some were revised further by the editors in collaboration with the authors, prior to publication. The editors would like to acknowledge the workshop authors for their patience and cooperation during the reviewing and editing processes.

Thanks also to Karen Prilop (Department of Hydrology and Landscape Ecology, Technical University Braunschweig, Germany) for formatting the papers, Dagmar Kronsbein for checking and improving the language, and Ulrich Schröder (both IHP/HWRP Secretariat, Federal Institute of Hydrology, Koblenz, Germany) for his scientific advice and support during this project.

IAHS matters

At IAHS Press, all incoming papers from the editors were checked and, if necessary, again reformatted by Penny Perrins and Cate Gardner (IAHS Press, Wallingford, UK).