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IAHS Newsletter

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News from Maastricht, July 2001 (see page 7)

Some of the IAHS Assembly participants at the splendid dinner held at "La Butte aux bois", Lanaken, Belgium on 25 July 2001. *Photo by Norman (Jake) Peters*.

Contents

From the President

At the splendid opening ceremony of the Sixth Scientific Assembly of our Association in the Maastricht Exhibition and Congress Centre, a group of people in local costume of the seventeenth century marched in loudly playing musical instruments. The last person had a dog who appeared not too happy to be taking part in the procession. The group assembled on the stage in the exact formation of "Night Watch" by Rembrandt, which we saw in the National Museum (Rijksmuseum) in Amsterdam on the way to Maastricht. Even the dog exactly portrayed the one seen in the Rembrandt.

It was with great pleasure that I became the nineteenth President of IAHS during this magnificent opening ceremony. To succeed such an outstanding President as John Rodda is tough, as John has devoted so much effort in leading the Association to its current level of success in scientific activities and its cultural reputation. On behalf of all the members, I would like to thank him and congratulate him on the excellent job he has done over the last six years; and ask him to continue contributing to IAHS in the future. I know it is even tougher for me to succeed in maintaining the scientific reputation of IAHS and to keep it responding to the needs of the contemporary world. I shall try to do my best and I ask for the cooperation of all IAHS members in this endeavour.

Hydrology has successfully served the development of nations at a basin scale. Now we have a new and demanding client, the Earth. Hydrology as an aspect of the earth sciences is expected to work jointly with other disciplines towards the development of the Earth simulator. At the same time, with respect to hydrology as an aspect of water resources management we have to face up to the suffering of people worldwide regardless of national boundaries. We have to serve both objectives at very different scales as earth scientists and as people's doctors of hydrology. We have been trying hard but have not been successful enough in demonstrating our capability to serve our client the Earth. We can do it much better by collaborating more closely with leading science programmes such as the GEWEX (Global Energy and Water Experiment)/WRAP (Water Resources Applications Project), the Water Cycle Theme of IGOS (the Integrated Global Observing Strategy), BAHC (Biospheric Aspects of the Hydrological Cycle), HELP (Hydrology for Environment, Life and Policy), FRIEND (Flow Regimes from International Experimental and Network Data), JIIHP (Joint International Isotope Hydrology Programme) and with good old friends like, IHP (the International Hydrological Programme), HWRP (the Hydrology and Water Resources Programme), and IAEA (the International Atomic Energy Agency).

Before Maastricht, we had new and very successful discussions about the IAHS strategic science agenda over the internet http://serv2.cee.yamanashi.ac.jp/iahs and using a mailing list IAHSV1@serv2.cee.yamanashi.ac.jp. I thank you all very much for your contributions. As you know, many interesting thoughts were introduced and discussed such as "scientific curiosity *vs* societal missions" and "Gaia Genome". In order to obtain a better profile in the international community, Dr Murugesu Sivapalan proposed that IAHS activities should assume a laser-like focus and adopt the Prediction of Ungauged Basins, as a specific focus. There was enthusiastic support for this idea and even a concrete workshop proposal. I am so glad to have taken part in such broad discussions with a group from all over the world (that included some members not so well acquainted with IAHS) that eventually converged on a specific focus subject. It was unfortunate that so few internet discussants were present at Maastricht for the Workshop on

IAHS Newsletter

The International Association of Hydrological Sciences (IAHS) is a nongovernmental scientific organization dedicated to serving the science of hydrology and the worldwide community of hydrologists. The IAHS Newsletter is issued three times a year (usually in January, May and September) and is distributed free of charge to individuals (not libraries) at the discretion of the Secretary General. Recent issues have been sent to all IAHS members.
Both this Newsletter and previous issues are downloadable from the IAHS web site:
http://www.cig.ensmp.fr/~iahs

Articles should be sent to the IAHS Secretary General, preferably by e-mail to iahs@ensmp.fr, or on diskette in Word, Rich Text Format or ASCII format, or by fax or mail to:

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Next deadline for copy

Articles must be received at least six weeks before the month of publication. **The next issue will be probably be published in February 2002 and the deadline for articles is 31 January 2002**.

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the Science Agenda of IAHS, as this meant there was a lot to settle afterwards. But we did agree to focus on ungauged basins as an IAHS cross-cutting inter-commission initiative. We agreed to create a new working group, designating the International Commission on Remote Sensing, the International Commission on Tracers, the Working Group on Theoretical and Experimental Hydrology in All Scales and the Working Group on GEWEX/BAHC as the most closely related groups within IAHS and asked Dr Al Rango to coordinate the initiation. I hope the discussions on ungauged basins bring the great scientific potentials assembled to practical use. Dr Al Rango is organizing the first informal workshop on 13 December 2001 in San Francisco during the AGU Fall meeting. Another focus that we agreed on was Global Water Assessment, proposed and lead by Dr Charles Vorosmarty.

The other important working group established at Maastricht was the Working Group on Hydrology 2020. This working group, made up of 12 promising young members led by Dr Taikan Oki, will look into the potential and opportunities of hydrological sciences in the foreseeable future and produce a report by Sapporo 2003. Free and fresh imagination always opens a new era. At the inauguration, Dr Zbigniew Kundzewicz, Chairman of the Hydrology 2000 Working Group (active 1983–1987), reviewed the Hydrology 2000* report and pointed out that the current dynamic developments in information technology, geographical information systems and satellite uses had not been predicted, while many theoretical interests such as scale issues had been predicted but remain unsolved to date. I believe that the objective of the Hydrology 2020 Working Group is not necessarily to correctly predict future developments accurately but to create enthusiasm for future challenges. Prior to Sapporo, the views of the working group will be invited for presentation at the next Kovacs Colloquium in Paris, June 2002. I wish the working group all the best for a good start to their discussions.

There is now a rising interest in water in the international political arena. The Third World Water Forum, the World Water Assessment Programme, UNESCO's priority on water sciences etc. reflect new strong political initiatives. We are expected to demonstrate our practical use there. Knowledge on hydrological processes and water resources, both natural and manmade, on local, basin, regional, continental and global scales is badly needed everywhere in the world. There are great opportunities in front of us. I sincerely hope that all the IAHS activities, whether continuing or newly established, will serve their planned objectives. Let us start immediately and work hard for such an honourable, enjoyable and rewarding mission.

Kuni Takeuchi

From the Secretariat

Maastricht is over. It was a very successful assembly, even if we would have been happier, not only from a financial point of view, with more participants. It was pointed out that among the reasons for the low number of participants was the duration of the Assembly. We shall try to take that point into account for future events and especially for the next IUGG (International Union of Geodesy and Geophysics) General Assembly, to be held in Sapporo, Japan, in 2003. In Maastricht there were first of all scientific symposia (4) and workshops (7). There were also administrative meetings of the Bureau and of the Commissions, two Plenaries and a lot of Working Parties. Later in this issue of the Newsletter you will find reports on some of the scientific meetings. You will find them also on the IAHS web site. Others reports will follow, both in the next issue of the Newsletter and on our web site. It is very difficult to summarize so many discussions in just a few words. Nevertheless, I shall try—my impression is that hydrologists want to be useful to society. A great emphasis is now given to "water problems". The scope of these problems is far larger than that of hydrology as it encompasses social and economical problems, but without hydrological data and hydrological knowledge all solutions to these problems would remain poor and not at all sustainable. This concern is reflected in the "Maastricht Manifesto" unanimously adopted by the participants of the Assembly (and published later in this Newsletter). To provide their input to society, hydrologists should develop and apply their science. For this reason, in addition to our traditional Commissions, the existing Working Group on Theoretical Hydrology and the IAHS/WMO Working Group on GEWEX (Global Energy and Water Experiment) have been confirmed and some new working groups have been appointed—like the Hydrology 2020 Working Group, composed of young hydrologists from all over the world who have been charged to think about the future of hydrology; the so-called "Ungauged basins" Working Group which is devoted to very practical hydrological problems, but which will probably need some theory to get the best from remote sensing. Plans for other possible working groups linked to large international programmes include one on Water Resources Assessment and one on Use of

* **Hydrology 2000** (The report of the Hydrology 2000 Working Group), *edited by Zbigniew W. Kundzewicz, Lars Gottschalk & Bruce Webb*, **Publ. no. 171** (1987), price ~~£14.50~~ *now only £9.00*, 100 + x pp., available from IAHS Press.

Isotopes Techniques in Hydrology; but some further discussions, and of course the agreement of the corresponding programmes are still needed. An IAHS–IAPSO (our sister association dealing with physical oceanography) Joint Commission on Groundwater–Seawater Interactions has been created and we decided to join what is now the IWA (International Water Association)/IAHR (International Association for Hydraulic Engineering and Research)/IAHS Joint Committee on Hydroinformatics. Such links with other scientific and technical bodies should be developed in the future, in a flexible way, especially to cope with the challenges of global hydrology.

The number of visitors to our web site (http://www.cig.ensmp.fr/~iahs), even if it does not make of us a star of the web, is very satisfactory. Special attention is given to the presentation of IAHS Press publications, and to the announcement of hydrological meetings organized, sponsored and/or supported by IAHS, but more needs to be done to meet the needs of IAHS National Committees and individual members. An historical section has just been created and will be developed. We think that more links to national hydrological sites, especially those of national hydrological organizations would be useful. Please send me such addresses, together with all your suggestions which will be carefully reviewed and, hopefully, as far as possible implemented.

We are now looking towards 2003, even though we have a lot to do next year, when two major events will take place, both of them in Japan. The first one will be the Third World Water Forum (Kyoto, Shiga and Osaka, 16–23 March 2003), where we shall promote the place of hydrological sciences for solving water problems of the twenty-first century. The second one is the XXIII IUGG General Assembly (Sapporo, 30 June–11 July 2003), the general theme of which will be "State of the Planet". Our Commissions have elaborated a lot of proposals for symposia and workshops, which have to be reviewed within IUGG and according to the publishing capacity of IAHS Press. These "pure" IAHS symposia and workshops should fit within one week, probably the second week of the General Assembly. Unfortunately it seems impossible at the present time to place in this same week all the joint events we will organize with other IUGG Associations. A first meeting was held last summer in Sapporo where the Local Organizing Committee presented the venue. A lot of exchanges within IAHS and IUGG are ongoing and the final programme for Sapporo 2003 should be definitely defined in San Francisco early December. It will be immediately posted on our web site and published in the next issue of the Newsletter.

Pierre Hubert

International Hydrology Prize

In July 2001 in Maastricht, Prof. Igor Shiklomanov, from the St Petersburg State Hydrological Institute (Russia) received the 2001 International Hydrological Prize, jointly awarded by UNESCO, WMO and IAHS. Below you will find the nomination by Prof. K. Takeuchi, IAHS President, and the response from Prof. Shiklomanov.

Ladies and gentlemen

It is my great fortune to be able to start off my presidency with the honourable role of presenting the International Hydrology Prize to my good old friend Igor. Professor Igor A. Shiklomanov was born in Tver Region, Russia, on 28 February 1939. He graduated at Leningrad Hydrometeorological Institute in 1961 as an engineering hydrologist and was given a doctorate of geographical sciences on hydrology and water resources at the same institute in 1977. He became a Professor of this famous Institute in 1985 and the Corresponding Member of the Russian Academy of Natural Sciences on Hydrology and Water Resources in 1991. He has been the Director of the Institute since 1981, after being the Deputy Director for Science between 1972 and 1981.

Professor Shiklomanov's major scientific areas include:

- *Developing the methods, assessing and forecasting human impacts on river runoff and water resources; studying changes in river water inflow and scientific generalization of measures for solving water problems.*
- *Hydrological generalization of river and water-body hydrology and water resource re-distribution.*
- *Dynamics, forecasting and management of water resources, water use, and water availability regionally and globally.*
- *Hydrological and ecological studies of water systems.*
- *Detailed studies of anthropogenic global climate change effects on hydrology, water resources, and water management problems and developing the necessary adaptation measures.*

Thus his expertise is mostly in global assessment of water resources, its availability, needs, development, problems, changes, estimates etc. Indeed he has been serving as the major scientist for collecting and analysing global water resources data. His first contribution on this subject was an article "Exploitation of the Earth's water resources" co-authored by G. P. Kalinin, published in 1974 in the epoch-making UNESCO IHP publication "World Water Balance and Water Resources of the Earth" which is still the only reliable worldwide assessment of the Earth's freshwater resources.

His recent contributions on freshwater assessment were again conducted under the IHP-IV programme in 1990–1996 and produced reports titled "Assessment of the Impact of Climate

Variability and Change on Hydrological Characteristics and World Water Resources at the Beginning of the 21st Century". These reports are the most important scientific documents serving as the bases of the current water policy planning in the UN agencies and many non profit-making organizations including the World Water Vision of the Word Water Council. The final publication based on those reports is the book "World Water Resources at the Beginning of the 21st Century" now in press at Cambridge University Press.

Professor Shiklomanov served and has been serving as a member or chair of a large number of committees, boards, councils etc. He has been the Deputy Chairman of the Russian National Committee for UNESCO's International Hydrological Programme (IHP) since 1990 and served as the Chairman of the Intergovernmental Council for IHP from 1992 to 1994. He has been serving as a key Member of the Scientific Steering Committee for the Global Energy and Water Experiment World Climate Research Programme since 1992 and was a lead author of the Intergovernmental Panel on Climate Change WG2 Third Assessment Report 1998–2000. Since 2000 he has been the Chairman of the Working Group on Water Resources of WMO's Commission for Hydrology and above all, he has been a Vice-President of the IAHS International Commission on Surface Water since 1999.

His contribution to the scientific community as well as to the people of the world is tremendous and he deserves to be the first winner of the International Hydrology Prize this century. Congratulations!

Professor Shiklomanov responded as follows:

Ladies and gentlemen, dear colleagues!

I am very grateful to IAHS, UNESCO, WMO, for the great honour of the International Hydrological Prize, and I am very much obliged to my friends and colleagues for my nomination and selection.

Hydrology is my science. I devoted 45 years of my life to it and for the last 20 years I have been Director of the St Petersburg State Hydrological Institute—the oldest, leading institute in Russia in the field of hydrology. Our institute will be 82 years old this year. Every day I come across various aspects of modern hydrology and water resources. Quite often our science is thought to be in crisis. If you ask my opinion I would frankly say "no—there is no crisis in hydrological science".

Hydrology came into existence to answer practical needs and in the twentieth century it has progressed both dynamically and comprehensively: hydrological networks, theory, field and laboratory experiments, remote sensing methods, mathematical modelling and computerization, and GIS technologies have been developed. Hydrology and water resources became more and more closely linked with ecology, economics, and social sciences. To a large extent the development of hydrology in the last 40 years has been promoted by international cooperation.

However all the experience accumulated in the past century needs to be critically analysed and harmonized. It is quite possible that in certain periods the role of some fields of hydrological science and practices was significantly overplayed at the expense of others. This is only natural.

For instance, the intense inclination towards mathematical modelling and computerization did not complement but was done at the expense of the process-oriented studies that involve tedious field and laboratory investigations. Such inclination quite often becomes a "fashion" and negatively affects the development of the fundamental basis of hydrological science and its applied and environmental-protection aspects.

For example, a college graduate who comes to hydrology

Dr John Rodda (left),Prof. Igor Shiklomanov and Dr Kuni Takeuchi at Maastricht.

usually has good computer skills and has general ideas about hydrological processes. Computers can be loaded with software for any hydrological task. Just enter the necessary data, press the buttons and you will have quick results. This creates an illusion that all hydrological problems are solved. If this is the case, why get engaged with high-cost experiments which require significant effort, time, knowledge and hard work?

Maybe this is one of the reasons (not just financial) of insufficient attention to observations and experimental aspects of hydrology we have witnessed in recent years? Maybe we really know everything about hydrological processes, can compute everything, and will be able to model everything? If we hydrologists as scientists think like that, then we can say with certainty: "hydrological science is in crisis".

I do not think so. It is no secret that many models are based on the most elementary algorithms, very rough approximations that are far from adequate representations of hydrological processes. This is primarily so because there are many things that we don't yet know, or perhaps it is better to say, we know more than we can explain. I am sure we must pay more attention to the development of experimental hydrology; and first of all, it should be done through IAHS as an authoritative, nongovernmental organization, not burdened with official projects of governmental organizations such as UNESCO, WMO and UNEP.

In the last 10 years the problem of anthropogenic climate change, global warming, and the studies of the possible consequences, including those related to water resources became very popular in the natural sciences and in hydrology in particular. This problem is often the subject of scientific discussions that result in different opinions.

Some scientists believe that temperature rise has nothing to do with the increase in CO_2 concentration, considering it as a pure manifestation of the natural cyclic fluctuation of the climate. To their mind future cooling is inevitable. Some believe that actually there is no CO_2 increase or warming, and the figures usually presented to illustrate the problem reflect shortcomings of our non-representative observational network or inaccuracies in the estimation methods we use, when it is possible to obtain any required results.

The problem of forecasting intense global warming has many uncertainties. Quite possibly this hypothesis will not be confirmed in the future. But even if this is the case the hypothesis of global warming is very useful and, in my mind it contributes a lot to the development of science. It unites scientists of different disciplines—climatologists, hydrologists, oceanographers, economists and others, which is very important and useful for all. It stimulates the development of our sciences, and finally it compels governments to allocate more money to our investigations.

I believe that the problem of global warming is one of the positive factors for the development of modern hydrology.

My whole life is closely related to the State Hydrological Institute, and the Prize I have been awarded is, first of all, important recognition of the institute's work, and its considerable contribution to international cooperation.

My home country, Russia, possesses 10% of the world's renewable water resources, and we fully recognize our responsibility for the study and rational use of the water resources in the large territory of our country.

Experience accumulated from hydrological investigations in Russia and generalization over vast territories with very sparse hydrological networks has become very useful for problems related to assessment of the world's water resources. We have been studying this problem for more that 30 years, and the role of international cooperation is very important.

In fact, it would not be possible to do something important and useful related to this problem without help and support from such international organizations as UNESCO, WMO, IAHS, and all our foreign colleagues. I would like to express my sincere gratitude to them all.

The state of the world water resources, the inadequate supply of clean freshwater in many regions of the world, water conflicts between different countries, forthcoming water crises—these are our common problems, our concerns and responsibilities. Those problems are important for both our generation and future generations. They can be solved only if there is a general understanding of how exclusive and unique freshwater is for life and the well-being of humanity, and how sensitive it is to unwise and harmful activities. This understanding should be based on a fundamental knowledge in the field of hydrology and water resources.

During this IAHS Assembly we will discuss the development of hydrology within the framework of IAHS, and, in particular, the initiative and proposals made by Prof. Kuniyoshi Takeuchi, the IAHS President, for a long-term programme "IAHS Decade on Ungauged Basins". I absolutely and enthusiastically support this brilliant suggestion. It is especially useful under the current reduction of the world hydrological network.

I would like to emphasize that the solution of this challenging problem has not only great practical but also scientific importance. To my mind, we can believe that we have successfully studied hydrological processes and phenomena only when we are able to solve various hydrological problems for ungauged basins, i.e. this problem should be a first priority for IAHS.

I am happy that I work in such an interesting and important field of science as hydrology. I have been lucky to participate in the international scientific cooperation, and communicate closely with you my friends and colleagues, and I deeply appreciate such a high recognition of my modest contribution to hydrology and water resources.

Tison Award

Dr Linda See received the Tison Award in Wallingford on 17 September 2001, during the celebration organized for the inauguration of the new IAHS Press office. This year the panel was led by Prof. Karsten H. Jensen (Lyngby, Denmark), then President of the International Commission on Atmosphere–Soil–Vegetation Relations. Below is the nomination for the award by Prof. Zbigniew Kundzewicz, IAHS Editor.

The Tison Award for the year 2001 is bestowed upon Dr Linda See from the School of Geography, University of Leeds, UK, for two papers recently published in "Hydrological Sciences Journal" (HSJ), of which she is the first co-author:

- See, L. & Openshaw, S. (1999) Applying soft computing approaches to river level forecasting. *Hydrol. Sci. J.* **44**(5), 763–778.
- See, L. & Openshaw, S. (2000) A hybrid multi-model approach to river level forecasting. *Hydrol. Sci. J.* **45**(4), 523–536.

The papers deal with applications of artificial intelligence (AI) in hydrological sciences, and flood forecasting in particular. The important area of river flow and stage forecasting is rather classical, but the approaches taken by Dr See are indeed novel and innovative. She made use of such modelling techniques as: artificial neural networks, fuzzy logic, and genetic algorithms. These methods, originally developed in systems sciences by Zadeh, Kohonen, Holland, Goldberg, Kosko and others, have been imported into hydrological sciences as they hold potential for applicability. They are not derived from well-established equations of mathematical physics, which rigorously describe hydrological processes in a micro-scale. However, they offer an attractive practical alternative, especially in cases where it is difficult to use physically-based models.

After having dealt with individual models, intercomparison of models and selecting the best approach for particular conditions, Dr See tried to integrate models into a hybridized construct combining conventional modelling methods with AI-based approaches to provide a better overall solution than could otherwise be achieved with the use of a single technology. She suggested several methods of integration and used different evaluation measures.

Even if some systems approaches to hydrology have been criticized as "curve-fitting exercises", which neither improve our insight nor understanding, in the opinion of present writers, the methodology in question does not belong to this category.

Both papers in question were well received by the anonymous reviewers who evaluated these submissions to "Hydrological Sciences Journal". Papers by Dr See and Dr Openshaw can be seen as being embedded in a set of several contributions, published recently in HSJ, on hydrological applications of neural networks, genetic algorithms and fuzzy sets. This fact documents growing interest of the hydrological community in these novel approaches. It is hoped that these methods may lead to enhancements of conventional models. As mentioned by Dr See, extensive testing is still required, on a wider range of station types and catchments, to see how they behave for many real-world events. Yet, the methodology has already gained attention for operational hydrology—neutral network flood forecasting software is being operationally used by the Environment Agency in the UK.

Pierre Hubert enjoying presenting the Tison Award to Linda See.

Despite her young age, Dr See has gathered considerable international experience, having already worked in four countries: Canada, Germany, Italy (for the intergovernmental Food and Agriculture Organization), and recently the UK.

Besides co-authoring the papers mentioned in this citation, Dr See has played an important role as a reliable reviewer of several papers submitted to "Hydrological Sciences Journal".

Congratulating Dr See, I wish to express the hope that she will continue to submit excellent papers to "Hydrological Sciences Journal" and to assist us in reviewing papers of others, and maybe she will also become involved in other IAHS activities.

Linda See responded by thanking Pierre and IAHS for the Award. She mentioned that it was very encouraging that soft computing techniques like fuzzy logic and neural networks were being recognized in a positive way as they are often considered black box models of little hydrological value because they tell you very little about the underlying processes. Dr See pointed out that the application in this case is operational flood forecasting and that many existing flood

forecasting models do not work very well. Therefore, if the black box models work better, then that should be sufficient argument to use them. Finally, she pointed out that she was not advocating that the existing models should be replaced by these "newer" black box models, but that they should be used together in a multi-modelling approach.

Outcomes from Maastricht

Manifesto of the IAHS Maastricht Assembly

The following Manifesto, prepared by Reinder Feddes, Chairman of the Maastricht 2001 Scientific Committee, draws together the highlights, conclusions and recommendations of the symposia and workshops held at Maastricht and includes suggestions made by participants during the General Concluding Session on 27 July.

A world water crisis is coming. Accelerating demand is exceeding the finite resources over widening regions of the globe. The rising threat from floods and droughts, erosion, pollution and climate change are increasing the danger to civilization. On the other hand the availability of clean drinking water forms the entry to socio-economic development for a large part of the world.

The participants in the Sixth Scientific Assembly of the International Association of Hydrological Sciences (IAHS) held in Maastricht from 18 to 27 July 2001, under the theme of "A New Hydrology for a Thirsty Planet" should be involved in the initiatives being taken by governments and institutions to solve water problems. We pledge that IAHS will participate actively in moves to alleviate these threats.

We, members of IAHS, offer this Manifesto to the delegations at the International Conference on Freshwater (Bonn, December 2001). We hope that they will respond to our offer by giving opportunities for interactive partnerships and constructive cooperation between science and policy. It is our wish to extend our efforts towards the 2002 World Summit on Sustainable Development in Johannesburg (Rio+10), the Third World Water Forum (Kyoto, Shiga and Osaka, 2003) and beyond.

Awareness of society

We have the knowledge that shortage and poor quality of freshwater constitute severe threats to human health, that floods and droughts kill many people and damage property and that soil erosion reduces agricultural production. Natural hydrological systems are altered by changing land use resulting in large-scale degradation of landscape, harnessing and polluting river and groundwater systems, increasing the effects of floods, droughts and salinization.

IAHS, in cooperation with social sciences, will attempt to offer the decision makers the proper socio-economic priorities on our water resources. We shall hope to make the public and the decision makers more aware of the vulnerability of water systems, involve stakeholders in water management plans and foster the sustainable management of our precious and scarce freshwater resources.

Hydrological systems under stress

The hydrological system is an integral part of the "system earth". The resistance and resilience of the hydrological system are often overestimated. Moreover, because of the amplifying effect of the hydrological cycle on climate, large-scale changes to hydrological conditions can result in climate change. Therefore a clear choice in the level of exploitation and adaptation of water entities should be made on the basis of the consequences of these choices.

IAHS commits itself to the observations and research which will lead to better understanding and assessment of the hydrological system and its interaction with the atmosphere, geosphere and biosphere. IAHS will work together with other international organizations on Global Water Assessment.

Overcoming the lack of data

Despite the importance of reliable data, hydro-meteorological networks in many countries have declined seriously in the last decades. The development of strategies, techniques and methodologies to acquire these data at local, regional and global scales and the establishment of mechanisms for making these data freely available are vital. Information technology enhances the link between mathematical models and data. In this respect remote-sensing-based information requires analysis and translation into hydrological characteristics.

We underline the importance of maintaining monitoring networks, the collection of data of high quality and standard quality assurance. Therefore, IAHS strongly encourages the sharing of hydrological data, information, knowledge and technology in an international framework, particularly in international river basins. In this respect IAHS has established a Working Group on Poorly Gauged Basins.

Research and education

Scientific research and education leading to integrated water management needs the

cooperation of natural and social scientists, including the institutional aspects, socio-economic conditions and public participation. This holds especially for sensitive areas such as high mountains, coastal lowlands, (semi)arid areas and humid tropics.

IAHS commits itself to operate as a catalyst, and will pay special attention to scientists from less developed countries. IAHS focuses on fundamental hydrological research and on the development of strategies to solve water problems. Major IAHS activities will be directed towards close cooperation with international research and education programmes and organizations. In the short term, young scientists of IAHS will present their views on the Hydrology of 2020.

Reports on symposia and workshops

Symposium 1: Water-related Threats to Social and Economic Developments—Invited Lectures

Symposium 1 addressed several questions related to water-related threats to socio-economic development: economics, ecology, health, water law, food security and flood control. It also focused on the World Water Assessment Programme.

In the first paper, Bernard Barraqué (France) showed the differing evolution of the services regarding water distribution: public services or private companies. He reminded us that the three "E"s should be considered together: Economic sustainability, Environmental sustainability and Ethical sustainability. He described different situations in North America, Europe and southern countries. He explained that in the developed countries, if the services were not efficient for a reasonable cost, then customers would try to get alternative solutions, which is the case in eastern Europe and in the big cities of the Third World, where public services are now inefficient. His point of view is that in many cases, regarding water distribution, capacity building in the public services is much more important than privatization.

Wim van der Hoek (Sri Lanka) made a presentation regarding case studies in Asia in which several diseases are linked to water quality. His presentation underlined the need for more research dedicated to the follow up of the recharge of drinking wells, to the definition of better practices in the field of irrigation. He then underlined the links between water uses, water pollution and health of the populations. More research should be undertaken not only in the field of water quality but also in the field of water uses and of the impact of irrigation and drilling on the water actually available to the people.

Jackie King (South Africa) emphasized the evident links between hydrologists and freshwater hydrobiologists and ecologists. She gave examples of such collaboration, underlining the good results to which they have led. She stressed the needs for information such as hydrological time series and results from hydrological and hydraulic research as hydrologists and ecologists have to work together to prevent the deterioration of rivers and freshwater quality. One of her conclusions was regarding training as she expressed her belief that all related topics should be taught together in universities and in post-graduate training courses.

Houria Tazi Sadeq (Morocco) underlined the need for a multidisciplinary approach to all water-related questions. She explained that the lack of collaboration between hydrologists and social scientists was a nonsense, mainly in a context of crisis regarding water resources in many countries. It should then lead people to consider more the demand than the offer, which is not the case at the time being. So she emphasized the fact that hydrologists should listen more to the world they live in, in order to provide it with useful solutions. On the other hand she recognized that social scientists should also rely on hydrological results to make their requests more legitimate.

U. C. Sharma (India) presented a case study in India to remind us that the growing population of the world would need more food and then a more efficient use of limited water resources. He reminded us that water resources were unequally distributed in space and time and that hydrologists should consider water resources at a global scale but not only in order to respond to the solicitations of the population of the planet. It means that hydrologists will also have to think of a better use of water resources especially in the countries where it is rare.

Carlos Tucci (Brazil) reminded us that floods are a natural process which can lead to hazards when flood plains become populated. He mainly emphasized the fact that technical tools and principles of urban drainage control are well known in developed countries but that their direct application in developing countries has generally not been successful. That's why he suggested that more research be done in the field of specific applications or adapting techniques. Otherwise, regarding the growing urban population—often economically poor in developing countries—which means no facilities and no infrastructures, there will probably be an increase in the number of flood events which lead to loss of human lives and to extensive damage.

Gordon Young (UNESCO) presented the World Water Assessment Programme (WWAP), which is a UN programme endorsed by all UN agencies. The programme serves as an "umbrella" for coordination of existing UN initiatives within the freshwater assessment sphere. Added to contributions from governments and UN agencies, expertise of nongovernmental organizations (NGOs) will be requested. In that sense he explained and demonstrated that a NGO such as IAHS has much to offer to the programme.

Eric Servat, Montpellier, France

Symposium 2: Regional Management of Water Resources

This symposium gave a holistic and comprehensive overview about many aspects of integrated water resources management. It represented the general orientation of IAHS towards a more holistic and comprehensive approach in water management. This became obvious by a subdivision of the symposium into three parts:

- Lessons learned from past management practices
- Sustainable regional water management for conflicting interests
- Tools for water resources management

The first topic considered the need to evaluate the effects of past management practices. It was shown that in some cases the planned effects of water management could not be realized. Often, practical water management was influenced by external forces in a way that was not foreseen during the planning period. A general result of the case studies presented in the first part of the symposium was the need for a permanent monitoring of water management systems in order to react to unforeseen developments as well as assess the effectiveness of the management practices themselves. In this part of the symposium, not only experiences in regional water management, but also examples of how to adapt water management facilities to changing conditions were demonstrated.

The second part of the symposium was dedicated to regional water management under conflicting interests. Water management has to consider especially the mounting public expectation for healthy rivers and wetlands. Degradation of the environment becomes less acceptable. Examples of conflicting interests discussed here were those between ecology and economy, between competing water users and between competing usages of different components of the hydrological cycle. It became obvious that a more holistic approach is needed in water management and that administrative and disciplinary boundaries limit our ability to react in a sustainable way. The extension of these boundaries seems to be an urgent challenge of the near future.

The third part of the symposium was dedicated to the evaluation of new techniques for integrated water resource management. It particularly covered the wide field of methodological developments in modelling at different scales and presented applications of different types of models addressing open questions in practical water management.

In general, the response to the call for papers for this symposium was very good; in total 78 abstracts were submitted. However, the different parts of the symposium were covered unevenly, with 23% of the abstracts dedicated to the first part, 30% to the second part and 47% to the third part. Unfortunately it was only possible to accommodate about half of all the abstracts submitted as full papers for oral presentation.

Within the symposium different approaches to quantify sustainability were presented. Nevertheless it became obvious that the selection of criteria of sustainability still depends on the specific problems and on the specific structure of the stakeholders involved in these assessments. However, many participants were confident that in the future sustainability will become an accepted part of the evaluation of water management projects.

The concept of integration of the human and the natural sector was a substantial part of many presentations. Through case studies from developing countries it became obvious that especially non-structural measures of water management e.g. control and legal regulations of the access to water resources cannot be planned without consideration of the specific social and cultural background. A general reform of water policy and law seems to be necessary in many parts of the world. A principle which was formulated by the Department of Water Affairs and Forestry (DWAF) of South Africa "Some for all for ever" which "sums up the goals of: access to a limited resource (some), on an equitable basis (for all), in a sustainable manner, now and in the future (for ever)" (originally formulated by DWAF in 1997) could be a guideline for the direction in which water policies should be going under a global water crisis.

An interdisciplinary approach to water management which was often demanded does not mean that we should replace the science of water management as a substantial part of the hydrological sciences by a conglomerate of ecology, social sciences, economy etc. The scientist in water resources management should be able to communicate with representatives of these disciplines and to integrate them into the processes of the solution of our common water management problems. From the past we can learn that the multi-objective problems of water management often have multiple solutions. It would be very dangerous if our recommendations were biased by our trust in experts of other disciplines without an open discussion of the advantages and drawbacks of their suggestions. Here we are challenged to be cooperators but also critical partners who are able to make their own assessments and to develop their own recommendations about the multiple ways of future developments. There is no simple and unique way out of the looming crises by stand-alone solutions. The actual trends to simple answers of complex questions, the trend to generate solutions which are based just on the forces of the market, on a steering of social processes, on legal regulations only or on structural measures is not appropriate to cope with future problems. Nevertheless after the Maastricht Assembly we are confident that the combinations of these tools will determine the future of water management.

Andreas Schumann, Bochum, Germany

Workshop 1: Flood Forecasting with Reference to Global Change

Presenters in Workshop 1 discussed a variety of issues and strategies based on their regional issues and opportunities. They chose solutions that reflected their local needs and realities and considered issues in model complexity:

- In tropical regions where relatively persistent weather patterns may be found, monthly or seasonal precipitation predictions may be generated through studies of teleconnections and extrapolation of longer term cycles of rainfall and other climatic variables.
- For relatively data-rich regions, a framework was presented for assessing the risk of flood damage from initial precipitation inputs and the generation of runoff through to risk (and implications) of dike failure.
- Other presenters discussed issues in model selection such as determining optimal resolution requirements and suggesting that soft computing approaches may be considered as an option to avoid unnecessary complexity and costs.
- Also shown was a method to use downscaled numerical weather prediction model output data instead of historical meteorological records to improve ensemble streamflow forecasts. An example of a coupled atmospheric–hydrological model which may provide feedback to eventually improve precipitation forecasts and subsequent streamflow predictions was shown as well.

Paul Campbell, Burlington, Ontario, Canada

Workshop 2: Hydrological Impacts of Long-term Exploitation and Climatic Evolution: Contributions of Studies Based on Tracers and Modelling

The rapidly increasing global demand for freshwater and the high vulnerability of water resources require new hydrological methods and concepts. The evolution of the climate and long-term anthropogenic exploitation of water resources can lead to transient conditions in the flow of water and the transport of solutes whose initial and boundary conditions are to be found in the distant past. Contributions to this workshop showed that the use of natural and environmental stable and radioactive isotope and water-chemistry tracers can be combined with model calculations, to produce information on water mixing and the age distribution of mixed waters. In particular, very old groundwaters from aquifers such as the sandstones in the Great Artesian Basin of Australia or the Nubian sandstone in the Sahara desert, have the potential to give the long-term information that is sought. In arid zones, the infiltration toward groundwater is limited to the surface and as a consequence the present spatial evolution of the groundwater composition records past hydrological conditions. In these regions, even the unsaturated zone of an aquifer can potentially be an archive of climatic evolution. The evaporative outflow from shallow aquifers accumulates chemical elements close to the soil surface. In special cases such as the Andean Altiplano, climatic conditions could be reconstructed for the time of the retreat of a palaeolake as an initial stage, in that residence times of groundwaters were assessed in the area. Isotope and water-chemistry studies, e.g. of precipitation water, rivers and watersheds, yield a better insight into the hydrology and chemical composition of waters in such hydro-systems. The mining of groundwater, i.e. its excessive use, especially in arid zones and urban environments, and anthropogenic impacts on the quality of water, such as the excessive use of fertilizers, are among the worst impacts to degrade resources. In the papers presented, the combined use of tracer techniques and numerical modelling helped both reconstruct past conditions and predict the impact of climatic change on the hydrological cycle. A better knowledge of the influence of the long-term exploitation and climatic or geological evolution on aquifer systems is a clue to the sustainable use of water resources.

Anne Coudrain, Montpellier, France

Workshop 4: High-Mountain Regions: Hydrological Processes and Cryological Processes, Models and the Variability of Available Water Resources; in Anticipation of the "Year of the Mountains 2002"

The essential general conclusions from Maastricht Workshop 4 were:

- The very great significance of snow, ice and water in mountain regions, for the water supply of large continental areas and for the flow regimes far downstream of many of the world's large rivers deserves much more and broader attention.
- With respect to future climatic scenarios and their impacts on the water cycle, the scientific research in the fields of Mountain Hydrology, Glaciology and Ecosystems should be given a high level of priority. Specific attention should be given to the less developed mountain regions.
- The scientific approaches need to be interdisciplinary, and a particularly strong interconnection of hydrological sciences is needed with the atmospheric/climatic science communities and with the ecosystem groups (such as the International Geosphere Biosphere Programme/Biospheric Aspects of the Hydrological Cycle Mountain Initiative). It should always be borne in mind that more or less all of the "natural" variations in time of hydrological fluxes are controlled and caused by atmospheric dynamics and radiative processes.

Specific conclusions from the seven W4 sessions were as follows:

- The orographic control of precipitation amounts and distribution in high mountain regions is still an outstanding problem in the reliable assessment of precipitation by observation networks and in model approaches. And there is still great uncertainty in the altitudinal gradients of precipitation. International field and model experiments like the Mesoscale Alpine Project MAP (SOP 1999, European Alps) are of particular importance to improve our understanding and in developing advanced scientific and practical tools.
- Besides their great significance in the global climate system, the variations in the cryosphere (a huge and complex storage and release system in time scales of between days and millennia) need careful monitoring and model efforts also with a view to their effects on sea-level variations. Promising model approaches are being developed to estimate the global glacier mass balance (15–20% of present-day sea-level rise is caused by the mass loss of mountain glacier systems). However there are regions where, at the same time, glaciers show positive mass balances, which indicates the great complexity of the combined ocean–landsurface–atmospheric climatic systems, reminding us that the present increase of annual mean air temperature is only one part of the climate change signal. Present-day hydrological and cryospheric model development, as shown in the sessions, is now more soundly physically based and can therefore handle non-stationary developments much better. In this respect the very important worldwide monitoring and data collection efforts deserve to be mentioned here.
- In the USA a new NASA programme is on the way to refine remote sensing techniques.
- One session was devoted to tropical glaciers and mountain hydrology which illustrated the great difference in their behaviour from mid latitude glaciers behaviour.
- It was made clear that any change in the areal distribution, extent and length of glaciers and of winter snow cover will affect the variability and regime of downstream river flow with corresponding consequences for the availability of water for water supply and reservoir management. In addition it will also affect the frequency and severity of extreme hazards, i.e. floods and droughts.

H. Lang, Zurich, Switzerland

Workshop 5: Application of Geographic Information Systems and Remote Sensing for Quantifying Patterns of Erosion and Water Quality

The objective of the workshop was to provide participants with the basic knowledge for the application of geographic information systems (GIS) and remote sensing tools for quantifying the spatial and temporal patterns of erosion and water quality across the landscape. Techniques for combining satellite and aircraft remotely-sensed data with digital elevation modelling (DEM) and ground truth data in a GIS were discussed to show ways to extend point data to field and regional scales. Prof. D. E. Walling (Exeter, UK) opened the workshop by presenting an excellent overview of the economic costs of erosion and sediment problems, and provided an estimate of the global cost of on-site and off-site impacts of soil erosion on agricultural land of US$400 billion per year. Six papers and eight posters were presented to give the participants examples of the sequence of events from measurements to maps of soil loss and water quality.

Jerry Ritchie, Beltsville, Maryland, USA

Workshop 6: Hydrogeological Evolution in Coastal Lowlands: Role of Density- and Compaction-Driven Groundwater Flow

This workshop brought together scientists working on groundwater and environmental problems associated with the highly vulnerable coastal lowlands and saline aquifers in (semi)arid regions. About 30 attendants participated in the discussions around nine contributions, including: reconstruction of palaeo-hydrological evolution of coastal areas to explain present conditions and processes; models for simulating coupled processes of multi-density flow, sedimentation, compaction, sea level change and dynamics of the saltwater/freshwater interface; side effects of groundwater extraction, water management and land reclamation; transport and physico-chemical processes connected with sebkahs, evaporites and palaeo-marine environments in arid areas. The overall conclusion was that a thorough knowledge of the evolution and processes on a geological time scale is a prerequisite for a proper understanding of the present situation in relation to protection and remediation, and to be able to forecast the impacts of global change and future human activities.

Jacobus de Vries, Amsterdam, The Netherlands

Task Force for Developing Countries (TFDC)

For many years IAHS has been sending *Hydrological Sciences Journal* (HSJ) and Red Books free of charge to institutions in financially disadvantaged countries to support hydrological research and education in these countries and provide up-to-date reference material on water-related issues. In 2001 IAHS publications have been sent to 73 institutions in the 46 countries listed in the table below.

To investigate the usefulness of this activity the recipients were asked to briefly outline their interest in and need for the publications sent, indicating if and in what way the publications contribute to the assessment of practical water resources problems that address the needs of the population in these countries.

Responses came from recipients in 20 countries. All of them acknowledged the great value of the IAHS publications for their respective countries. For many countries HSJ is the only regular international hydrological journal received that brings not only news of the latest developments in hydrology but also information about forthcoming conferences and meetings. It was underlined in many letters that without HSJ there would be no continuous link to international hydrology in financially disadvantaged countries. The Red Books were also highly valued and frequently used, alongside HSJ, by researchers and university students. Moreover, as the university libraries are open to the public, the publications were also used by different governmental organizations involved in water resources planning and management. The great value of HSJ for the education of the PhD students was stressed in many letters. National specialists with high competence in hydrology and water resources are badly needed in many developing countries. There were examples in the responses showing that the material published in HSJ and the Red Books was directly used for the amelioration of the living conditions of poor people (e.g. urban water projects in Chile).

The economic situation for education and research is unfortunately becoming worse in many of the recipient countries

Table listing countries and the number of organizations in each of these countries that are currently supplied with IAHS publications sent on behalf of TFDC.

Country	No.	Country	No.	Country	No.
Albania	1	Ecuador	1	Pakistan	2
Algeria	1	Ethiopia	2	Panama	1
Angola	1	Ghana	1	Papua New Guinea	1
Argentina	4	India	6	Philippines	1
Bangladesh	1	Indonesia	2	Romania	1
Benin	1	Jordan	1	Russia	4
Bhutan	1	Kenya	2	Senegal	2
Botswana	1	Malawi	1	Sri Lanka	1
Brazil	4	Malaysia	2	Swaziland	1
Bulgaria	1	Mali	1	Thailand	1
Burkina Faso	1	Mozambique	1	Uruguay	1
Chile	3	Myanmar	1	Uzbekistan	1
China	3	Namibia	1	Yugoslavia	1
Colombia	1	Nepal	1	Zambia	1
Cuba	1	Niger	1		
Czech Republic	1	Nigeria	4		

(notably in the countries of the former USSR) and they cannot afford to subscribe to scientific journals or purchase new books. The solidarity with colleagues in financially disadvantaged countries demonstrated for many years by IAHS is highly appreciated and acknowledged. The respondents urged IAHS and sponsoring organizations to continue this fruitful and important activity helping to address some of the most acute issues of today, namely clean water for all people, mitigation of floods and droughts, and sustainable development of water resources.

Lars Gottschalk, Oslo, Norway

IAHS Press

Red Books

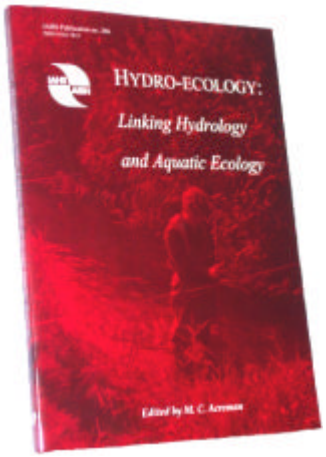
The following five new titles in the IAHS Series of Proceedings and Reports (Red Books) have been published. A description, the contents and abstracts of each contribution can be seen at the IAHS web site:

http://www.cig.ensmp.fr/~iahs

Hydro-ecology: Linking Hydrology and Aquatic Ecology

Edited by M. C. Acreman

Applied hydro-ecology involves the study of changes in aquatic ecosystems resulting from alterations to a river's flow regime, channel structure or water quality. As demand for water rises, yet concerns about our environment and man's effects on it increase, interest in hydro-ecology has rapidly expanded. IAHS has recognized hydro-ecology as a key developing area of hydrological science. At the IUGG General Assembly in Birmingham 1999, IAHS held its first hydro-ecology workshop entitled "Riverine Ecological Response to Changes in Hydrological Regime, Sediment Transport and Nutrient Loading". This volume contains an overview paper by M. J. Dunbar & M. C. Acreman followed by 13 papers presented at this workshop.



The papers cover a wide range of topics from data collection, through mathematical analysis to the application of models. The focus of the publication is on physical aspects of hydro-ecology, primarily the impacts of changes in flow regime, although sediment transport and water quality feature in some papers. The papers also cover a wide geographical area, including Mexico, USA, Nigeria, China and South Africa and various parts of Europe. The overview paper attempts to set these studies in context of the state of the art of hydro-ecology at the end of the twentieth century and to look at the challenges and prospect it presents for the twenty-first century.

As a whole the papers confirm the interdisciplinary nature of hydro-ecological science and the opportunities that exist for hydrologists to work as part of a team with hydraulic engineers, ecologists, geomorphologists, chemists and other experts. It is hoped that this volume will bring hydro-ecological science to the attention of hydrological scientists worldwide and stimulate further collaborative research and solutions to environmental problems in the future.
Publ. no. 266 (September 2001), price £33.00 (membership price £24.75; 2002 price to members in financially disadvantaged countries only £9.00), 160 + xiv pp., ISBN 1-901502-41-4

Remote Sensing and Hydrology 2000

Edited by Manfred Owe, Kaye Brubaker, Jerry Ritchie & Albert Rango

Remote sensing applications in hydrology have progressed considerably since the International Workshop on Hydrologic Applications of Space Technologies* in 1985. This volume, the proceedings of the International Symposium on Remote Sensing and Hydrology 2000 (Santa Fe, New Mexico, USA, April 2000), is clear evidence of that progress and represents the state of the art at the beginning of the twenty-first century. Keynote papers by Dr Gert Schultz on *Present and future perspectives of remote sensing in hydrology and water management*, and *Satellite remote sensing of precipitation: progress and problems* by Dr Eric Barrett, provide overviews, whilst the other 123 papers detail many operational applications as well as attempts to exploit a more varied portion of the electromagnetic spectrum. The papers are grouped in 10 sections:

- Precipitation
- Snow and ice
- Large area experiments
- Evapotranspiration
- Radar applications
- Microwave soil moisture
- Geographic information systems
- General hydrology
- Wetlands
- Hydrological modelling

Publ. no. 267 (August 2001), price £80.00 (membership price £60.00; 2002 price to members in financially disadvantaged countries only £16.00), 610 + xiv pp., ISBN 1-901502-46-5

Regional Management of Water Resources

Edited by A. H. Schumann, M. C. Acreman, R. Davis, M. A. Marino, D. Rosbjerg & Xia Jun

Effective and better integrated water resources management at the regional scale is needed more than ever to complement the increasing demand on water resources. Water scarcity, in terms of quantity and quality, increasingly causes serious problems for drinking water supply and food production, especially in arid and semiarid areas. But not only is demand rising, the paradigms of water management are shifting in increasing recognition of the importance of ecosystem functions in providing the life support system for the planet.

These challenges call for innovation among the scientific community. This volume, comprising 34 papers presented at Symposium 2 at Maastricht, July 2001, embraces a holistic and comprehensive approach to water management and addresses the issues in three parts:

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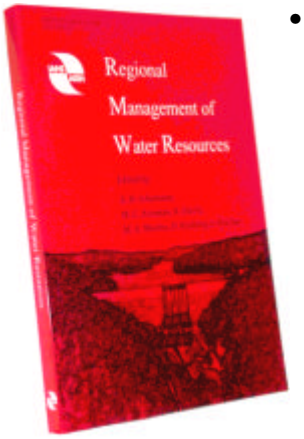
* **Hydrologic Applications of Space Technology** (proceedings of a workshop held at Cocoa Beach, August 1985), *edited by A. I. Johnson*, Publ. no. 160 (December 1986), price ~~£29.50~~ *now only £9.00*, 488 + xii pp.



- **Lessons learned from past management practices** The case studies presented demonstrate the need for permanent monitoring of water management systems to enable reaction to unforeseen developments and assess the effectiveness of the management practices. Monitoring can also provide a more comprehensive view of economic, ecological and social impacts of water management systems. Several examples of adaptation of water management facilities to changing conditions are described.
- **Sustainable regional water management for conflicting interests** There is mounting public expectation for healthy rivers and wetlands; environmental degradation is becoming less tolerable. The examples of conflicting interests include those between ecology and economy, between competing water users and between competing usages of water at different stages of the hydrological cycle. It becomes obvious that a more holistic approach is needed in water management and that administrative and disciplinary boundaries limit our ability to react in a sustainable way. The extension of these boundaries seems to be an urgent challenge of the near future.
- **Tools for water resources management** The focus is on methodological developments in modelling at different scales, and applications of different types of models addressing open questions in practical water management.

Publ. no. 268 (July 2001), price £47.75 (membership price £35.81; 2002 price to members in financially disadvantaged countries only £9.55), 288 + viii pp., ISBN 1-901502-51-1

Impact of Human Activity on Groundwater Dynamics

Edited by Hans Gehrels, Norman E. Peters, Eduard Hoehn, Karsten Jensen, Chris Leibundgut, Jasper Griffioen, Bruce Webb & Willem Jan Zaadnoordijk

Human activities are intricately linked to the evolution and dynamics of groundwater quantity and quality. Given the alarming rate of land-use change globally, it is important to understand the linkages between land-use change and groundwater dynamics, as land use affects the quantity and chemical quality of recharge water. The recharge directly determines the natural dynamic behaviour of the groundwater system, and is (hence) often the most important driving force in groundwater systems. In many areas, groundwater is the major source of surface water, and in others, surface water infiltration is a major source of recharge. Consequently, understanding the interaction of groundwater and surface water is important to the understanding of groundwater dynamics. Geochemical aquifer characteristics also have to be quantified to enable prediction of both the movement and contamination of groundwater.

In this book, the impact of a number of human activities on groundwater dynamics and resources, such as urbanization, land-use change and groundwater contamination is evaluated. In addition, several hydrological processes that need to be known to adequately assess the impact of these activities, such as methods for quantifying recharge, for geochemical characterization of aquifers, and for the modelling of contamination transport, are investigated.

The volume has 53 papers (presented at Symposia 3/4 at Maastricht, July 2001), which are divided into five themes:

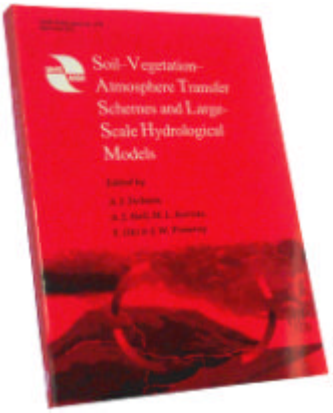
- Quantification of groundwater recharge
- Urbanization and land-use change
- Groundwater–surface water interaction
- Aquifer characterization and transport modelling
- Groundwater contamination

Publ. no. 269 (July 2001), price £59.50 (membership price £44.62; 2002 price to members in financially disadvantaged countries only £11.90), 369 + x pp., ISBN 1-901502-56-2

Soil–Vegetation–Atmosphere Transfer Schemes and Large-Scale Hydrological Models

Edited by A. J. Dolman, A. J. Hall, M. L. Kavvas, T. Oki & J. W. Pomeroy

Soil–vegetation–atmosphere interactions determine, to a large extent, the global climate and the behaviour of the hydrological cycle. Model predictions thus depend critically on adequate parameterization of this interaction. This volume represents a "state of the art" in Soil–Vegetation–Atmosphere Transfer (SVAT) modelling in the hydrological community; it contains 48 papers presented at Symposium 5 at Maastricht, July 2001.



Several key issues in SVAT models are poorly parameterized or simply not well enough understood. Current SVAT schemes include increasingly complex descriptions of the physical mechanisms governing land surface processes requiring large numbers of soil and land surface parameters controlling the vertical fluxes. The underlying rationale is that improved process representation will result in parameters which are easier to measure or estimate, and in improved model performance and robustness. However, this is not necessarily so. Studies show that characterizing surface properties is fraught with difficulties, as determining representative parameterizations is non-trivial due to our inability to accurately measure land surface properties. Hence, data assimilation, whereby measurements are integrated with models, is increasingly used to keep hydrological models on track. Remote sensing of the state of the land surface is important in efforts to improve data assimilation. However, these issues are particularly difficult for snow-covered areas, where vegetation communities are strongly coupled with patterns of snow accumulation and snowmelt.

This book is organized into five sections:

- General SVAT modelling

- SVAT and precipitation processes at large scales
- Parameter estimation of large-scale hydrological models
- Data assimilation in large-scale hydrological models
- Snow–vegetation interactions

Publ. no. 270 (July 2001), price £59.50 (membership price £44.62; 2002 price to members in financially disadvantaged countries only £11.90), 372 + x pp., ISBN 1-901502-61-9

The following Red Books are in preparation—the first two are nearly finished:

The Extremes of the Extremes: Extraordinary Floods

Edited by Arni Snorrason, Helga P. Finnsdottir & Marshall Moss

Sixty papers comprising the proceedings of a symposium held at Reykjavik, July 2000.
Publ. no. 271

Integrated Water Resources Management

Edited by Miguel A. Marino & Slobodan Simonovic

Proceedings of a symposium held at Davis, California, April 2000, with 61 papers.
Publ. no. 272

Agricultural Effects on Ground and Surface Waters

Edited by Joop Steenvoorden, Frans Claessen & Jaap Willems

Proceedings of a symposium held at Wageningen, October 2000, comprising 65 papers.
Publ. no. 273

Hydrological Sciences Journal (HSJ)

The table on the next page lists the papers published in issues 3-5 of the 2001 volume, as well as those that will appear in issue no. 6—the December Special Issue. Also listed are papers that have been accepted for publication and will appear in subsequent issues.

Special issue December 2001: *Can Science and Society Avert the World Water Crisis in the 21st Century?*

With water attracting more and more attention as an issue of global importance, it seems most appropriate for IAHS to devote one issue of the Journal to a discussion of some of the current water problems facing humanity. The papers presented at the Tokyo International Symposium "Can Science and Society Save the Water Crisis?" held in October 2000, provided a convenient basis for this Special Issue. These papers are being published as the IAHS contribution to the growing discussion of world water problems. This issue of the HSJ will also be important to the preparations for "Dublin+10"—the International Conference on Freshwater—being held in Bonn, Germany, in December 2001, "Rio+10"—the World Summit on Sustainable Development—to be held in Johannesburg in September 2002 and the Third World Water Forum which is due to take place in Kyoto, Shiga and Osaka in March 2003.

This Special Issue also represents something of a landmark for the Association, as never before have the President, and a number of the Association's officers contributed papers to the same issue of the Journal.

The Special Issue contains an introduction and 11 papers. The papers deal with a range of topics concerned with water resources, the use of water, floods and flood risk on global, regional and national scales, as well as with macroscale modelling, fractals and other methods. They aim to give a hydrological perspective to a number of the initiatives that have been launched in the wake of Agenda 21.

Future Special Issues

As a result of discussions of the IAHS Bureau at Maastricht in July 2001, it was decided that due to a steady increase of good papers being submitted to HSJ, more papers should be published each year, possibly in the form of an additional Special Issue of the Journal. Several proposals were received by the Editor for publication of a topic-oriented Special Issue, perhaps consisting of workshop papers. Another proposal was for "special clusters" of papers resulting from an IAHS workshop to be published within an issue of the Journal. At present, the details of the proposal are being finalized and it is hoped to publish a Special Issue alongside the August 2002 issue, thereby increasing the number of issues a year to seven.

Subscriptions 2002

In view of the proposals to publish an additional issue in 2002, the price has been set to reflect the increased production and printing costs. The full price of vol. 47 (2002) is £172 or US$250. The price for IAHS members (50% discount) is £86 or US$125 and for members in financially disadvantaged countries, receiving 80% discount, the price is only £34.50.

In order to ensure that you start receiving the 2002 volume as soon as the first issue is published, please send your payment now to Frances Watkins at the IAHS Press address. Payment may be made by VISA or MasterCard/Eurocard (giving card number, expiry date and the name and billing address of the cardholder) or by cheque drawn from a bank in the UK (GB pounds—payable to "IAHS Ltd") or the USA (US dollars—payable to "IAHS"). Please contact Frances for further information, or if you require an invoice. Remember, the discount for IAHS members is valid only if you are purchasing the journals for your personal use!

Hydrological Sciences Journal 2001/02

Papers in vol. 46, no. 3 (June)

SURENDRA KUMAR MISHRA & VIJAY P. SINGH: On the Seddon speed formula

KWAN TUN LEE, CHIN-HSIN CHANG, MING-SANG YANG & WIE-SHENG YU: Reservoir attenuation of floods from ungauged basins

YESHEWATESFA HUNDECHA, ANDRAS BARDOSSY & HANS-WERNER THEISEN: Development of a fuzzy logic-based rainfall–runoff model

BELLIE SIVAKUMAR, RONNY BERNDTSSON & MAGNUS PERSSON: Monthly runoff prediction using phase space reconstruction

MAGNUS PERSSON, RONNY BERNDTSSON & BELLIE SIVAKUMAR: Using neural networks for calibration of time-domain reflectometry measurements

ARMANDO BRATH, ATTILIO CASTELLARIN, MARCO FRANCHINI & GIORGIO GALEATI: Estimating the index flood using indirect methods

C. K. JAIN: Adsorption of zinc onto bed sediments of the River Ganga: adsorption models and kinetics

RAY KOSTASCHUK, JAMES TERRY & RISHI RAJ: Tropical cyclones and floods in Fiji

JACQUES CALLEDE, PASCAL KOSUTH & EURIDES DE OLIVEIRA: Etablissement de la relation hauteur–débit de l'Amazone à Obidos: méthode de la dénivelée normale à "géométrie variable"

JAIME GARATUZA-PAYAN, RACHEL T. PINKER, W. JAMES SHUTTLEWORTH & CHRISTOPHER J. WATTS: Solar radiation and evapotranspiration in northern Mexico estimated from remotely sensed measurements of cloudiness

Papers in vol. 46, no. 4 (August)

G. S. CAVADIAS, T. B. M. J. OUARDA, B. BOBEE & C. GIRARD: A canonical correlation approach to the determination of homogeneous regions for regional flood estimation of ungauged basins

BERHANU FANTA, B. T. ZAAKE & R. K. KACHROO: A study of variability of annual river flow of the southern African region

ZEKAI SEN & ZEYAD HABIB: Monthly spatial rainfall correlation functions and interpretations for Turkey

SALVADOR SÁNCHEZ-CARILLO, MIGUEL ALVAREZ-COBELAS, MANUEL BENÍTEZ & DAVID G. ANGELER: A simple method for estimating water loss by transpiration in wetlands

E. J. KLOK, K. JASPER, K. P. ROELOFSMA, J. GURTZ & A. BADOUX: Distributed hydrological modelling of a heavily glaciated Alpine river basin

R. S. KUROTHE, N. K. GOEL & B. S. MATHUR: Derivation of a curve number and kinematic-wave based flood frequency distribution

D. H. A. AL-KHUDHAIRY, C. LEEMHUIS, V. HOFFMANN, R. CALAON, I. M. SHEPHERD, J. R. THOMPSON, H. GAVIN & D. L. GASCA-TUCKER: Monitoring wetland ditch water levels in the North Kent Marshes, UK, using Landsat TM imagery and ground-based measurements

RENAAT DE SUTTER, ANDREAS KREIN & RONNY VERHOEVEN: Simulation of sediment transport during flood events: laboratory work and field experiments

ANDREAS KREIN & RENAAT DE SUTTER: Use of artificial flood events to demonstrate the invalidity of simple mixing models

M. BAYAZIT, B. ÖNOZ & H. AKSOY: Nonparametric streamflow simulation by wavelet or Fourier analysis

Papers in vol. 46, no. 5 (October)

Q. FENG, G. D. CHENG & K. N. ENDO: Towards sustainable development of the environmentally degraded river Heihe basin, China

K. J. SENE, H. A. HOUGHTON-CARR & A. HACHACHE: Preliminary flood frequency estimates for Lebanon

BRIAN S. CARUSO: Regional river flow, water quality, aquatic ecological impacts and recovery from drought

L. SHOTBOLT, S. M. HUTCHINSON & A. D. THOMAS: Establishing the sediment stratigraphy of reservoirs in the southern Pennines, UK

ANTHONY S. KIEM & STEWART W. FRANKS: On the identification of ENSO-induced rainfall and runoff variability: a comparison of methods and indices

T. S. HU, K. C. LAM & S. T. NG: River flow time series prediction with a range-dependent neural network

ABDALLAH MDAGHRI-ALAOUI & WERNER EUGSTER: Field determination of the water balance of the Areuse River delta, Switzerland

WITOLD G. STRUPCZEWSKI, VIJAY P. SINGH & STANISLAW WEGLARCZYK: Impulse response of a linear diffusion analogy model as a flood frequency probability density function

AMIN ELSHORBAGY, U. S. PANU & S. P. SIMONOVIC: Analysis of cross-correlated chaotic streamflows

IAN LITTLEWOOD: Practical aspects of calibrating and selecting unit hydrograph-based models for continuous river flow simulation

MING-SANG YANG & KWAN TUN LEE: Determination of probability distributions for Strahler stream lengths based on Poisson process and DEM

Papers in vol. 46, no. 6 (December Special Issue)

Can science and society avert the world water crisis in the 21st century?

JOHN RODDA: Water under pressure

IRINA KRASOVSKAIA, LARS GOTTSCHALK, NILS ROAR SÆLTHUN & HALLVARD BERG: Perception of the risk of flooding: the case of the 1995 flood in Norway

ZBIGNIEW W. KUNDZEWICZ: Water problems of central and eastern Europe—a region in transition

XIA JUN & YONGQIN DAVID CHEN: Water problems and opportunities in the hydrological sciences in China

ASHIM DAS GUPTA: Challenges and opportunities for water resources management in southeast Asia

CARLOS E. M. TUCCI: Some scientific challenges in the development of South America's water resources

LEKAN OYEBANDE: Water problems in Africa—how can the sciences help?

LARS GOTTSCHALK, STEIN BELDRING, KOLBJÖRN ENGELAND, LENA TALLAKSEN, NILS ROAR SÆLTHUN, SJUR KOLBERG & YURY MOTOVILOV: Regional/macroscale hydrological modelling—a Scandinavian experience

PIERRE HUBERT: Multifractals as a tool to overcome scale problems in hydrology

KUNIYOSHI TAKEUCHI: Increasing vulnerability to extreme floods and societal needs for hydrological forecasting

TAIKAN OKI, YASUSHI AGATA, SHINJIRO KANAE, TAKAO SARUHASHI, DAWEN YANG & KATUMI MUSIAKE: Global assessment of current water resources using total runoff integrating pathways

Forthcoming papers (in no particular order)

J. WILK & D. A. HUGHES: Calibrating a rainfall–runoff model for a catchment with limited data

J. WILK & D. A. HUGHES: Simulating the impacts of land use and climate change on water resource availability in a large southern Indian catchment

ZEKAI SEN & KHALID AL-SUBA'I: Hydrological considerations for dam siting in arid regions—Saudi Arabian study

SANJAY K. JAIN & M. K. GOEL: Assessing the vulnerability to soil erosion of the Ukai Dam catchments using remote sensing and GIS

ALISON WILLIAMS & DAVID ARCHER: The use of historic flood information in the English Midlands to improve risk assessment

PAWEL M. ROWINSKI, WITOLD G. STRUPCZEWSKI & VIJAY P. SINGH: A note on the applicability of log-Gumbel and log-logistic probability distributions in hydrological analyses. I: Known PDF

STANISLAW WEGLARCZYK, WITOLD G. STRUPCZEWSKI & VIJAY P. SINGH: A note on the applicability of log-Gumbel and log-logistic probability distributions in hydrological analyses. II: Assumed PDF

CHEN XIQING, XU JIANGANG & ZHANG ERFENG: Large and episodic decrease of water discharge from the Yangtze to the sea during the dry season

PRATAP SINGH & S. K. JAIN: Snow and glacier melt contribution in the Satluj River at Bhakra Dam in the western Himalayan region

DAWEN YANG, SRIKANATHA HERATH & KATUMI MUSIAKE: Hillslope-based hydrological model using catchment area and width functions

JURAJ M. CUNDERLIK & DONALD H. BURN: The use of flood regime information in regional flood frequency analysis

SHIV KUMAR PANDEY, ABHAY KUMAR SINGH & S. I. HASNAIN: Grain size distribution, morphoscopy and elemental chemistry of suspended sediments of the Pindari Glacier, Kumaon Himalaya, India

SANJAY K. JAIN, PRATAP SINGH & S. M. SETH: Assessment of sedimentation in the Bhakra Reservoir in the western Himalayan region using remotely sensed data

L. DESCROIX & J. C. OLIVRY: Spatial and temporal factors of erosion by water of black marls in the badlands of the southern French Alps

ZUHAL AKYUREK & A. UNAL SORMAN: Monitoring the snow-covered areas in the eastern part of Turkey from NOAA-AVHRR data

XU JIONXIN: Sediment flux into the sea as influenced by different water and sediment source areas in the drainage basin: example of the Yellow River, China

SHAHRAM ASHRAFI, ASHIM DAS GUPTA, MUKAND SINGH BABEL, NORIHIRO IZUMI & RANER LOOF: Simulation of infiltration from porous clay pipe in subsurface irrigation

MAGNUS PERSSON: Evaluating the linear dielectric constant-electrical conductivity model using time-domain reflectometry

V. HRISSANTHOU: Comparative application of two erosion models to a basin

Do you support IAHS by subscribing to the Association Journal?

Bookstand at Maastricht

We were delighted to see so many old friends and so many new faces at the IAHS Bookstand in Maastricht in July.

The registration fee at Maastricht included the cost of one of the symposium proceedings (Publ. no. 268, 269 or 270—descriptions given earlier in this article), but participants who had not ticked a box on the registration form to indicate their choice of publication were not issued with a voucher for any of the publications. We have a final list of registrants and names of those who exchanged their voucher for a Red Book. If you registered for Maastricht but did not collect your free Red Book from the Bookstand, then let us know. Let us also know which Red Book you want and we shall be pleased to mail it to you.

It was discovered at Maastricht that a 16-page section in Publ. no. 269, *Impact of Human Activity on Groundwater Dynamics*, was missing. This book was reprinted and in August perfect copies were airmailed to participants who had collected this book at the Bookstand.

Openings, Closures and Climate Change

On 17 September a reception was held at the Centre for Ecology and Hydrology (CEH), Wallingford, UK, home of IAHS Press, hosted by Prof. Jim Wallace (Director CEH), Prof. Kuni Takeuchi and Dr John Rodda to mark the opening of the new IAHS Press office, and the change of leadership of IAHS; John retired as IAHS President and Kuni took over on 18 July at Maastricht. Particularly welcome guests were Pierre Hubert (Secretary General IAHS) and Henny Colenbrander (former Secretary General).

The spacious new IAHS Press office immediately impressed those who had visited the old one. And, as Jim Wallace put it, the move is from the "depths of the building" to a prominent location at the entrance so that all visitors to, and staff at, CEH are now aware of IAHS Press presence.

Jim Wallace acknowledged the leading role played by John Rodda in initiating the association between IAHS and the former Institute of Hydrology, now CEH, more than 30 years ago. All hope, and expect, the fruitful association of the two organizations to continue for at least as long again.

After lunch, Pierre Hubert presented the Tison award to Dr Linda See (University of Leeds) who effectively made the case for experimenting with fuzzy logic and neural networks in hydrological modelling. Dr Rob Lamb (CEH, Wallingford) then gave a presentation entitled "Climate change and flooding" assessing the possibility of links between the extensive flooding in England and Wales in autumn 2000, and climate change.

The IAHS Press team at the Wallingford reception on 17 September—from left to right: *Frances Watkins, Jill Gash, Penny Kisby and Cate Gardner.*

Professor Nigel Arnell's (University of Southampton) presentation "Climate change and water resources" explained how the Intergovernmental Panel on Climate Change (IPCC) remains very uncertain as to the impact of climate change on hydrology, except where warming has an impact on snowfields and glaciers, and the runoff therefrom.

Penny Kisby, Frances Watkins,
Cate Gardner & Jill Gash

News from Commissions

International Commission on Surface Water (ICSW)

1. Activities 1999–2001

The first bureau meeting of ICSW took place at the IUGG 99 General Assembly at Birmingham University, UK, on 28 July 1999. At this meeting the ICSW vision was discussed and this is summarized in section 4. ICSW will endeavour to strengthen activities in developing countries and would welcome proposals to organize IAHS workshops in these countries.

ICSW has supported several scientific meetings:

- *International Symposium on Integrated Water Resources Management*, Davis, California, USA, 9–12 April 2000.
- *The Extremes of the Extremes: an International Symposium on Extraordinary Floods*, Reykjavik, Iceland, 17–19 July 2000.
- *International Symposium in Flood Defence*, Kassel, Germany, 20–23 September 2000.

- *Workshop on Runoff Generation*, Freiburg, Germany, 9–12 October 2000.
- *ERB-2000 Monitoring and Modelling Catchment Water Quantity and Quality*, Gent, Belgium, 27–29 September 2000.
- *European Conference on Advances in Flood Research*, Potsdam, Germany, 1–3 November 2000.
- *FRIEND/AMHY (Alpine and Mediterranean Hydrology) Seminar*, Montpellier, France, 11–13 October 2000.
- *European Geophysical Society Workshop: Modelling and Managing Hydrological Droughts*, Nice, France, 26–30 March 2001.
- *A New Hydrology for a Thirsty Planet*, IAHS Sixth Scientific Assembly at Maastricht, The Netherlands, 18–27 July 2001.

ICSW has established a mailing list to ease communication with and dissemination of information to the hydrological community interested in surface water-related topics. ICSW has established its own web site:

http://www.uni-freiburg.de/hydrology/icsw

which will help to transmit the work of the Commission to a wide scientific audience. The second bureau meeting was held in Stockholm on 13 September 2000 at the Swedish Natural Science Research Council.

2. Planned activities 2001–2004

To approach IAHS to design a brochure which would be of help to present IAHS. It would make IAHS more attractive to the scientific community. Funding will be further discussed for forthcoming workshops and conferences.

ICSW will support the following scientific meetings:

- *Fifth International Symposium on Hydrologic Applications of Weather Radar—Radar Hydrology*, Kyoto, Japan, 19–22 November 2001.
- *Symposium or workshop on "Integrated Water Resources Management"*, Cape Town, 2002.
- *FRIEND 2002: Fourth International Conference on FRIEND—Bridging the Gap between Research and Practice*, Cape Town, South Africa, 18–22 March 2002.
- *International Conference on the Hydrology in the Mediterranean and Semiarid Regions*, Montpellier, France, 7–10 April 2003.
- *Workshop on Flood and Drought Forecasting with Reference to Global Change* (part of the XXIII General Assembly of the International Union of Geodesy and Geophysics), Sapporo, Japan, 30 June–11 July 2003.

3. Flow Regimes from International Experimental and Network Data (FRIEND)

The (long) part of the report on FRIEND activities has not been reproduced here, but is available on the web at
http://www.cig.ensmp.fr/~iahs/maastricht/maas01-icsw.pdf

4. IAHS strategy and the ICSW science agenda

The Maastricht Scientific Assembly provided an opportunity for ICSW to contribute to the IAHS strategy for developing a science agenda. The ICSW consensus was that IAHS should focus on its two strengths. One is to organize scientific workshops and conferences, and the second is that it should publish high quality journals and conference proceedings. Through these two mechanisms it can influence the national and international science agenda. Our focus should be "excellence in context" ranging from fundamental science to providing solutions to environmental problems.

IAHS should not therefore develop a science programme or science projects except where there is a specific targeted initiative which IAHS has the resources to deliver. The view of ICSW is that there is a large and ever increasing number of science initiatives at the project level, at the research institute or university department level, at a national level, at a funding level, e.g. EU, and at the international level, the Global Energy and Water Experiment (GEWEX) , the International Hydrological Programme (IHP), World Climate Programme (WCP), etc. IAHS should not develop another international research programme which duplicates these initiatives. ICSW strategy should influence the science agenda through the organization of, or contribution to, workshops, conferences and special issues of journals. Our agenda would be more targeted if we could plan a six-year programme for our key activities. Key ICSW initiatives would include the following:

- Assessment of water resources at a range of spatial and temporal scales
- Forecasting extreme events at a range of time and space scales
- Interaction between hydrology, instream ecology and wetland functions
- Interaction between surface and groundwater systems
- Interaction between hydrology, policy, socio-economics and poverty reduction
- Transferring research to the user, particularly in developing countries
- Capacity building and dissemination of research

The primary initiative is therefore inter-disciplinary research and this raises the question of our commission structure.

Siegfried Demuth & Alan Gustard,
ICSW Secretary and President respectively

International Commission on Continental Erosion (ICCE)

ICCE at Maastricht, July 2001

At the Sixth Scientific Assembly in Maastricht, The Netherlands, ICCE held its Plenary Meeting at which ICCE President-Elect Wojciech Froehlich took over as ICCE President from Bent Hasholt. ICCE welcomes Prof. Froehlich to his new position, and thanks Bent Hasholt for his many years of service to ICCE and IAHS. Also in Maastricht, ICCE, the International Commission on Remote Sensing (ICRS), and the International Commission on Water Quality (ICWQ) sponsored Workshop 5: Application of Geographic Information Systems and Remote Sensing for Quantifying Patterns of Erosion and Water Quality. The convenors of Workshop 5 were: Jerry C. Ritchie (ICRS), Des E. Walling (ICCE), and Norman E. "Jake" Peters (ICWQ). Jerry Ritchie has provided a report on this workshop elsewhere in the Newsletter.

ICCE Vice-President Wolfgang Summer provided the following report on soil erosion in the Republic of Moldova.

Soil erosion in the Republic of Moldova

Upon flying into Chisinau, the capital of the Republic of Moldova, situated between Romania and the Ukraine, a hydrologist can only be astonished at the many gullies covering a large proportion of the fields, both bare and under crops, and cannot help but notice the landslides on the rolling hills near the city. During my involvement in a EU-project focusing on "Environmental Protection Review, Protection Strategy and Options" it became obvious again that, for the larger part of the country, soil erosion can develop into a major natural threat to the agricultural economy and the wealth of the rural population. It is estimated that soil erosion in Moldova results in a financial loss of US$45 to 55 million annually.

Due to the breakdown of the former Soviet Union, the centrally organized economic network collapsed, and the large-scale agricultural structures became obsolete as markets for agricultural products disappeared overnight. Moldova was left with an energy- and cost-intensive agricultural infrastructure of single fields with sizes of several km^2. It was impossible to adapt the existing infrastructure to the regional needs within the country. After a decade of inappropriate agricultural management combined with natural processes such as drought, soil losses due to extensive landslides, wind erosion, pollution of water sources due to erosion processes, degradation of soil fertility, and many other erosion-related negative impacts, the country's economy is stressed and the future agricultural productivity of the soils is threatened. For example, over a period of only five years, the area affected by landslides has increased from 55 427 to 1 430 000 ha. The estimated average annual soil loss is more than 30 t ha^{-1}, which amounts to a total of 22 million t $year^{-1}$.

Currently, land reforms and other legal steps are being undertaken to allow the establishment of soil conservation strategies as well as all the other necessary environmental protection strategies to insure, in the first instance, the health of the country's population and, in the long run, the sustainability of the environmental situation. It is estimated that the total benefits of soil conservation would add up to US$450 to 550 million. A lack of funds, however, endangers the urgently needed suggested programmes and projects, a problem also found elsewhere in the eastern European region of the former Soviet Union. Due to the collapse of the political system, the important agricultural sector fell apart so that:

- the rural population is left with an income of US$0.5 a day, leading to
- an increased stress on the environment by improper field structures and farming such as animal husbandry in and around the villages with negative impacts on the water sources, causing
- water pollution and linked sanitary problems, leading to health problems affecting the young as well as the elderly, so that the life expectancy of the rural population is expected to decrease significantly.

It was extremely impressive to see the actual links between political, economic and social developments, agricultural structures and management, and soil and environmental conservation strategies, and the impacts of these links on the country's wealth.

I would like to conclude that we, as academics as well as applied scientists, should always be aware of the final goals of our activities and their importance to people. I would therefore like to suggest that IAHS might want to consider establishing a new commission aimed at focusing on the economic, legal, cultural, or other socio-economic aspects and on the development of appropriate strategies to install hydrological programmes and projects.

Alice Springs Symposium, September 2001

The organization of the International Symposium on The Structure, Function and Management Implications of Fluvial Sedimentary Systems, to be held in Alice Springs, Northern Territory, Australia, from 2–6 September 2002, is well under way. Around 80 abstracts have been submitted. Abstracts for poster papers will be accepted until January 2002. The local organizers (Fiona Dyer, fiona.dyer@canberra.edu.au,

Martin Thoms and Jon Olley) have booked the brand new Alice Springs convention centre for the conference (next door to Lassiters Casino for those who have seen that great Australian film *Priscilla, Queen of the Desert* ... if you haven't seen it, its essential viewing before visiting central Australia!). The local organizers are currently approaching people to give plenary sessions—the plan is to have one plenary session for each theme of the conference, and most likely hold it as a summary session after all the papers.

Dirk de Boer, Secretary ICCE

International Commission on Snow and Ice (ICSI)

Maastricht, IAHS Scientific Assembly, July 2001

At the Sixth Scientific Assembly of IAHS, Prof. Gerry Jones succeeded Dr Elizabeth Morris as President of the International Commission on Snow and Ice.

ICSI sponsored/co-sponsored the following two meetings:

- Symposium 5: *Soil–Vegetation–Atmosphere Transfer Schemes and Large-Scale Hydrological Models.* Prof. John Pomeroy, Chair of the ICSI Working Group on Snow–Vegetation Interactions convened the session on interactions between snow and vegetation.
- Workshop 4: *High-Mountain Regions: Hydrological Processes and Cryological Processes, Models and the Variability of Available Water Resources; in anticipation of "The Year of the Mountains 2002"*. The convenor was Herbert Lang and the co-convenors were Alfred Becker, Suresh Chalise, Andrew Fountain, Remigio Galarraga, Georg Kaser, and Pierre Ribstein.

Innsbruck, IAMAS Scientific Assembly, July 2001

ICSI sponsored one meeting:

- *Workshop on the Inter-comparison of the Performance of Different Snowmelt Models (SNOWMIP)*. The ICSI convenor was Paul Föhn.

Other ICSI sponsored meetings

ICSI has co-sponsored the following six meetings:

- *International Symposium on Sea Ice and its Interaction with the Ocean, Atmosphere and Biosphere*, Fairbanks, Alaska, 2000. The ICSI representatives were Steven Ackley and Manfred Lange.
- *International Workshop on Debris-Covered Glaciers*, Seattle, Washington, USA, 13–15 September 2000. The ICSI representative was Andrew Fountain.
- *International Symposium on Snow, Avalanches and Impact of the Forest Cover*, Innsbruck, Austria, 22–26 May 2000. The ICSI representative was Michael Kuhn.
- *The Extremes of Extremes: International Symposium on Extraordinary Floods*, Reykjavik, Iceland, 17–19 July 2000. The ICSI representative was Liz Morris.
- European Geophysical Society Symposium OA36: *Water Balance Components of High Mountain Basins*, Nice, France, 25–29 April 2000. The ICSI representative was Eric Brun.
- UNESCO/ICSI/Hindu Kush-Himalayan-FRIEND Workshop: *Mass Balance Measurements of Himalayan Glaciers*, 20–24 March 2001. The ICSI representatives were H. G. Jones, G. Kaser, S. Hasnain, J. Kargel and Y. Ageta.

Publications

ICSI has participated in the publication of four works:

- *Glacier Mass Balance Bulletin no. 6 (1998–1999)*. World Glacier Monitoring Service, Department of Geography, University of Zürich—IRCHEL, Winterthurerstrasse 190, CH-8057 Zürich, Switzerland (haeberli@geo.unizh.ch).
- *Tropical Glaciers* (in press) by G. Kaser & G. Osmanston. Cambridge University Press, The Edinburgh Building, Cambridge CB2 2RU, UK.
- *Snow Ecology: an Examination of Snow-covered Ecosystems* (2001) edited by H. G. Jones, J. W. Pomeroy, D. A. Walker & R. W. Hoham. Cambridge University Press, The Edinburgh Building, Cambridge CB2 2RU, UK. 378 pp.
- *Physics of Ice Core Records* (2000) edited by Takeo Hondoh. Hokkaido University Press, Kita 9, Nisha 8, Kita-ku, Sapporo 060-0809, Japan. 459 pp.

H. G. Jones, President ICSI

International Commission on Water Quality (ICWQ)

ICWQ activities 2000–2001

In October 2000, the Commission took the lead in convening an International Conference on *Agricultural Effects on Ground and Surface Waters* at Wageningen, The Netherlands. In cooperation with the IHP/OHP National Committees of The Netherlands and Germany, this meeting focused on water scarcity and pollution caused by agriculture in the Northern Hemisphere, water management methods to protect water resources, interlinking sociological and scientific issues and the role of the political decision-making processes. These themes were

addressed for local, regional and national levels.

At the IAHS Maastricht Scientific Assembly, July 2001, the Commission took the lead in convening Symposium S3/4: *Impact of Human Activity on Groundwater Dynamics*. It was also involved in:

- Symposium 1: *Association Lectures on Water-related Threats on Social and Economic Development*
- Symposium 2: *Regional Management of Water Resources*
- Workshop 5: *Application of Geographic Information Systems and Remote Sensing for Quantifying Patterns of Erosion and Water Quality*
- Workshop 7: *Optimization of Monitoring Strategies for Groundwater Quantity and Quality*

In the period since the IUGG Assembly in Birmingham, the Vice-Presidents of the Commission have reported on water quality issues and problems in the countries where they work. To date, reports (all published in previous IAHS Newsletters) have been received on:

- Cost of cyanobacterial blooms to Australia.
- Water quality in South Africa.
- Changes in water quality in eastern Germany and the Czech Republic since 1990.
- Salinity and water quality in Australia.

These reports have appeared in previous issues of the IAHS Newsletter.

Dr Kate Heal, Edinburgh University, UK, has been elected to serve as the ICWQ representative on the newly formed Hydrology 2020 Working Group.

Bruce Webb, Secretary ICWQ

International Commission on Water Resources Systems (ICWRS)

Strategic analysis of the future role of ICWRS

Introduction

During recent years the objectives of ICWRS have been: "to advance the science of hydrology in planning, design and operation of water resources systems and to close the gap between theory and practice and between science and technology" (personal communication, Kundzewicz, 2000). During 1999–2000 the Strategic Science Discussion conducted among IAHS members led the ICWRS Bureau to evaluate its own strategic role in IAHS. Inputs were elicited from all members who were on the Commission's address list as having expressed interest in the Commission's activities (about 50 individuals); a discussion on this evaluation took place at a ICWRS Bureau meeting in April 2000, and subsequent e-mail exchanges followed among some members about this topic. All in all 12 individual contributions were received for this discussion. This report summarizes the components of the different perspectives expressed by the participants in the form of an integrated view of the strategic role of ICWRS for the future.

Integration of components of individual perspectives

"Systems" by definition implies a focus on sustainability: A common theme in the various contributions is that ICWRS activities and projects should continue to focus on sustainability in water resources management and development. Strategies towards sustainability of utilization of a resource would fail if they did not recognize that the resource resides in, or comprises, an input-transference-response system with many components, qualities and links.

"Systems" by definition implies a focus on integration: As the only Commission with an explicit "systems" mandate, ICWRS has to promote research development on the inter-connectedness of both biotic and abiotic components of water resources systems and, by extension, on the integration of all the phases of water resource protection, planning, design, management, operation and utilization. In this way the mutual dependence between sustainability and integration becomes a guiding principle for ICWRS's planning activities. This integration challenge should be interpreted very widely and includes linking water quantity and quality, atmospheric/surface water and groundwater, land use and water management, small-scale sub-catchments and large-scale main river basin systems, ecosystems and economic/social development, water supply and water conservation, urban and rural water users, poor communities and better-off users, biophysical and socio-economic information, statutory water governance and participation by catchment stakeholders, routine management and responses to hydrological extremes, technology application and capacity-building/advocacy, etc.

Recognition of all four characteristics of a water resource—quantity, quality (physico-chemical-microbiological), condition of the aquatic habitat and condition of the aquatic biota: Exposition of ICWRS's sustainability/systems agenda must promote processes that, internationally, help management objectives in the water resources field to focus on these four characteristics, as well as their interrelationships.

Integrating hydrological sciences: ICWRS is challenged to play an integrative role among the various geophysical disciplines in and beyond the domain of IAHS. It can be said that this

Commission "needs" the other IAHS Commissions to do their work in order to be able to do its own work! It should provide a systematic framework on which the other disciplines can hang their individual objectives, secure in the knowledge that their localized objectives form part of a systematic strategy towards *sustainability R&D*. ICWRS should seek and exploit potential bridging needs between separate disciplines, promote opportunities for cross-fertilization among these disciplines, and also challenge them on matters of internal focus and priority, in a sustainability/systems context.

Raising the profile of the human factor in hydrology: The integration challenge to ICWRS includes going outside the comfort zone of the geophysical sciences and engineering to engage the human factor in sustainability R&D in the water resources field. Here the Commission must broaden the focus to the social context of water: balancing food production and human health and social development with resource protection; understanding and employing the links between water and energy, water and policy, and water and civilization; engaging public perceptions of sustainability; exploring the links between hydrological extremes and their impacts on human communities and *vice versa*.

Systematizing information: Integration of outputs from different disciplines relevant to the sustainability/systems approach requires a technological and conceptual ability to bridge the conceptual and jargon gaps between disciplines, to make the differing types and scales of information and data inter-operable; and to re-interpret information that lies in the overlap between the abiotic and the biotic sub-domains of hydrology and water resources. ICWRS should maintain a focus on these information systematization needs.

Themes and tools for implementation of ICWRS strategies

Against the backdrop of the above perspectives, the themes, proposed by contributors, which may be vehicles for implementation of ICWRS strategies are:

- Sustainable water resources development
- Integrated water resources management (in its widest definition or focused on sub-themes)
- Extreme hydrological events
- Water resources systems design and operation
- Systems in hydrology
- Risk management in the water resources field
- The Hydrology for Environment, Life and Policy (HELP)/IHP-VI and FRIEND initiatives
- Climate change
- Urban hydrology

The tools that have been proposed are:

- International symposia
- International workshops
- Special research projects
- Special issues of *Hydrological Sciences Journal*
- Papers in journals
- Joint ventures with other Commissions
- Joint ventures with other water-related associations

Way forward

No contributor has made specific proposals on the "way forward". This aspect deserves a specific debate by the ICWRS Bureau. Known plans at the time of writing (March 2001) are:

- Primary involvement in the Sixth Scientific Assembly of IAHS, Maastricht, July 2001.
- Secondary involvement in the FRIEND Conference, Cape Town, March 2002.
- Primary involvement in the Integrated Water Resources Management (IWRM) (sub-theme focused) Symposium, and Remote Sensing Workshop, Stellenbosch, November 2001–January 2002.

Potential sponsorship for invited speakers at the Stellenbosch event has already been offered by the UK Department for International Development and the South African Water Research Commission.

André Görgens, ICWRS Secretary 1999–2001

Note: *André Görgens has now resigned as Secretary of ICWRS and the new Secretary is:*

Dr Andreas Schumann
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International Commission on Remote Sensing (ICRS)

At Maastricht in July it was announced that in spring 2001 for personal reasons Dr Eric Barrett had resigned as President-Elect of ICRS, and that Dr Al Rango and Prof. Gert Schultz had agreed to continue as President and Past-President respectively of the Commission until 2003.

International Commission on Atmosphere–Soil–Vegetation Relations (ICASVR)

Past events

- *Groundwater 2000: International Conference on Groundwater Research*, Copenhagen, Denmark, 6–8 June 2000. Karsten H. Jensen was a member of the scientific advisory committee.

- *Workshop on Typological Approaches to Estimation of Global Suspended Sediment Flux*, Boulder, Colorado, USA, September 2000. At this International Geosphere Biosphere Programme (IGBP) water/sediments workshop, Charles Vörösmarty represented IGBP - Biospheric Aspects of the Hydrological Cycle (BAHC) to develop land-to-ocean flux models to support IGBP activities in this realm.

Training and teaching activities

- Training in the Use of LBA-HydroNET Hydrometeorological Network Database in Support of the Large-scale Biosphere–Atmosphere Experiment in Amazonia, CPTEC, Cachoeira Paulista, Brazil, December 2000. It is hoped this was the first in a series of workshops which has created http://www.lba-hydronet.sr.unh.edu over the LBA (Large-scale Biosphere–Atmosphere Experiment in Amazonia) domain. It is a result of earlier work with UNESCO and the Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC) to develop the http://www.r-hydronet.sr.unh.edu. A group of about 35 researchers from the USA, Brazil, Colombia, Peru, Venezuela, Bolivia, and Ecuador attended; and Charles Vörösmarty was the convenor.
- National Science Foundation–Arctic Systems Science Hydrology Workshop, convened by the National Center for Ecological Analysis and Synthesis (NCEAS), Santa Barbara, California, USA, September 2000. This was a gathering of about 30 researchers, both US and international, to develop a research plan for the US National Science Foundation's Arctic Systems Science Program to improve hydrological research across the Arctic. The plan being submitted recommends creation of a pan-Arctic hydrological systems initiative composed of linked monitoring, process studies, and simulation exercises. Charles Vörösmarty was the workshop convenor and co-chair.
- Jirka Simunek (Secretary ICASVR) together with M. Th. Van Genuchten have been the instructors on a short course in "Advanced Modelling of Water Flow and Solute Transport in Variably-Saturated Media" that has been offered in countries including Germany, Australia, Switzerland, Denmark and USA. **The same course will be held at Nanjing Agricultural University, China, in July 2002** (contact: Genxing Pan, gxpan@mail.njau.edu.cn).

The Maastricht Scientific Assembly

ICASVR was involved in the following meetings at the IAHS Sixth Scientific Assembly, Maastricht, The Netherlands:

- Symposium 3/4: *Impact of Human Activity on Groundwater Dynamics* (Karsten H. Jensen was a co-convenor), 23–25 July 2001.
- Symposium S5: *Soil–Vegetation–Atmosphere Transfer Schemes and Large-Scale Hydrological Models* (Han Dolman was the convenor).

Forthcoming events

- Stewart Franks (Vice-President ICASVR) (ceswf@civeng.newcastle.edu.au) is planning an Interdisciplinary Conference on Hydrological Change towards the end of 2002, through the Institution of Engineers (Australia) and the Climate Variability and Agriculture Programme. The aim is to assess practical measures to climate adaptation—integrating insight from climate studies through to the economics of engineering designs in the light of climate uncertainty.

Charles Vörösmarty, President ICASVR

International Commission on Tracers (ICT)

ICT 2000–2001

General

It has been observed that the number and the quality of published papers relating to tracer studies have strongly increased during the last six years. Dedicated international and national conferences on tracer hydrology, tracer hydrogeology, tracer use in contaminant hydrology, tracers for calibrating groundwater modelling, etc. have been organized and supported by ICT, and other meetings have been jointly organized with the Association of Tracer Hydrology (ATH).

These meetings have provided an opportunity for specialists from different branches (hydrologists, hydrogeologists, chemists) all having in common the challenging goal of the development of "tracer techniques", to meet with numerical and geostatistical specialists who need good data for calibration, validation, conditional simulations, etc.

New techniques of tracer determination, new tracers, improved knowledge of their properties, impact of tracers on the environment, new developments in the way of interpreting tracer studies have been found and published. On the other hand, several crucial questions of hydrology and hydrogeology have emerged that may not be solved without the help of tracers.

As water supply and demand concerns increase worldwide, so does consciousness of the importance of hydrology. In this way, ICT has encouraged the participation of hydrologists from all parts of the world. Their experience and case

studies from different hydrological conditions are of great interest to the whole community. In general ICT has succeeded in attracting many of the best minds from these scientific fields and a large number of young scientists.

ICT web page and mailing list

It is the intention that the site created by Alain Dassargues (Past-President of ICT) http://www.lgih.ulg.ac.be/ict/ will be taken over and regularly updated by Jeff McDonell (the new President of ICT). It should become a web site with much information, addresses and links, etc. on tracer studies, products, publications and reports.

The International Commission on Tracers has established a mailing list (kept at the Secretariat of ICT) to facilitate and implement close links and transfer information between the hydrological community interested in tracers.

Publications

ICT edited the following Red Book:

- *Tracers and Modelling in Hydrogeology*. Proceedings of the TraM'2000 Conference held at Liège, May 2000, edited by A. Dassargues, IAHS Publ. no. 262 (May 2000), price £74.00, 572 + xii pp.

In addition, the Proceedings of the International Workshop on Runoff Generation and River Basin Modelling, held in Freiburg, Germany, 9–12 October 2000, have been published by *Freiburger Schriften zur Hydrologie*.

Relationship of ICT with international organizations

An important future activity focusing on tracer methods in hydrology is a long-term inter-agency programme entitled the Joint International Isotopes in Hydrology Programme (JIIHP) which has been established under the auspices of the International Atomic Energy Agency (IAEA) in cooperation with UNESCO with suitable linkages to WMO and other international hydrological and water-related programmes. The aim of this programme is to facilitate the integration of isotopes in hydrological practices through:

- **development** of tools for better understanding of specific hydrological processes and improving the assessment, development and management of water resources;
- **support** of national, regional and international programmes in water resources;
- **incorporation** of isotope hydrology as part of hydrological curricula in universities worldwide;
- **integration** of isotopic data in hydrological databases at national, regional and global scales.

It is expected that JIIHP will cover scientific, practical and educational aspects of relevant hydrology and water resources studies and will improve the implementation and coordination of hydrological programmes of UNESCO, WMO, IAEA and other international governmental or nongovernmental organizations.

ICT is delighted with the general philosophy of this programme and considers it a successful culmination of the work and the efforts of ICT during the last 10 years in promoting tracer methods in hydrology and in particular in bringing hydrologists and tracer specialists closer together. This planned international programme basically follows the aims and purposes of ICT formulated in 1991 and promoted during the last 10 years.

Events with ICT involvement

Past

- *International Conference on Tracers and Modelling in Hydrogeology*, University of Liège, Belgium, 23–26 May 2000, organized by ICT, the IAHS International Commission on Groundwater and the International Association of Hydrogeologists (IAH).
- *International Workshop on Runoff Generation and River Basin Modelling*, Freiburg, Germany, 9–12 October 2000.
- *New Approaches to Characterizing Groundwater Flow*, Munich, Germany, 10–14 September 2001. Organized by IAH in cooperation with ATH.
- *AGU Chapman Conference on State of the Art of Hillslope Hydrology*, Sunriver, Oregon, USA, 8–12 October 2001. The 5-day meeting, convened by Larry Band and Jeff McDonnell, will include invited oral presentations and submitted poster presentations.

Future

- *Application of Isotopes to Arid Zone Groundwater*, Adelaide, Australia, 6–8 December 2001, organized by the Adelaide Laboratory of the Centre for Groundwater Studies and CSIRO Land and Water (contact: Dr Andrew Herczeg, andrew.herczeg@adl.clw.csiro.au).

Call for next TraM Conference in 2004 or 2005

Due to the scientific success of TraM'2000: International Conference on Tracers and Modelling in Hydrogeology held at Liège, May 2000, ICT is considering organizing a similar meeting jointly with IAH in the future (2004 or 2005?).

My best wishes to Jeff McDonnell, the new President of ICT, and the ICT team!

Alain Dassargues, Past-President ICT

Reports on Meetings

SWICA-M^3—First International Conference on Saltwater Intrusion and Coastal Aquifers: Monitoring, Modelling and Management

Essaouira, Morocco, 23–25 April 2001

Two workshops, one on "Modelling flow and solute transport in the subsurface" by Prof. Jacob Bear, and the second on "Practical modelling of saltwater intrusion: variable-density flow and solute transport simulation using the US Geological Survey SUTRA code" by Clifford I. Voss & Leonard F. Konikow, were held 18–21 April, in conjunction with the SWICA-M^3 conference. The conference attracted about 300 international and local participants, and the workshops were attended by about 25 people each. The conference proceedings were published in a CD-rom. By the courtesy of all participants, the entire CD-rom contents can be downloaded from SaltNet: http://www.olemiss.edu/sciencenet/saltnet/page8.html Selected contributions from the conference were pre-published in a special issue of *Transport in Porous Media*:

Cheng, A. H.-D., Konikow, L. F. & Ouazar, D. (guest editors) Special Issue: Saltwater Intrusion in Coastal Aquifers. *Transport in Porous Media* **43**(1), April 2001.

Alexander H.-D. Cheng, Mississippi, USA

OH2

Dijon, France, 9–11 May 2001

Dijon is famous for mustard and, amongst hydrologists, for Darcy, but from 9 to 11 May it was where the International Symposium on the Origins and History of Hydrology took place. The symposium was attended by 100 or more historians, hydrologists and other scientists and the discussions were divided into themes extending from antiquity to modern times. Each theme was introduced by an invited paper, starting with Prof. Jim Dooge's review of concepts of the hydrological cycle—ancient and modern, and these papers explored a range of ideas and stories and theories about water. The submitted papers covered a wide range of topics, periods and locations: for example, the history of the water supply to the city of Tyre, a retrovision on lagooning in France and the development of surface hydrology in the USA. The concluding session chaired by Dr J. P. Carbonnel, who was also the chair of the organizing committee, discussed the content of the Dijon meeting and agreed that there should be future symposia on the history of hydrology. One suggestion, made subsequently, is for a meeting in Italy in 2004.

John Rodda, Brightwell cum Sotwell, Oxfordshire, UK

International Workshop on River Runoff: Minima and Maxima

St Petersburg, Russia, 6–8 June 2001

The International Workshop on River Runoff: Minima and Maxima was organized by the Russian State Hydrometeorological University of St Petersburg and took place in the historical buildings of Smol'ny (former residence of Lenin and the first Soviet Government). About 40 participants actively participated in the workshop, of which 20 were Russians and 20 came from abroad (Algeria, Chile, Finland, France, UK, Italy, Japan, The Netherlands, USA, Uzbekistan, and the Ukraine). The main theme of the workshop was the analysis of extreme hydrological events; not only floods but also droughts. Apart from rainfall–runoff models, statistical models were also presented as suitable approaches for describing extreme events. Most of the theoretical models were presented as case studies of river basins from several parts of the world. The workshop was held as a plenary session with about 30 full-paper presentations and a number of poster presentations. A book of abstracts had been distributed in advance of the workshop, and a final proceedings volume containing all the presented papers and posters is in preparation and scheduled to be printed in September 2001. During the three days of the workshop an interesting programme was handled. Apart from the scientific exchanges, social activities also took place such as visits to the Peterhoff (palace of Peter the Great, just outside the city) and a boat trip with dinner and drinks on the canals and the River Neva. A larger meeting on the theme of extreme hydrological events is planned to be jointly organized in St Petersburg by the Russian State Hydrometeorological University and the Russian State Hydrological Institute under IAHS sponsorship in the autumn of 2003, which will be the 300-year anniversary of the city of St Petersburg. The IAHS Newsletter will keep you updated on the preparations for this event.

Vadim A. Kuzmin, St Petersburg
& Pieter H. A. J. M. van Gelder, Delft, The Netherlands

Groundwater Quality 2001: Third International Conference on Groundwater Quality

Sheffield, UK, 18–21 June 2001

Soil and groundwater pollution from historical urban and industrial activities exists in all countries of the world, and continues to occur. There remains a need to find innovative and especially cost-effective methods to clean up pollution in soils and aquifers. GQ2001, a research-based conference hosted by the University of Sheffield, addressed the newest understanding of natural and enhanced restoration of pollutants in groundwater and soils.

The main recommendations to emerge from the conference are:

In situ bioremediation is constrained by our limited understanding of subsurface microbiology. Uncertainty in the delivery of treatment chemicals in complex hydrogeological environments presents significant challenges to scientists and engineers alike. The addition of treatment chemicals to aquifers to enhance bioremediation needs the acceptance of regulatory authorities before these emerging technologies progress from pilot scale to full-scale established technologies. One of the major unknowns is the fate of biodegradable pollutants in dual porosity aquifers, in particular the location of biological activity (matrix or fracture). Mass transfer mechanisms and rates need to be elucidated for complex component, multi-phase contaminants in the soil, vadose and saturated zones in these complex subsurface environments.

Reactive barriers are now recognized as a valid alternative to pump-and-treat where the operation time scale is believed to be long. However, experience to date has focused on relatively shallow plumes in poorly consolidated geologies. Future research efforts

should include the application of the barrier approach to contaminated groundwaters in deep consolidated aquifers where groundwater supplies are often impacted by long-lived contamination sources.

Source zone treatment has focused mainly on the non-aqueous phase liquids (NAPLs). These pollutants, in particular the DNAPLs, result in long-lived sources of contamination that are typically not suited to treatment by conventional remedial treatment technologies such as pump-and-treat. Treatment approaches may be highly site specific and further work needs to be undertaken to identify plume time scale (100s to 1000s of years) benefits of partial mass removal from NAPL source zones. Research efforts need to identify technologies to deal with NAPLs in deep consolidated, and often dual-porosity, aquifers. Research must also consider coupling combined source zone and plume treatment technologies and the development of predictive tools to assess the performance of these enhanced treatment approaches.

Flow and transport modelling is used extensively in the design and performance evaluation of pilot scale tests conducted to remediate contaminated sites. The development of predictive models to represent the long-term behaviour of pollutants in groundwater and assess the performance of remediation technologies requires essential underpinning from a range of disciplines. Research efforts should focus on incorporating heterogeneity, inherent in complex sedimentary architecture and fractured dual porosity domains, in multi-process models.

Site characterization to identify the location and mass distribution of pollutants in heterogeneous environments is essential in identifying the risk to potential receptors, for focusing remediation technologies and in providing "base-line" data for performance assessment. Our understanding of pollutant distribution is seriously limited by the ability to measure and represent both geological features and contaminant distribution at appropriate scales. The amount of uncertainty determines how effectively we deliver, treat and assess the performance of remediation technologies. The characterization of DNAPL source zones for delineating the distribution of DNAPL and in focusing remediation technologies remains a significant challenge—at present there are no DNAPL sites in deep consolidated aquifers where full site characterization has been validated.

The prevalence of contaminants at hazardous waste sites is well documented; if they are not removed or sequestered, they can contaminate millions of litres of groundwater over time scales of decades and even centuries. The remediation of polluted groundwater is driven by the need to reduce risks by achieving regulatory compliance, or in reducing liabilities, at the least cost. Variability in the nature of the pollutant source, the uncertainty in the pathways for plume migration and the wide scope of potential remediation scenarios due to site specific constraints suggest that integrated remediation technologies offer the greatest hope for the cost-effective remediation of polluted groundwater. Prior to investing in remedial technologies, decision makers want to know the benefits, both short term and long term, that will be derived from a proposed remedial activity. However, we are faced with a legacy of pollutant source zones that will generate plumes for many centuries, and perhaps longer. A significant paradigm shift is therefore required to manage groundwater pollution on appropriate time scales, a long-term strategy is required that challenges current approaches that are constrained by 30–40 year fiscal cycles.

(This report is extracted from a document developed to provide recommendations to the sixth phase of the UNESCO International Hydrological Programme (IHP) 2002–2007, in particular the implementation of the groundwater resources component under the coordination of Dr A. Aureli, Division of Water Science, UNESCO, Paris, France.)

Gary Wealthall & David Lerner, Sheffield, UK

Conference on the Role of Water in History and Development: Second Conference of the International Water History Association

Bergen, Norway, 10–12 August 2001

The second conference of the International Water History Association (IWHA) on the Role of Water in History and Development was a great success with 280 participants from more than 70 countries and 184 presented papers on a variety of interdisciplinary subjects. The background of the participants included: history/archaeology/anthropology, geography/environmental sciences, socio-economic/political sciences, water management/hydrology and law. Most contributions emphasized the interaction of water management/water use and socio-economic developments, including political implications and environmental aspects. Only a few specialized hydrologists attended the conference, which was reflected in the restricted number of papers associated with the technological and scientific evolution of hydrology.

The sessions were organized along the following themes:

- Political economy of water—ownership and control
- Images of water in religion, myths, literature and art
- History of hydrology, water control and narratives on the river and the dam
- Water, poverty and social developments
- The history of water, sanitation and health

As hydrologists, we are used to being confronted with questions on water management, water use and environmental issues, which in fact are the main reasons for the scientific study of water. And we are familiar with as many stories on misuse and mismanagement of water within large schemes as on successful projects. As a natural scientist, I found it an interesting experience to hear the views and analyses from the disciplines of humanities on many of these enterprises. To mention a few:

- The hydrological aspects of the rise and the decline of agriculture on the High Plains of the USA.
- The evolution of ideas on river management in southeast Asia—technological/hydrological expertise *vs* political decisions.
- The role of water power on European industrialization and the change in attitude through environmental awareness.
- The political background of the gigantic diversion schemes for the Siberian rivers in the former Soviet Union.

Hydrological sciences contributions included: Medieval Moslem hydro-technology; Application of nineteenth century hydraulic knowledge on the distribution of irrigation water in the Indus basin; The development of rainfall–runoff models in the USA

during the "Big Dam Era"; Scientific development of groundwater hydrology in The Netherlands.

The conference, which also marked the formal establishment of the IWHA, proved that there is an evident need for an interdisciplinary forum for the understanding of water history. The association's aim is to become this forum and to foster a stronger relationship between those engaged in water history as well as water administrators, engineers, planners and other practitioners. As such it is expected to make major contributions to the theme "Water and society" of UNESCO's IHP-VI, and especially to the IHP project "History of water and civilization", which aims towards the production of a multi-volume series on water history. Closely related to the IWHA and the IHP project is the development of a database for information on all facts and aspects of water and water history at the University of Bergen. The Norwegian Research Council is the main sponsor of the this project for the period 2001–2006; additional funding will come from the Dutch government.

It is evident that the hydrology organizations, notably IAHS and the International Association of Hydrogeologists, should participate in these initiatives and should stimulate their members to get involved in the study of water history in order to be better prepared for the future through lessons that can be learned from the past. Another player in this field is the Standing Committee on the History, Drainage and Flood Control of the International Commission on Drainage and Irrigation (ICID) and the closely related German Frontinus Gesellschaft. The latter society, which mainly studies the technical aspects of ancient water works, was also represented in Bergen to show its interest in cooperation. For more information on the IWHA and the abstracts of the conference, consult:

www.ihwa.net

Jacobus de Vries, Amsterdam, The Netherlands

International Conference on Hydrological Challenges in Transboundary Water Resources Management

Koblenz, Germany, 25–27 September 2001

The global situation is characterized by the fact that about 50% of the world's land surface belongs to transboundary water systems forming half of the overall freshwater resources. These resources determine the living conditions of about half of mankind.

Increasing demands and declining water quality, growing vulnerability from floods and droughts, alarming water-borne health and eco-hydrological problems confront water resources management with challenges that need comprehensive strategies for providing water of adequate quantity and quality and protecting man and nature from adverse impacts. Sustainable solutions for transboundary water systems are therefore of high priority.

The main topics of the conference, organized by the German IHP/OHP National Committee, were hot spot analysis of hydrological problems, integrated hydrological networks and information systems, methodologies for analysing hydrological processes in large-scale water systems, institutional and legal challenges of transboundary hydrological cooperation, and experiences and challenges for sustainable development in transboundary water systems.

The participants came from 34 countries and many international organizations were represented. The conference supported the International Hydrological Programme of UNESCO (IHP-V project 4.1: International water systems). At the end of the conference the participants agreed on the following conclusions and recommendations:

- The conference demonstrated that there is an increasing trend to adopt sustainable policies to water resources development and to apply integrated water resources management (IWRM) practices in transboundary water resources systems (including rivers, lakes, aquifers and coastal seas) to implement these policies.
- There was a consensus that an integrated approach to water resources management practices by institutions at the national level will facilitate and improve transboundary cooperation.
- A number of examples were presented which demonstrated that valuable scientific methodologies and good practices for transboundary water resources systems, that are worth disseminating, exist in some parts of the world.
- The participants expressed the need for improving the exchange and access to comparable hydrological data and information, and strengthening institutional facilities and capacity-building in transboundary water resources systems.
- The participants stressed that assessment of water resources based on good quality data is a key prerequisite for the establishment and functioning of collaboration in transboundary water systems.
- The participants recognized that monitoring systems in many parts of the world largely need to be improved to supply valuable data and information for decision-making. Assessment of long-term variations in river runoff, sediment yield and pollutants under the effect of man's impact and climate change should be given recognition. It is urged to strengthen joint monitoring of transboundary water systems.
- Several case studies were presented which showed the importance of confidence-building measures to improve the culture of collaboration, cooperation and joint decision-making in transboundary water resources management. At the same time, the cases presented demonstrated the importance of economic incentives to be provided by the international community to facilitate the mediation processes.
- The participants called upon the UN system to continue their efforts to effectively facilitate collaboration in transboundary water systems management. The UN-wide World Water Assessment Programme projects and initiatives and the UN worldwide and regional (UN/ECE) conventions were welcomed. International governmental organizations, governments, scientific/technical nongovernmental organizations are called upon to support and to contribute to these initiatives.
- The participants expressed the wish that as many countries as possible should participate in and implement regional and global agreements on the utilization and protection of transboundary water resources systems with a view to achieving a sustainable international water order.

The papers and posters of the conference have been published in the series *IHP/OHP-Berichte*, Sonderheft 12, obtainable from: Bundesanstalt für Gewässerkunde, IHP/OHP Secretariat, Koblenz, Germany (fax: +49 261 13065422; e-mail: hofius@bafg.de).

Gerhard Strigel, Koblenz, Germany

Forthcoming Events

(all meetings are organized or sponsored by IAHS and/or its Commissions)

IAHS Prediction of Ungauged Basins (PUBS) Open Meeting

San Francisco, California, USA, 13 December 2001

Call for participation

A meeting organized by Dr Al Rango will be held during the Fall Meeting of the American Geophysical Union (AGU) in Room MC, between 5:30 and 7:00 p.m. on 13 December.

In order to focus the scientific activities of IAHS and to make the scientific potentials practical, IAHS initiated a unique science discussion over the internet. Many exchanges took place and numerous areas of research were proposed. One proposal that received enthusiastic support from the various IAHS scientific commissions and individuals was on the subject of research on ungauged basins. In The Netherlands in July 2001 at the Sixth Scientific Assembly of IAHS, it was recommended that a Working Group on Prediction of Ungauged Basins be established, and that this working group should hold a series of open discussion meetings and workshops to define the appropriate research approaches to follow in addressing the ungauged basins problem. The meeting at AGU will be the first meeting in the series.

For more information contact:

Dr Al Rango
USDA-ARS Jornada Experimental Range, 401 E. College Avenue, PO Box 30003, New Mexico State University, MSC 3JER, Las Cruces, New Mexico 88003, USA
[tel.: +1 505 6462120; fax: +1 505 6465889; alrango@nmsu.edu]

Session HSA4.03: Hydrological and Meteorological Coupling in Mountain Areas at the XXVII General Assembly of the European Geophysical Society

Nice, France, 22–26 April 2002

Call for abstracts

The IAHS International Commission on Tracers is co-sponsoring a session on the theme: Hydrology and Earth System Sciences. The aim of this session is to present the symbiosis of meteorological and hydrological processes at a range of high elevation scales, extending from single sites to basins and mountain ranges and over a range of time steps, from hourly to annual.

This session invites contributions on understanding, monitoring and modelling of individual or coupled meteorological and hydrological issues in mountain environments. From a meteorological viewpoint, contributions are welcome on fundamental interface processes: evapotranspiration, precipitation, temperature, humidity and wind profiles. From a hydrological viewpoint, work can include topography-related evaporation, transpiration, slope water dynamics, glacier mass balance, snowmelt, and discharge with special emphasis on floods. Since measurement and modelling of key hydrological and meteorological variables often pose logistical and scientific problems in mountain regions, an introduction to alternative instrumentation, remote sensing (space- and airborne) and new approaches is welcome.

The preliminary scientific programme is available at: http://www.copernicus.org/EGS/egsga/nice02/programmC/HES.program.htm

The deadline for **abstracts** is **11 January 2002**. A copy of each abstract should be submitted in EGS-format (http://www.copernicus.org/EGS/egsga/nice01/abstract_submission_txt.htrn~) both directly to the EGS office via e-mail (egs@copernicus.org) as well as to:

Dr Carmen de Jong
Berlin Environmental Research Group (BERG), Institut für Geographische Wissenschaften, FR Angewandte Physische Geographie, FU Berlin, Malteserstrasse 74–100, D-12249 Berlin, Germany
[tel.: +49 30 83870254/252; fax: +49 30 77391758; e-mail: cdjong@geog.fu-berlin.de]

It is anticipated that the proceedings will be published in a Springer Science Book as a joint effort towards the International Year of the Mountains. The aims of the book are to give an overview on experimental and theoretical techniques in hydrology and meteorology of high mountain basins. The book will include contributions from both this EGS session and those from the preceding year on "Water balance of high mountain basins" and "Hydrometeorological processes in mountain regions".

Limited support is available from EGS for: Young Scientist's Travel Award (YSTA), East European Support Award (EESA), Adrain Gill Travel Award (AGTA), and the Keith Runcorn Travel Award for North Americans (KRTA). Simply add the appropriate abbreviation in the abstract submission information. Additional applications for financial assistance can be made via Dr Carmen de Jong to the German International Year of the Mountains Committee. Students and scientists from developing countries will be given priority.

Fifth International Conference on Hydroinformatics: Hydroinformatics 2002

Cardiff, UK, 1–5 July 2002

Reminder of abstract deadline

This conference is sponsored by the International Association for Hydraulic Engineering and Research (IAHR) and IAHS, and the topics include, but are not limited to:

- Decision support and management systems
- Integration of technologies and systems
- Geographic information systems (GIS)
- Tools, environments and languages
- Numerical engines
- Data acquisition and management
- Data mining and knowledge discovery
- Neural networks in hydroinformatics
- Evolutionary algorithms in hydroinformatics
- Internet, intranets and extranets
- Inverse modelling and data assimilation
- Uncertainty and risk
- Ecology and water quality modelling
- Experiences with modelling systems

The deadline for **abstracts** was extended to **26 October 2001**. For further details contact:

Cherrie Summers
Hydroinformatics 2002 Secretariat, Cardiff School of Engineering, Cardiff University, Queen's Buildings, PO Box 917, Cardiff CF24 0XH, UK
[tel./fax: +44 29 20874421; summersc@cardiff.ac.uk]

or visit the web site:
http://www.cf.ac.uk/engin/news/confs/hydro

The Third Inter-Celtic Colloquium on Hydrology and Management of Water Resources—Celtic Water in a European Framework: Pointing the Way to Quality

Galway, Ireland, 8–10 July 2002

Call for papers

The Third Inter-Celtic Colloquium follows those which took place in Rennes and Aberystwyth, in 1996 and 2000, respectively. The meeting is organized under the aegis of IAHS with support from a number of the Irish National Committees and other bodies.

During the past year, publication and enactment of the European Union Water Framework Directive has set challenging targets for member states in relation to the long-term management of European water resources. By the year 2016, water quality of all surface and ground waters in member states must, through a combination of planning, treatment and remediation, be returned to their original pristine state—a formidable challenge indeed! Some of the issues involved in this task will be addressed at this colloquium.

Papers are invited on all relevant topics and especially on the following:

- Water quality—pressures and responses, past, present and future
- Integrated river basin management—planning for the future
- Scientific support for management: hydrological processes and models—limitations and uncertainties
- Risk assessment, perception and management: extreme rainfalls, floods, droughts and climate change
- Social history of water use in Celtic lands

Papers, not exceeding 12 pp., will be pre-published in the colloquium proceedings. Poster presentations are also welcome. Papers will be accepted in a Celtic language, English, or French, with the abstract in two of these languages.

For further details and pre-registration, please contact:

Prof. Con Cunnane
Department of Engineering Hydrology,
National University of Ireland, Galway, Ireland
[tel.: +353 91 750425; fax: +353 91 524913;
conleth.cunnane@nuigalway.ie]

or look at:
http://www.nuigalway.ie/hydrology/celtic.htm

International Symposium on Lowlying Coastal Areas: Hydrology and Integrated Coastal Zone Management

Bremerhaven, Germany, 9–12 September 2002

Call for abstracts

This symposium is being organized by the German National Committee for the International Hydrological Programme of UNESCO and the Hydrology and Water Resources Programme of WMO. The symposium co-sponsors include IAHS.

The following topics will be discussed:

1. **Climate change and hydrology** (invited speakers) Impacts on coastlines and estuaries, geological dynamics, sea-level change, extreme events, tidal dynamics, interactions, drainage aspects.
2. **Hydrology of water stress conditions** (case studies by invited speakers) Demand for and use of natural resources by agriculture, aquaculture, industry, tourism and urbanization, impact on the environment.
3. **Tools for coastal zone management** Risk assessment and risk management, GIS, structural design criteria, policies, community participation, education.
4. **Measures for integrated coastal zone management** Non-structural and structural measures, low-cost strategies, legal aspects.

Participants intending to present a paper or a poster on topics 3 or 4 are requested to send an **abstract** in English of 300–400 words before **15 November 2001**. Papers accepted for publication in the symposium proceedings must be submitted in camera-ready form before 15 April 2002.

For further details, or to submit an abstract, please contact:

Gerhard Strigel
Bundesanstalt für Gewässerkunde
IHP/OHP Secretariat, PO Box 200253,
D-56002 Koblenz, Germany
[fax: +49 261 13065422; strigel@bafg.de]

or visit the web site:
http://www.bafg.de/html/aktuell

Second International Symposium on Flood Defence: the Prospect of Living with Floods in the 21st Century (ISFD'2002)

Beijing, China, 10–13 September 2002

Call for abstracts

The second ISFD follows the symposium held in Kassel, Germany, in 2000, exploring state-of-the-art technology and bringing together colleagues from around the world to address critical issues in the practice of flood defence. IAHS is one of the sponsoring organizations. The symposium in China will provide not only a forum for exchange of the latest development in flood defence but also a chance for the participants of the conference to see the development of hydraulic engineering in China.

The symposium topics are:

- History of flood defence
- Precipitation, vegetation, and hydrology
- Flood modelling
- Pollution and disease pathogens
- Flood plains and flood-plain management
- Disasters induced by sedimentation and erosion
- Landslides and debris flow
- Reservoirs and reservoir management
- Environmental impact of floods
- Urban drainage systems
- Global climate modelling
- Coastal floods and storm surges
- New developments in flood prevention
- Drainage management
- Real-time control of flooding
- Strategies/concepts on flood defence
- Laws and policies on flood control
- Experience and practices in flood control
- Engineering measures mitigating flooding disasters
- Flood insurance
- Hydroinformatics

Key dates are: one-page **abstracts** due **31 January 2002**; full-length paper due 31 May 2002. Please submit abstracts to Dr Baosheng Wu (address below).

For further information please visit the ISFD'2002 web site:

http://www.irtces.org/isshhu/2ISFD.htm

or contact:

Dr Baosheng Wu
ISFD'2002 Secretary, Department of Hydraulic Engineering, Tsinghua University, Beijing 100084, China
[tel.: +86 10 62772097; fax: +86 10 62772463; baosheng@tsinghua.edu.cn]

ICHE-2002: Fifth International Conference on Hydro-science and Hydro-engineering

Warsaw, Poland, 18–21 September 2002

Reminder of abstract deadline

The central theme of this conference, whose sponsors include UNESCO, IAHS and the International Association for Hydraulic Engineering and Research is: Hydro-science and Hydro-engineering in the Changing World—challenges, opportunities and constraints. Special emphasis will be laid on water-related issues special to the quickly developing transition economies. The deadline for **abstracts** (in English) is **15 December 2001**, and the deadline for submission of camera-ready papers is 30 April 2002.

The conference topics are:

- Environmental hydraulics
- Subsurface hydraulics
- Hydrology and hydraulics of fluvial systems
- Hydraulic structures
- Hydraulics of maritime engineering
- Water management systems
- Web-based education and engineering

For more information see: http://www.iche2000.pl.

All correspondence should be directed to:

Prof. Janusz Kindler
Chairman Local Organizing Committee, Faculty of Environmental Engineering, Warsaw University of Technology, 20 Nowowiejska Street, 00-653 Warsaw, Poland
[tel.: +48 22 6214560; fax: +48 22 6257377; dziekan@is.pw.edu.pl]

International Conference on Urban Hydrology for the 21st Century

Kuala Lumpur, Malaysia, 14–18 October 2002

Call for abstracts

This conference is mainly targeted at countries in the humid tropical regions. In conjunction with the conference, the International Hydrological Programme of UNESCO for Southeast Asia and the Pacific will hold its 10th Regional Steering Committee Meeting. The theme of the conference is: Induced Problems in Urban Environment Requiring Holistic Solutions for the New Millennium, with the objectives:

1. to foster better coordination and information exchange;
2. to encourage public participation to create opportunities for concrete actions that address local problems;
3. to promote continued interaction between scientists and managers;
4. to create networking/coordination among organizations at the hemispheric, national and regional levels.

The main topics will be:

- Mathematical rainfall–runoff modelling
- Urban hydrology/instrumentation/data collection
- Emerging urban hydrology issues

The deadline for submission of **abstracts** is **15 December 2001**. Participants intending to present papers or posters are required to send extended abstracts in English, providing a clear statement of the issues, methods and conclusions of the proposed contribution. Authors should indicate whether the papers submitted are for oral or poster presentation and the theme(s) chosen.

For further information and submission of abstracts, please contact:

Dr Mohd Nor bin Mohd Desa
International Conference on Urban Hydrology for the 21st Century, HTC Kuala Lumpur, Department of Irrigation and Drainage Malaysia, Km. 7 Jalan Ampang, 68000 Ampang, Kuala Lumpur, Malaysia
[tel.: +60 3 42552507/502/508/575; fax: +60 3 42561894; htckl@pop.moa.my]

or visit the web site:

http://htc.moa.my/htc/icuh2002/icuh2002.html

The International Conference of Preventing and Fighting Hydrological Disasters

Timisoara, Romania, 21–22 November 2002

Call for abstracts

This conference is being organized by the Romanian National Committee for IHP-UNESCO, "Politehnica" University Timisoara, Hydrotechnical Faculty, and the Romanian Water Authority W. D. Banat, under the high patronage of Ion Iliescu, President of Romania, and under the auspices of IAHS.

The objectives are:

1. Exchanges of opinion regarding the scientific approach to hydrological extremes.
2. The presentation of the results of some research, application and recent experiments.
3. To find the directions for future research.

The conference topics are:

- **Natural and accidental floods**
  flood forecasting and flood warning
  concepts concerning the prevention of the effects of floods
  structural and nonstructural solutions
  soil erosion, sediment transport and sedimentation
  systems and schemes for the management of floods
  physical and numerical modelling
  interaction between river and floodable/wet areas
  large/small hydrographical catchments
- **Hydrological droughts**
  Short/long-term forecasting
  potential desertification
  approaches in the case of insufficient data
  integrated/numerical systems and models
  water as an economic, social and environmental good
  water management subordinated to water scarcity
  uses and recycling of water resources
- **Water quality and environmental impact**
  ecohydrological processes at the catchment scale
  interaction between surface water and groundwater
  water resources protection
  water quality modelling
  accidental pollution
  environmental impact evaluation

- **Policies and strategies preventing the exhaustion and pollution of water resources**
  traditional/modern approaches
  informational and decisional systems
  advanced monitoring
  conflicts between water uses and the environment
  instruction and educational systems
  politics, strategies and legislation in the water field
  globalization, privatization, water as a public good
  global change of climate phenomena

The languages of the conference will be English and Romanian. Important deadlines are: **15 December 2001** for pre-registration and **abstract submission** (400–500 words in English) by electronic mail; 15 April 2002 for the full text of contributions (in English).

For more information contact:

Gheorghe Cretu
Conference Secretariat, **University "Politehnica" Timisoara, Facultatea de Hidrotehnica, Str. George Enescu nr. 1A, 1900 Timisoara, Romania**
[tel./fax: +40 56 221481; e-mail: gcr@mail.dnttm.ro]
or visit:
http://www.utt.ro/pfhd

16th IAHR International Symposium on Ice

Dunedin, New Zealand, 2–6 December 2002

Call for abstracts

The IAHS International Commission on Snow and Ice is co-sponsoring the International Symposium on Ice that is being organized by the International Association for Hydraulic Engineering and Research. The symposium will cover a range of issues in river, lake and sea ice research, including:

- Ice mechanics and forces
- Broken ice in rivers, lakes and oceans
- Ice forecasting and management
- Ice–ocean–atmosphere interactions
- Global climate change and ice-covered waters
- Ice ecology and management
- Navigation in ice-covered waters
- Transport of pollutants and nutrients in ice
- Thermal regimes in rivers and lakes

Please send abstracts to the address below by the deadline of **1 March 2002**. Camera-ready typescripts will be due by **2 August 2002**.

A Workshop on Ice Crushing will be held during the week of the conference. Other specialist workshops may also be organized.

The second announcement/circular will be distributed to those who register interest.

For the latest information on this meeting see:
http://www.physics.otago.ac.nz/~nzice/
or contact:

Pat Langhorne
16th IAHR International Symposium on Ice,
Department of Physics, University of Otago,
PO Box 56, Dunedin, New Zealand
[tel.: +64 3 4797749; fax: +64 3 4790964;
nzice@physics.otago.ac.nz]

International Conference on the Hydrology of the Mediterranean and Semiarid Regions

Montpellier, France, 7–10 April 2003

Call for abstracts

All over the world, the hydrological variability of regions under a Mediterranean or a semiarid climate is due to a combination of heavy rainfall irregularly distributed in time and space, heterogeneous land topography and high anthropogenic pressures. Due to these conditions, it is difficult to plan and manage water resources for competing users: both traditional and irrigated farming, human consumption, hydroelectric production, protection against droughts and floods in rural and urban areas, erosion, etc.

These difficulties clearly indicate the real need to deepen our knowledge of the hydrological regimes in Mediterranean and semiarid regions, particularly (i) their spatial and temporal variability, (ii) the surface and groundwater transfer mechanisms over river basins, (iii) the extreme events, (iv) the surface and groundwater resources and their integrated management.

This conference aims at taking stock of hydrological research conducted in these different fields. Furthermore, it is hoped the conference will provide an opportunity for the exchange and comparison of research priorities, methods, data, knowledge and results, acquired by scientific teams from around the world who are working for a better understanding of the hydrological phenomena observed under Mediterranean and semiarid climates.

The conference themes will be:

- Climatic variability and hydrological consequences
- Extreme climatic and hydrological phenomena (floods and droughts)
- Erosion and sediment transport
- Surface and groundwater resources
- Consequences of human activity (pollution, change of vegetation, overexploitation)
- Integrated water resources management
- Coastal areas (lagoons)

Participation is expected from experts in domains such as: hydrology, climatology, agronomy, geography, environment.

The conference proceedings will be pre-published as an IAHS Red Book. Results will also be released on the conference website:
http://mpl.ird.fr/montpellier2003

The deadline for **abstracts** is **15 December 2001**; and the deadline for receipt of full papers is 1 July 2002.

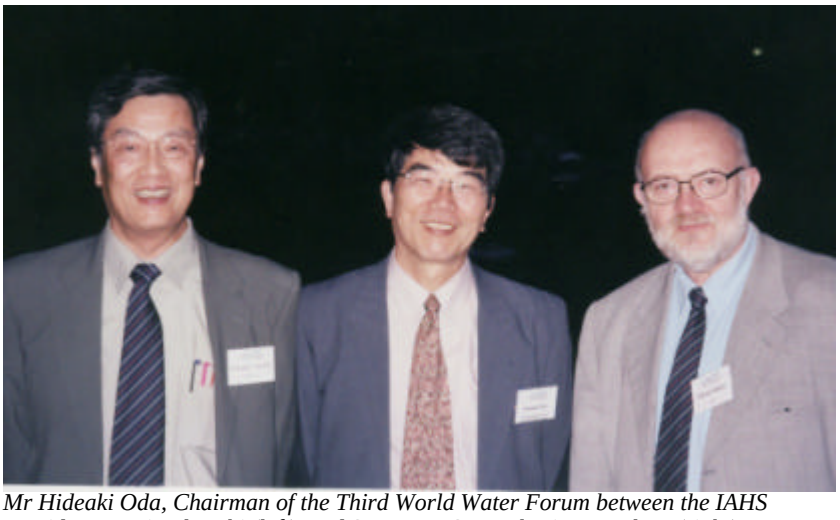
The mailing address for abstracts and for more information is:

Muriel Tapiau, Conference 2003,
Laboratoire HydroSciences Montpellier,
UMR 5569, BP 5045, F-34032 Montpellier Cedex, France
[tel.: +33 4 67149020; fax: +33 4 67149010;
montpellier2003@msem.univ-montp2.fr]

Other News

The Third World Water Forum

After Marrakech (Morocco) in 1997 and The Hague (The Netherlands) in 2000, a third Water Forum will be held in Kyoto, Shiga and Osaka (Japan) from 16 to 23 March 2003. To launch the preparations for this important event, which is expected to attract thousands of people interested in all aspects of water problems, a "kick-off meeting" was organized last March in Kyoto. In order to propose a contribution from IAHS to the Forum, Kuni Takeuchi and Pierre Hubert



Mr Hideaki Oda, Chairman of the Third World Water Forum between the IAHS President, Kuni Takeuchi (left), and Secretary General, Pierre Hubert (right).

participated in this meeting and made, together with other organizations, like IAHR (International Association for Hydraulic Engineering and Research) and IAH (International Association of Hydrogeologists) some proposals which are now being reviewed by the Organizing Committee chaired by Mr Hideaki Oda. We hope that sciences in general and especially hydrology will find a place in the Third World Water Forum.

You can find all available information on the Third World Water Forum on its web site:

http://www.worldwaterforum.org

which is linked to the homepage of the IAHS web site.

80th Anniversary of the Hydrometeorological Service of Uzbekistan

The Main Administration on Hydrometeorology at the cabinet of Ministers of the Republic of Uzbekistan (Glavgidromet) is a state body with the status of a Ministry. Glavgidromet is responsible for the interdepartmental management of all types of hydrometeorological services and observations, including environmental pollution monitoring over the territory of Uzbekistan, and is responsible for the state of the art and development of the relevant activities.

In the year of the tenth anniversary of the independence of the Republic of Uzbekistan, the National Hydrometeorological Service celebrates its 80th anniversary. It is one of the oldest scientific and operational institutions in central Asia. The official date of its beginning is 7 May 1921.

Today the staff of the hydrometeorological service includes more than 3000 specialists, from which five are doctors and 48 candidates of science. The work of the hydrometeorological service is based on an observational network at present comprising 53 meteorological, 10 hydrological, 1 water balance, 5 lake, 3 snow–avalanche and 14 aviational meteostations, 1 zonal aviational centre, 1 upper-air meteorological complex, 2 stations for background monitoring and 87 sites for agrometeorological observations.

For this 80th anniversary the Hydrometeorological Service of Uzbekistan has issued a booklet in English with a comprehensive presentation of its purposes and activities, which is available from the Deputy Director:

Ludmila Borovikova
Deputy Director, Central Asian Hydrometeorological Institute, 72 K. Makhsumov, Tashkent 700052, Uzbekistan

Happy Anniversary to Glavgidromet from IAHS!

Retirement of Professor Hans Liebscher

On 31 May there was a colloquium at the Federal Institute of Hydrology in Koblenz to mark the 65th birthday and the retirement of Hans Liebscher after many years of service in the Institute. The day's programme started with an introduction by Prof. Volkhard Wetzel (Director) followed by eight invited papers, the last by Hans himself on the history and development of runoff models. During his career Hans organized the IAHS Scientific Assembly at Hamburg in 1983, he was President of the Surface Water Commission from 1983 to 1987 and he represented Germany at many sessions of the IHP Intergovernmental Council and of the WMO Commission for Hydrology. He fostered the establishment of the Global Runoff Data Centre at Koblenz and has chaired its Steering Committee.

John Rodda, Brightwell cum Sotwell, UK

André Van der Beken (Belgium) on sabbatical

André Van der Beken has been given sabbatical leave by the Department of Hydrology and Hydraulic Engineering, Free University of Brussels. During the academic year 2001–2002 he will work with Dr Janos Bogardi of the International Hydrological Programme (UNESCO) towards launching the **GOUTTE of WATER** (Global Organization of Universities for Teaching, Training and Ethics of Water) project of IHP-VI (2002–2007). He will apply his 20 years of experience of national and interna-

tional networking to investigate best practices in different modes of networking and to prepare a blueprint for the operational activities of GOUTTE of WATER. He will continue to coordinate the European Network of Education and Training (ETNET) for ENVIRONMENT—WATER:

http://keywater.vub.ac.be

and the European Union–USA Cooperation Project in Higher Education and Vocational Training Exchanges in Environmental/Water Engineering and Sciences:

http://www.ecn.purdue.edu/EWRES

Both projects are funded by the European Commission. Anybody interested in Prof. Van der Beken's survey on networking practices is kindly invited to contact him (avdbeken@vub.ac.be). A web site about the project is being designed, where you will be invited to add your networking activities/best practices.

New UNESCO Regional Hydrologist for the Arab Region

Welcome to the new Regional Hydrologist for the Arab Region in UNESCO, who is also a member: of IAHS:

Dr Radwan Al-Weshah
Programme Specialist/Regional Hydrologist, UNESCO Cairo Office, 8 Abdel Rahman Fahmy Street, Garden City, Cairo 11541, Egypt
[tel.: +202 7945599/7943036; fax: +202 7945296; r.weshah@mail.unesco.org.eg]

Dr Al-Weshah is based in Cairo and will supervise the implementation of IHP activities in the Arab World.

Changes to IAHS National Representatives

Please note the following changes to the list of IAHS National Representatives published in the *IAHS Handbook* (pp. 87–94) in 2000:

Egypt/Egypte
NEW National Representative
Prof. Nasser M. H. Abou Ashour
Geophysics Department,
Faculty of Science, Ain Shams University,
Abbassia, Cairo, Egypt
e-mail: aboashor@asunet.shams.eun.eg
fax: +202 4842123

India/Inde
tel. added and additional e-mail!
Dr Subhash Chander
72 Deshbandhu Apartments,
Kalkaji, New Delhi 110019, India
e-mail: schander@ndf.vsnl.net.in *or* schander@teri.res.in
tel.: +91 11 6286516

Switzerland/Suisse
NEW National Representative
Dr Rolf Weingartner
Gruppenleiter Hydrologie/Projektleiter HADES,
Geographisches Institut der Universität Bern,
Hallerstrasse 12, CH-3012 Bern, Switzerland
e-mail : wein@giub.unibe.ch *or* wein@bluewin.ch
fax: +41 31 6318511
tel.: +41 31 6318874 (direct) *or* 6318015 (Secretariat)

Taiwan/Taiwan
NEW National Representative
Prof. Yih-Chi Tan
Department of Agricultural Engineering and Hydrotech Research Institute, 1, Section 4 Roosevelt Road,
Taipei 106, Taiwan
e-mail: yctan@ccms.ntu.edu.tw
fax: +886 2 23639557
tel.: +886 2 23690342

The full and revised list of IAHS National Representatives can be found at:

http://www.cig.ensmp.fr/~iahs

Calendar of Meetings Organized/Sponsored by IAHS

2001		
Heian-Kaikan, Kyoto, Japan 19–22 November	Prof. Eiichi Nakakita, Water Resources Research Center, DPRI, Kyoto University, Uji, Kyoto 611-0011, Japan tel.: +81 774 384260; fax: +81 774 323093; radconf@civil.ac; http://www.eie.gee.kyoto-u.ac.jp/~nakakita/radarconf/5thconf2.html	Fifth International Symposium on Hydrological Applications of Weather Radar—Radar Hydrology
San Francisco, California, USA 13 December	Dr Al Rango, USDA-ARS Jornada Experimental Range, 401 E. College Avenue, PO Box 30003, New Mexico State University, MSC 3JER, Las Cruces, New Mexico 88003, USA tel.: +1 505 6462120; fax: +1 505 6465889; alrango@nmsu.edu	IAHS Prediction of Ungauged Basins (PUBS) Open Meeting
2002		
Berne, Switzerland 6–8 March	International Conference on Flood Estimation, Federal Office for Water and Geology, CH-3003 Berne, Switzerland tel.: +41 31 3247758; fax: +41 31 3247681; floodestimation@bwg.admin.ch; http:/hydrant.unibe.ch	International Conference on Flood Estimation
Cape Town, South Africa 18–22 March	FRIEND 2002, Institute for Water Research, Rhodes University, PO Box 94, Grahamstown 6140, South Africa juanita@iwr.ru.ac.za; http://www.ru.ac.za/institutes/iwr	FRIEND 2002: Fourth International Conference on FRIEND—Bridging the Gap between Research and Practice

Berkeley, California, USA 25–29 March	Dr Angelos Findikakis, Bechtel Systems & Infrastructure Inc., Mail Stop 333/12/C34, PO Box 3965, San Francisco, California 94119-3965, USA tel.: +1 415 7688550; fax: +1 415 7684898; anfindik@bechtel.com; http://www.iahr.nl/conferences/groundwater2002/groundwater2002.htm	Bridging the Gap between Measurements and Modelling in Heterogeneous Media: International Groundwater Symposium
Paestum, Italy 8–10 April	Ing. Mario Scagnetto, Via Nigra 38/b Mestre, I-30170 Venezia, Italy tel. +39 339 5831289; mhcify.bh@usa.net	ICCORES Workshop on Ecological, Sociological and Economic Implications of Sediment Management
Nice, France 22–26 April	Dr Carmen de Jong, Berlin Environmental Research Group (BERG), Institut für Geographische Wissenschaften, FR Angewandte Physische Geographie, FU Berlin, Malteserstrasse 74–100, D-12249 Berlin, Germany tel.: +49 30 83870254/252; fax: +49 30 77391758; e-mail: cdjong@geog.fu-berlin.de; http://www.copernicus.org/EGS/egsga/nice0 1/abstract submission txt.htrn~	Session HSA4.03: Hydrological and Meteorological Coupling in Mountain Areas at the XXVII General Assembly of the European Geophysical Society
Paris, France 13–15 June	UNESCO, Division of Water Sciences, 1 Rue Miollis, F-75732 Paris Cedex 15, France tel.: +33 1 45684001; fax: +33 1 45685811; ihp@unesco.org	Kovacs Colloquium on Scientific Achievements of IHP-V Projects
Prague, Czech Republic 17–20 June	Conference Secretariat ModelCARE 2002, Guarant Ltd, Opletalova 22, 11000 Prague 1, Czech Republic tel.: +420 2 84001444; fax: +420 2 84001448; modelcare2002@guarant.cz; http://www.guarant.cz/ModelCARE2002	ModelCARE 2002: Fourth International Conference on Calibration and Reliability in Groundwater Modelling (A few steps closer to reality)
Turin, Italy 17–21 June	Antonello Provenzale, Istituto di Cosmogeofisica, Consiglio Nazionale delle Richerche, Corso Fiume 4, I-10133 Turin, Italy tel.: +39 011 6306806; fax: +39 011 6604056; anto@icg.to.infn.it; http://www.icg.to.infn.it/cmg2002	24th IUGG Conference on Mathematical Geophysics: Pattern and Form in Earth's Dynamics
Capri, Italy 24–28 June	Dr Rossella Monti, Centro Studi Idraulici par l'Ambiente, Politecnico di Milano, Piazza Leonardo da Vinci 32, I-20133 Milan, Italy tel.: +39 02 6683624; fax: +39 02 23996298; monti@marina.iar.polimi.it	Second International Conference on New Trends in Water and Environmental Engineering for Safety and Life: Eco-compatible Solutions for Aquatic Environments
Cardiff, UK 1–5 July	Cherrie Summers, Hydroinformatics 2002 Secretariat, Cardiff School of Engineering, Cardiff University, Queen's Buildings, PO Box 917, Cardiff CF24 0XH, UK tel./fax: +44 29 20874421; summersc@cardiff.ac.uk; http://www.cf.ac.uk/engin/news/confs/hydro	Fifth International Conference on Hydroinformatics: Hydroinformatics 2002
Galway, Ireland 8–10 July	Prof. Con Cunnane, Department of Engineering Hydrology, National University of Ireland, Galway, Ireland tel.: +353 91 750425; fax: +353 91 524913; conleth.cunnane@nuigalway.ie; http://www.nuigalway.ie/hydrology/celtic.htm	The Third Inter-Celtic Colloquium on Hydrology and Management of Water Resources: Celtic Water in a European Framework—Pointing the Way to Quality
Dresden, Germany 22–26 July	Cathleen Schimmek, Conference Secretariat ICWRER 2002, Institute of Hydrology and Meteorology, Dresden University of Technology, Wuerzburger Strasse 46, D-01187 Dresden, Germany tel.: +49 351 4633931; fax: +49 351 4637162; icwrer2002@mailbox.tu-dresden.de; http://www.tu-dresden.de/fghhihm/hydrologie.html	Third International Conference on Water Resources and Environment Research (ICWRER): Water Quantity and Quality Aspects in Modelling and Management of Ecosystems
Alice Springs, Australia 2–6 September	Dr Fiona Dyer, School of Resource, Environment and Heritage Sciences, University of Canberra, Canberra ACT 2601, Australia tel.: +61 2 62012267; fax: +61 2 62012328; fiona.dyer@canberra.edu.au; http://lake.canberra.edu.au/~iahs2002	International Symposium on the Structure, Function and Management Implications of Fluvial Sedimentary Systems
Bremerhaven, Germany 9–12 September	Gerhard Strigel, Bundesanstalt für Gewässerkunde, IHP/OHP Secretariat, PO Box 200253, D-56002 Koblenz, Germany tel.: +49 261 13065421; fax: +49 261 13065422; strigel@bafg.de; http://www.bafg.de/html/aktuell	International Symposium on Low-lying Coastal Areas: Hydrology and Integrated Coastal Zone Management
Beijing, China 10–13 September	Dr Baosheng Wu, ISFD'2002 Secretary, Department of Hydraulic Engineering, Tsinghua University, Beijing 100084, China tel.: +86 10 62772097; fax: +86 10 62772463; baosheng@tsinghua.edu.cn; http://www.irtces.org/isshhu/2ISFD.htm	Second International Symposium on Flood Defence: Prospect of Living with Floods in the 21st Century (ISFD'2002)
Warsaw, Poland 18–21 September	Prof. Janusz Kindler, Local Organizing Committee, Faculty of Environmental Engineering, Warsaw University of Technology, 20 Nowowiejska Street, 00-653 Warsaw, Poland tel.: +48 22 6214560; fax: +48 22 6257377; dziekan@is.pw.edu.pl; http://www.iche2000.pl	ICHE-2002: Fifth International Conference on Hydro-science and Hydro-engineering
Kuala Lumpur, Malaysia 14–18 October	Dr Mohd Nor bin Mohd Desa, HTC Kuala Lumpur, Department of Irrigation and Drainage Malaysia, Km 7, Jalan Ampang, 68000 Ampang, Kuala Lumpur, Malaysia tel.: +60 3 42552507/502/508/575; fax: +60 3 42561894; htckl@pop.moa.my; http://htc.moa.my/htc/icuh2002/icuh2000.html	International Conference on Urban Hydrology for the 21st Century
Timisoara, Romania 21–22 November	Prof. Gheorghe Cretu, Conference Secretariat, University "Politehnica" Timisoara, Facultatea de Hidrotehnica, Str. George Enescu nr. 1A, 1900 Timisoara, Romania tel./fax: +40 56 221481; e-mail:gcr@mail.dnttm.ro; http://www.utt.ro/pfhd	International Conference on Preventing and Fighting Hydrological Disasters

Dunedin, New Zealand 2–6 December	Pat Langhorne, 16th IAHR International Symposium on Ice, Department of Physics, University of Otago, PO Box 56, Dunedin, New Zealand tel.: +64 3 4797749; fax: +64 3 4790964; nzice@physics.otago.ac.nz; http://www.physics.otago.ac.nz/~nzice/	16th IAHR International Symposium on Ice
2003		
Montpellier, France 7–10 April	Muriel Tapiau, Conference 2003, Laboratoire HydroSciences Montpellier, UMR 5569, BP 5045, F-34032 Montpellier Cedex, France tel.: +33 4 67149020; fax: +33 4 67149010; montpellier2003@msem.univ-montp2.fr; http://mpl.ird.fr/montpellier2003	International Conference on the Hydrology in the Mediterranean and Semiarid Regions
St Petersburg, Russia June	Dr Vadim Kuzmin, Department of Hydrology, Russian State Hydrometeorological University, Malookhtinski 98, St Petersburg 195196, Russia tel.: +7 812 4445636 *or* 5853608; fax: +7 812 4446090; kuzmin@solaris.ru	International Symposium: Hydrological Extremes: Theoretical and Applied Aspects of Forecasting and Computations
Sapporo, Japan 30 June–11 July	Secretariat of IUGG2003, IUGG2003 LOC Office, Deep Sea Research Department, Japan Marine Science and Technology Center (JAMSTEC), 2-15 Natsushima-cho, Yokosuka, Kanagawa 237-0061, Japan iugg_service@jamstec.go.jp; http://www.jamstec.go.jp/jamstec-e/iugg/htm/frist.htm	XXIII General Assembly of the International Union of Geodesy and Geophysics with a number of IAHS symposia and workshops including:
	Dr Günter Blöschl, Technische Universität Wien, Institut für Hydraulik, Gewässerkunde und Wasserwirtschaft, Karlsplatz 13/223, A-1040 Vienna, Austria tel.: +43 1 5880122315; fax: +43 1 5880122399; bloeschl@hydro.tuwien.ac.at; http://www.jamstec.go.jp/jamstec-e/iugg/htm/frist.htm	International Symposium on Water Resources Under Global Change
Davos, Switzerland 10–12 September	Dr Dieter Rickenmann, Swiss Federal Institute WSL, Zürcherstrasse 111, CH-8903 Birmensdorf, Switzerland tel.: +41 1 7392442; fax: +41 1 7392488; rickenmann@wsl.ch; http://www.wsl.ch/3rdDFHM	Third International Conference on Debris-Flow Hazards Mitigation: Mechanics, Prediction and Assessment
Visakhapatnam, India 16–18 October	Prof. C. Subbarao, AHI International Seminar, Department of Geophysics, Andhra University, Visakhapatnam 530003, India tel.: +91 891 702239/40/41/42; fax: +91 891 755547; chalamks@hotmail.com	International Seminar on Watershed Development Special Colloquium on Drinking Water Supply in SAARC Countries

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Contacting you!

Important for all IAHS members

To ensure you keep receiving the Newsletter we need accurate contact information for all members. Do let us know about changes to your address, tel. no., fax no. and e-mail (also any change in the subjects that interest you—based on the titles of the IAHS International Commissions given on the back cover of this Newsletter). Please send any changes to:

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International Association of Hydrological Sciences

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Individual Membership

Individual membership of the Association is ***free*** and open to anyone who endeavours to participate in IAHS activities, such as IAHS symposia and workshops. *Members in financially disadvantaged countries may obtain 80% discount on most IAHS publications.* Members in other countries may obtain 50% discount on *Hydrological Sciences Journal* and 25% on other IAHS publications. For further information on membership contact:

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Information about IAHS may be found at the IAHS web site:

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or from the Secretary General:

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Scientific Commissions

Some Commissions have their own web site which can be accessed through that of IAHS (see above). Information about the activities of the Scientific Commissions of the Association may be obtained from their Secretaries:

International Commission on Surface Water (ICSW)
Contact: Prof. SIEGFRIED DEMUTH, Institute of Hydrology, University of Freiburg, Fahnenbergplatz, D-79098 Freiburg, Germany
[tel.: +49 761 2033538; fax: +49 761 2033594; demuths@uni-freiburg.de; http://www.uni-freiburg.de/hydrology/icsw]

International Commission on Groundwater (ICGW)
Contact: Dr NORIO TASE, Institute of Geoscience, University of Tsukuba, Ibaraki 305-8571, Japan
[tel.: +81 298 534244; fax: +81 298 519764; tase@atm.geo.tsukuba.ac.jp; http://www.envr.tsukuba.ac.jp/~ICGW]

International Commission on Continental Erosion (ICCE)
Contact: Dr DIRK DE BOER, Department of Geography, University of Saskatchewan, 9 Campus Drive, Saskatoon, Saskatchewan S7N 5A5, Canada
[tel.: +1 306 9665671; fax: +1 306 9665680; deboer@duke.usask.ca; http://duke.usask.ca/~deboer/icce/]

International Commission on Snow and Ice (ICSI)
Contact: Dr GEORG KASER, Geographical Department, University of Innsbruck, Innrain 52, A-6020 Innsbruck, Austria
[tel.: +43 512 5075407; fax: +43 512 5072895; georg.kaser@uibk.ac.at; http://geowww.uibk.ac.at/research/icsi]

International Commission on Water Quality (ICWQ)
Contact: Prof. BRUCE WEBB, School of Geography and Archaeology, University of Exeter, Amory Building, Rennes Drive, Exeter EX4 4RJ, UK
[tel.: +44 1392 263334; fax: +44 1392 263342; b.w.webb@exeter.ac.uk; http://www.ex.ac.uk/~BWWebb/icwq]

International Commission on Water Resources Systems
Contact: Dr ANDREAS SCHUMANN, Ruhr University Bochum, Institute for Hydrology and Water Management, D-44780 Bochum, Germany
[tel.: +49 234 7002688; fax: +49 234 3214153; andreas.schumann@ruhr-uni-bochum.de; http://www.ce.umanitoba.ca/~simon/iahs/icwrs]

International Commission on Remote Sensing (ICRS)
Contact: Dr ALAIN PIETRONIRO, National Water Research Institute, 11 Innovation Blvd, Saskatoon, Saskatchewan S7N 3H5, Canada
[tel.: +1 306 9754394; fax: +1 306 9755143; al.pietroniro@ec.gc.ca; http://hydrolab.arsusda.gov/~jritchie/]

International Commission on Atmosphere–Soil–Vegetation Relations (ICASVR)
Contact: Dr JIRKA SIMUNEK, US Salinity Laboratory, USDA, ARS, 450 W. Big Springs Road, Riverside, California 92507, USA
[tel.: +1 909 3694865; fax: +1 909 3424964; jsimunek@ussl.ars.usda.gov]

International Commission on Tracers (ICT)
Contact: Prof. CHRIS LEIBUNDGUT, Institute of Hydrology, University of Freiburg, Fahnenbergplatz, D-79098 Freiburg, Germany
[tel.: +49 761 2033531; fax: +49 761 2033594; chrisle@uni-freiburg.de; http://www.lgih.ulg.ac.be/ict]

Hydrological Sciences Journal

The Association has produced a scientific journal since 1956—now called *Hydrological Sciences Journal*. As well as scientific papers on all aspects of hydrology, the Journal contains announcements on worldwide hydrological activities organized or sponsored by IAHS, book reviews, and a diary of forthcoming events. August issues sometimes comprise a collection of papers on a single topic. These Special Issues are available as separate publications.

Subscriptions: The full annual subscription rate (for six issues) for 2001 is £148/US$230 (the price for members in financially disadvantaged countries is £29.60 and the price for other members is £74/US$115). Please send orders for both current subscriptions, Special Issues and back issues to Frances at the address given below.

Contributions: The Editor welcomes original papers, scientific notes, and discussions in either English or French. There is no page charge for papers less than 15 printed pages in length. Please send material for publication to:

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Original papers will be screened by two referees, one of whom is usually an Associate Editor. Instructions to Authors are available from Frances.

Proceedings and Reports/Special Publications

Since 1924 the Association has published proceedings of symposia and workshops, and reports from working groups. These publications comprise the well established "Red Book" *Series of Proceedings and Reports*. In 1989 the first of a series of Special Publications was published. Publications in this series have an A4 format, a blue cover, and do not generally exceed 100 pp. Please send orders for these publications to:

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Standing orders: By placing a standing order, customers wishing to receive every new title in the Red Book and/or Blue Book series benefit from a 15% discount, and receive each publication at the earliest opportunity.

International Hydrology Prize

An International Hydrology Prize is awarded annually to an individual in recognition of an outstanding contribution to the science. Nominations for the prize are made by National Committees and forwarded to the Secretary General for consideration by the Nominations Committee. Details of the criteria considered for the award are found on the IAHS web site.

Tison Award

The Tison Fund provides an annual prize of US$1000 (plus a year's free subscription to *Hydrological Sciences Journal*!). The Tison Award is granted for an outstanding paper published by IAHS in the two years before the deadline for nominations. The rules are found on the IAHS web site. Nominations should be received by the Secretary General not later than 31 December each year. Candidates must be under 41 years of age at the time their paper was published.