



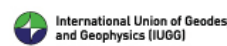
IAHS Newsletter

NL105 April 2013

**KNOWLEDGE
FOR THE FUTURE**

**Joint Assembly
Gothenburg** IAHS - IAPSO - IASPEI
Sweden 22-26 July 2013

Summary of IAHS Scientific Programme – p. 13



Red Books will be pre-published for five of the IAHS symposia to be held at the Assembly in Gothenburg. To ensure that there is a book waiting for you in Gothenburg, pre-order at the special conference price online at the IAHS bookshop: www.iahsmembers.info/shop.php

GLOBAL DATA FOR GLOBAL SCIENCE: The new ICSU World Data System

With IUGG and IAHS both founding Members (Partner and Associate, respectively) of the recently established ICSU World Data System (ICSU-WDS), we would like to take this opportunity to introduce IAHS members to the rationale and strategies behind this new conceptual framework. See page 4.



New developments for Hydrological Sciences Journal authors and readers

Hydrological Sciences Journal (HSJ) continues to grow. In 2012, almost 500 new manuscripts were submitted, including over 30 invited papers that will comprise a special issue on *Hydrological Science for Environmental Flows*, guest-edited by Mike Acreman.

Recently, *HSJ* has introduced several new features to enhance the submission and review process and to improve online access. See page 5.

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WMO CHy – Assessment of Performance of Flow Measurements and Techniques

The last 25 years have seen great advances in instrumentation available for hydrometry and in the procedures and methods for discharge measurement. For several reasons, this progress has not seen a parallel development of guidance material and standards.

At its 12th session (Geneva, October 2004), the Commission for Hydrology (CHy) of the World Meteorological Organization (WMO), reached a general consensus that information on the appropriate use of this instrumentation and methodologies is urgently needed. Continued page 8.

Catchment Models vs Non-stationary Catchments

Workshop HW15 at the IAHS/IAPSO/IASPEI Joint Assembly is not a conventional scientific session, but a participative workshop, where we hope (courageous) modellers will confront a few non-stationary catchments. We ask you to run your model on at least one of the proposed catchments, and to submit your simulations before the end of May.

All details are on the workshop webpage: <http://non-stationarities.irstea.fr/>. The evaluation framework is specified, and catchment data can be downloaded. It is now too late to submit abstracts for the session, but you can still try out your model and discuss the results.

Vazken Andréassian, Lead convener

Message from the President

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The years since the Hyderabad Assembly in 2009 have passed very quickly and I now find myself writing my last message as President of the Association. It is a time to look back at achievements in the past four years, to look forward to exciting years ahead and to pay tribute to the many individuals and organizations that have made such valuable contributions to our research and cooperative efforts.

But first some comments on the general state of affairs on water resources and hydrology. There is no doubt that water is gaining prominence world-wide as a critically important issue. UN-Water – the group of some 30 United Nations agencies and entities – presented a report on the state of the management of water resources to the Rio+20 Earth Summit in 2012. The report identified, for individual countries and for groupings of countries, the importance of water availability for its many uses – for food production, for health, for the production of energy and industry, and for sustaining natural ecosystems; and the threats posed by water – floods, droughts and pollution spills. Out of such reports has developed the concept of “water security” – UN-Water is in the process of developing a concept paper on this (an analytical brief: [Water Security & the Global Water Agenda](http://www.unwater.org/downloads/watersecurity_analytical_brief.pdf) is available at the UN-Water website: www.unwater.org/downloads/watersecurity_analytical_brief.pdf), and countries are establishing institutes and programmes to focus on the important

aspects of overall security. The United Nations is responding by developing “Sustainable Development Goals” – which will include essential water-related issues – that will come into effect in 2015.

The world of science is responding to the challenges facing society in several ways, the most significant of which, perhaps, is the creation of the “Future Earth” initiative, led by the International Council for Science (ICSU), the International Social Science Council (ISSC), the Belmont Forum and several UN agencies, to promote research for global sustainability. The 10-year programme starts in 2013 and, clearly, research in hydrology and water resources management will be a critical component. Thus the research programmes of IAHS – particularly the “Panta Rhei” decadal initiative scheduled to commence in July 2013 – will be of great relevance to Future Earth.

While it is important to set IAHS activities within the much broader global contexts, it is also pertinent to look inwards to our achievements within our own house. Here we can distinguish between the “regular” activities of the Association and the special initiatives of Prediction in Ungauged Basins (PUB) and Panta Rhei.

Our major scientific assemblies at Hyderabad in 2009 (held jointly with the International Association of Hydrogeologists, IAH), at Melbourne in 2011

(as part of the Assembly of the International Union of Geodesy and Geophysics, IUGG) and at the upcoming Gothenburg Assembly (in conjunction with the International Association of Physical Sciences of the Oceans, IASPO, and the International Association of Seismology and Physics of the Earth’s Interior, IASPEI) consist of a large number of individual symposia and workshops, the proceedings of many of which are published as Red Books. Between assemblies, our 10 Commissions hold stand-alone symposia and workshops producing another set of Red Book proceedings. It is indeed the activities of our Commissions – particularly through organizing symposia – that are critically important for the success of the Association. It is very pleasing to report that the Working Group on Statistical Hydrology was elevated to the International Commission on Statistical Hydrology at the Melbourne Assembly – and this new group of scientists has been particularly active in the last four years and has “raised the standards” for other Commissions through innovation in their website. Outreach to the university community is being fostered through the IAHS Working Group on Education – this has been an important activity in the last four years and will continue to be so in the foreseeable future.

Our *Hydrological Sciences Journal (HSJ)* is flourishing and the volume of papers being submitted for inclusion is increasing. This has resulted in expansion from six to eight issues per year – and there is discussion of extending this to twelve issues per year. The transition from purely hard-copy production to electronic publication has been successfully undertaken and our engagement with the Taylor & Francis publishing organization has been a remarkably successful partnership.

During the past four years we have added five new titles to our list of Benchmark books and two to our Blue Book series – all of these publications have been very successful. Our Newsletters, three per year, are now distributed almost entirely electronically to our 5500 individual members and to libraries and organizations around the world.

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Edited by Cate Gardner

The Newsletter is provided free of charge to members of IAHS. This Newsletter and previous issues may be downloaded from: www.iahs.info

Articles from IAHS members on all aspects of hydrology and related topics are welcomed for publication in the Newsletter. They should be sent to the IAHS Secretary General, Christophe Cudennec: cudennec@agrocampus-ouest.fr, or to:

IAHS, UMR SAS, Agrocampus Ouest,
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Advertisements may be placed in the Newsletter, at the discretion of the IAHS Secretary General. Contact: cate@iahs.demon.co.uk

The next Newsletter will be published in September 2013; copy deadline: 15 August 2013.

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Gordon Young (standing 4th from right) with the Board of IAHS Ltd after its annual meeting at CEH Wallingford, UK, in February. From right, standing: Chuck Onstad (Treasurer), Hubert Savenije (President Elect), Christophe Cudennec (Secretary General), Gordon Young (President), Des Walling (Chair IAHS Ltd), Zbyszek Kundzewicz (*HSJ* Co-editor), Cate Gardner (IAHS Press), John Rodda (Member), Mike Acreman (Secretary to the Board), Gwyn Rees (Member), and in front: Demetris Koutsoyiannis (*HSJ* Co-editor). Photo by John Sutcliffe.

Another aspect of our “regular” activities is promoting partnerships with other organizations. We seek out the possibilities of joint activities with other associations within IUGG and within the broader context of ICSU. We are a partner member of UN-Water and continue our strong cooperative activities with UNESCO, WMO and IAEA. Another important cooperative venture is to facilitate interaction between National Hydrological Associations (NHAs). At Melbourne an initial meeting of NHAs was held and this is being followed up with a meeting in Gothenburg. In this sense IAHS is a facilitating organization, and, hopefully, we will benefit greatly through involvement of NHAs in the *Panta Rhei* initiative.

“Special” initiatives – *PUB* and *Panta Rhei* – are now of very great importance within IAHS. *PUB*, created in 2003, has come to its finalization; a final conference held in Delft in October 2012, coinciding with celebration of the 90th birthday of IAHS, brought *PUB* to a very successful close; two major publications – one through Cambridge University Press*, just published, and another on “Putting *PUB* into Practice”*

(in press), bring *PUB* to completion. Perhaps the most important achievement of *PUB* was its bringing together and energizing of the hydrological community. Its success has encouraged the initiation of *Panta Rhei* for the coming decade – a great effort has been made since Melbourne to include the opinions of the broad IAHS community and the initiative will reach out to include many other organizations, including the American Geophysical Union and the European Geosciences Union. A new Working Group on “Data”, so essential to underpin research, is scheduled to be set up during the Gothenburg Assembly. A forthcoming issue of *HSJ* will include summary papers on the achievements of *PUB* and the scientific plan of *Panta Rhei*.

Backed up with inputs from the IAHS Commissions, *Panta Rhei* will be the engine of IAHS for the coming decade; it will involve both the younger and the older members of the community and it will focus on better understanding of hydrological process prediction and forecasting, and implications for society, all in the context of changing environments. The initiative will bring significant prominence to the Association.

I feel very honoured to have been part of IAHS, not only as President over the last four years, but in various other activities since the 1970s. I hope that I have been able to make some contributions to the success of our ventures, particularly through encouraging and facilitating the efforts of our individual members. I am very confident that, as of the Gothenburg Assembly, the Association will prosper under the Presidency of my good friend and colleague, Hubert Savenije.

While including individuals of diverse background, interest and temperament, the strength of the Association lies in cooperative and mutually stimulating activities. It is this sense of “family” and teamwork that so characterizes IAHS. The leadership provided by the officers of the Association and its Commissions and Working Groups, the essential behind-the-scenes work of the IAHS Press office and the vigour and enthusiasm of the individual members world-wide are all essential to the success of the Association. It has been a pleasure working with all of you and I wish you all success in the future!

Gordon Young

*See details on pages 4 and 14.

Global Data for Global Science: The new ICSU World Data System



Birth of the ICSU-WDS Concept

The International Geophysical Year in 1957–1958 saw the creation by the International Council for Science (ICSU) of the World Data Centres (WDCs) and Federation of Astronomical and Geophysical data analysis Services (FAGS). Charged with managing the data gathered by this global project and making those available to the scientific community, both the WDCs and FAGS remained largely unchanged for 50 years.

It was another major international scientific initiative, the International Polar Year (IPY; 2007–2008), that saw the disbanding of the WDCs and FAGS in 2009 by the ICSU General Assembly. Hoping to utilize the existing infrastructure to house the diverse IPY data, it quickly became clear that the predominantly disciplinary centres and services were not able to respond to modern data needs.

The ICSU World Data System (WDS) was thus born from the legacy of those two bodies with the aim of transitioning from stand-alone components to a common, globally coordinated and distributed data system. By ensuring universal and equitable access to, and long-term stewardship of, quality-assured scientific data and data services, products and information covering a broad range of natural sciences and expanding to social sciences, WDS supports ICSU's mission of "strengthening international science for the benefit of society".

Building the "System"

ICSU-WDS Member organizations from wide-ranging fields are the building blocks of a worldwide "community of excellence" for scientific data.

As of 22 March 2013, WDS has 67 Member organizations grouped into two types:

1. Regular and Network Members, who hold, serve, or produce data; and include virtual data centres.
2. Partner and Associate Members, who provide various backing to WDS or are simply interested in the endeavour.

Not only do these Members participate in advancing WDS goals, their data holdings, services and products are the cornerstone of the federated data system.

Organizations are formally accepted into WDS by its governing Scientific Committee (the WDS-SC)—an ICSU-appointed "think tank" made up of prominent data scientists covering a broad range of disciplines and geographical areas. Supported by an International Programme Office, the

WDS-SC safeguards the trustworthiness of ICSU-WDS by certifying Regular and Network Members according to internationally recognized standards (Partners and Associates are co-opted).

Realizing the WDS Vision

It is also the responsibility of the WDS-SC to develop and prioritize plans for ICSU-WDS to achieve its goals. In particular, with a strong membership now in place, WDS must look to significantly contribute to projects such as the ICSU-sponsored *Future Earth* programme, which attempts to answer the grand challenges for global sustainability.

To that end, the following areas have been recognized as imperative.

Community building—WDS will promote the creation of collaborative networks and will be an international coordination forum for data centres and services to document common practices and standards.

Establishing relevant tools—WDS will exclusively provide two essential leading-edge services.

1. A community-based Data Publication and Curation Service.
2. A WDS Scalable Knowledge Network and Open Metadata Catalogue: a searchable enriched data and information catalogue on global capability of data centres and services.

Strengthening links with partners—ICSU-WDS is working with other data organizations to guarantee that a unified message on data stewardship is given. It will also co-host the world's principal data science event by co-locating future conferences with its sister organization ICSU-CODATA.

Final remarks

It is an exciting time to be involved with ICSU-WDS. We hope that, as a WDS Associate Member, IAHS will actively participate in accomplishing the above strategies. Through their realization, ICSU-WDS looks to have a bright future positioned as the premier global multidisciplinary network for quality-assessed scientific data.

Mustapha Mokrane

Further information at: <http://www.icsu-wds.org>

Putting PUB into Practice

Edited by John Pomeroy, Chris Spence & Paul Whitfield

This Monograph is an outcome of the international *Putting PUB into Practice Workshop* (May 2011, Canmore, Canada) that considered perspectives and practices by which approaches for prediction in ungauged basins contribute directly to water resources management. By examining a gradient from data-rich to data-poor contexts, and the needs of a range of hydroclimatic regions, the Monograph considers a variety of regional efforts and perspectives in the PUB movement.

Publisher: [CWRA](#) with IAHS
Publication, Spring 2013



A range of approaches for maximizing the predictive value of streamflow data, and the translation of theory based on understanding of the structure and variability of physical processes into practical predictive solutions are considered, as well as the potential for new technologies to contribute to the development of solutions which incorporate improvements in hydrological understanding, thereby encouraging the translation of PUB research into practice.

New developments for Hydrological Sciences Journal authors and readers

Hydrological Sciences Journal (HSJ) now also has its full complement of 36 Associate Editors (AE), who handle about two-thirds of all manuscripts between them, the remainder being handled by the two co-editors, Zbyszek Kundzewicz and Demetris Koutsoyiannis. A full list of AEs may be found online at the journal web site.



Taylor & Francis
Taylor & Francis Group

HSJ is published in partnership with Taylor & Francis (T&F) who provide the [ScholarOne Manuscripts](#) system for manuscript submission and review, and the online platform for hosting the journal.

Several new features have recently been introduced to enhance the submission and review process for authors of papers in *HSJ*, and to improve online access:



Scholarly journals in general wish to avoid publishing material that has already been published elsewhere, and *HSJ* is no exception. The ScholarOne Manuscripts site uses [CrossCheck™](#) software to screen papers for unoriginal material. By submitting their paper to *HSJ* authors are agreeing to it being checked, if considered necessary, during our peer review and production processes.

Supplementary material

Supplementary material, such as text files and data files, can be submitted with a manuscript for eventual publication online. There is normally no time limit on hosting supplementary material. Currently, Taylor & Francis are making all supplementary material published in *HSJ* in 2013 free to view, while the article remains behind the paywall (generally 2 years). Their data show that downloads of such articles are considerably higher than for those without supplementary material.

More information may be found at T&F's author services pages:

<http://journalauthors.tandf.co.uk/preparation/multimedia.asp> and an example of a paper that includes supplementary material is:

Burn, D.H., *et al.*, 2012. Reference hydrologic networks II. Using reference hydrologic networks to assess climate-driven changes in streamflow. *Hydrological Sciences Journal*, 57 (8), 1580–1593. doi:10.1080/02626667.2012.728705
<http://www.tandfonline.com/doi/full/10.1080/02626667.2012.728705>

Immediate publication online of accepted manuscripts

As a service to authors and researchers, the co-editors of *HSJ* have agreed to **selected** manuscripts being published online immediately after acceptance, whereby the final, accepted (but unedited and uncorrected) manuscript is posted online in HTML form at the journal's T&F online site. The posted file is clearly identified as an unedited manuscript that has been accepted for publication. Copy-editing, typesetting and review of the resulting proof are then undertaken on this manuscript before it is typeset.

The accepted author version will be assigned a doi; it will be replaced with a final, corrected version (the Version of Record, VoR) of the paper, and subsequently placed into an issue of the *Hydrological Sciences Journal*. The paper's doi will not change.

Once an accepted manuscript has been identified as suitable for immediate online publication, the process requires the authors' approval; it also relies on the author returning the signed copyright form within 48 hours of receipt from the T&F production editor.

A list of all accepted papers, whether immediately published or not, is now available at the *HSJ* website and is updated periodically.

Featured articles

The co-editors of *HSJ* select a "featured article" to highlight in each issue. This featured article is made free-to-view until the subsequent issue is published online. The most recent featured article is:

Lavers, D., Prudhomme, C., and Hannah, D.M., 2013. European precipitation connections with large-scale mean sea-level pressure (MSLP) fields. *Hydrological Sciences Journal*, 58 (2), 310–327, doi:10.1080/02626667.2012.754545

The most recent article will remain free to view until the next issue is published online and a new featured article has been identified.

Open Access Publishing

Two years after publication, *all* papers published in *HSJ* are made open access (i.e. freely available to be read online by anyone), thus all volumes up to and including volume 55 can be viewed online by all comers. Certain research funders (e.g. RCUK) request that papers based on research funded by them are made available sooner. *HSJ* (and all T&F journals) provide options that are fully compliant with this requirement, i.e. "Gold" open access where authors pay for their paper to be made open access immediately on publication, and "Green" open access whereby, after a 12 month embargo, authors may make their paper available in an institutional repository.

Frances Watkins, *HSJ* Editorial Office

IAHS Outreach: Availability of IAHS Publications in Developing Countries

It is part of IAHS's remit to facilitate access to current hydrological research by all hydrologists. Accordingly, for more than 20 years the IAHS *Task Force for Developing Countries* (TFDC) has distributed copies of books and provided *Hydrological Sciences Journal* free-of-charge to addresses in poorer countries.

The main principle underlying the distribution of these publications is that they should be made available to as many interested individuals as possible: hydrologists and other scientists, engineers and other practitioners, students and teachers, whether members of the receiving organization or visitors to it. The retail value of the publications provided to each institution is around US\$1000 per year and so we are concerned that everyone at each organization, and the wider hydrological community in the region/country, has full opportunity to make use of them.

The general principles of the distribution of free publications are:

General Principles for Distribution of Publications by IAHS-TFDC

1. Publications should only be distributed to recognized publicly-funded organizations (e.g. universities, research institutes), and the recipient organization should make publications available to **all staff and students, and also to visitors**.
2. If an organization's application is successful, IAHS-TFDC will supply *HSJ* plus all other publications for a period of three years. At the end of the three years, the application will be subject to review.
3. Each developing country that applies for TFDC support should have at least one organization that receives IAHS-TFDC publications. Big developing countries with several geographically-separated educational organizations, such as India or China, could have more support from IAHS-TFDC. The maximum number of organizations per country, however, should usually be limited to three or four.
4. IAHS-TFDC will distribute publications to the first organization in a country that applies, if the IAHS National Representative supports the application.
5. If IAHS receives more applications for TFDC support from the same developing country, the IAHS National Representative will be required to provide advice. Then, the VP of IAHS responsible for TFDC will make a final decision.

The TFDC address list was reviewed in 2010 after a survey in 2009, and brought into line with the IAHS definition of poorer countries, which is now based on annual

per capita GNI figures as used by the UN Development Programme. Addresses from which there was no communication regarding the provision of books were dropped from the list. The TFDC list will be reviewed again later this year; any changes will be implemented from 2014.

Africa has the largest number of recipients (a total of 25) spread across the sub-regions of the continent. Asia has the second largest number and of these, India has the most (5).

During the survey the TFDC also ensured that the recipient institutions were aware of the United Nations Development Programme's Open Access to Research in the Environment (www.oaresciences.org) initiative, which provides eligible institutions with online access to more than 2990 scientific journals covering an enormous range of environmental and related topics, including hydrology, oceanography, environmental pollution and conservation policy. Organizations in the poorest countries get free access, while those in poor countries get access to all the journals for a single basic annual fee of US\$1000. Some institutions were not aware of this opportunity to access scientific literature at affordable rates.

The future should see improved integration of the TFDC programme with other IAHS activities, particularly the Working Group on Education and the new Science Initiative for the forthcoming decade (2013–2022) that will replace PUB. IAHS is committed to enabling the development of new scientists, as well as encouraging the full participation of developing countries in international hydrological research activities. Many societal problems associated with water are experienced by developing countries

and appropriate solutions can often be best developed by local researchers who are familiar with the problems. It is very important, therefore, that these researchers are able to keep abreast of international developments in hydrological sciences so that they are able to develop their own science, as well as apply it in practice. It is evident that the TFDC has contributed to achieving this objective during the more than 20 years that it has been in existence.

Denis Hughes

The publications have been received ... and are indeed valuable additions to our library's collection. We are most grateful for the gifts

Thailand, April 2013

The current list

The addresses of the recipient organisations are listed below by country. If you need to contact the organisation, please go to the person named; if no-one is named, please contact the librarian/head of the library/organization. In any communication with IAHS, please give the TFDC reference number.

New applications for TFDC support should be referred to the IAHS Vice-president for Developing Countries:

Denis Hughes d.hughes@ru.ac.za

Other enquiries may be addressed to jilly@iahs.demon.co.uk

- Albania**
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Mme B. Touaibia TFDC 094
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The Director TFDC 014
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Management (ESRM)
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Bangladesh
Ruksana Haque Rimi TFDC 129
- Benin**
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Chief of the Hydrological Service
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Dr Adisso TFDC 069
- Botswana**
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Gaborone, Botswana
The Director TFDC 120
- Bulgaria**
Comite National Bulgar pour le PHI
66 Tzarigradsko Chaussee Bld
1184 Sofia
Bulgaria
Dr S Dakova TFDC 086
- Burkina Faso**
Library
Centre de Documentation et de d'Information,
Fondation 2iE
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01 BP 594 Ouagadougou 01,
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Librarian TFDC 128
- Cambodia**
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- Cameroon**
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TFDC 083
- Nepal**
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<p>Nigeria Dept Hydrol & Water Resour Management Sch of Envir Sci, University of Abeokuta PMB 2240, Abeokuta, Ogun State Nigeria TFDC 107</p>	<p>Philippines University of the Philippines College of Engineering Diliman, Quezon City 1101 Philippines Prof. Leonardo Q. Liangson TFDC 056</p>	<p>Uganda Uganda Water Network Makerere University PO BOX 7062 Kampala Uganda Dr Michael Ocaido TFDC 125</p>
<p>University of Nigeria, Nsukka Eco-Hydrological Systems Research Unit Dept of Agricultural Engineering Nsukka Enugu State 410001 Nigeria Dr C. C. Mbajjorgu TFDC 108</p>	<p>South Africa Institute for Water Research Old Geology Building Rhodes University Campus Grahamstown 6139 South Africa IWR Librarian TFDC 123</p>	<p>Ukraine State Centre for Integrated Surface- and Groundwater Management (SCIM "UkrWodGeo") 6 Shevchenko Street, Office 205 61013 Kharkiv Ukraine TFDC 114</p>
<p>University of Lagos Hydrology Laboratory, Dept Geogr & Plan Box 160, Unilag Post Office Akoka, Lagos 698, Nigeria Dr Lekan Oyebande TFDC 005</p>	<p>Lifesciences Librarian University of KwaZulu-Natal, Pietermaritzburg Campus Private Bag X014, Scottsville, Pietermaritzburg 3209 South Africa Sherian Latif TFDC 126</p>	<p>Zimbabwe Zimbabwe National Water Authority Madamombe, Research & Data Manager PO Box CY 726, Causeway Harare Zimbabwe TFDC 109</p>
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<p>Palestine Al-quds University Faculty of Science and Technology PO Box 20002 Jerusalem Israel TFDC 112</p>	<p>Tanzania Dept. of Water Resources Engineering University of Dar es Salaam Dar es Salaam Tanzania Dr Deogratias Mulungu TFDC 124</p>	

WMO CHy Project on the Assessment of the Performance of Flow Measurements and Techniques

Continued from page 1

At its 12th Session (Geneva, October 2004), the Commission for Hydrology (CHy) of the World Meteorological Organization (WMO), having reached a general consensus that information on the appropriate use of this instrumentation and methodologies is urgently needed, identified under the priority thematic area "Basic systems (hydrometry and hydraulics)" an activity to develop a proposal and implement a project to assess the performance of flow measurement instruments and techniques against WMO standards.

A small expert team from the Open Panel of CHy Experts (OPACHE) on Basic Systems developed a proposal, which suggested the implementation of a project with the main objective of making information on standardized test results on hydrometric instrumentation and measurement methodologies available to National Hydrological Services by providing a Web site as a forum for exchange of information among interested parties. An exploratory meeting to further develop the proposal took place in Geneva in April 2007.

As a consequence of the meeting, the original proposal was reviewed and, at its 13th session (Geneva, November 2009), CHy-XIII decided to establish a Steering Committee for the project, to provide overall guidance, a role which was given to the Advisory Working Group of CHy and a Management Committee for day-to-day implementation. The members of the Management Committee (MC) were P. Pilon

(Chair, representing CHy), Z. Buzas (WMO Regional Associations), M. Muste (IAHR), J. Le Coz (IAHS), T. Yorke (ISO), J. Skripalle and R Haimelin (HMEI), and J. Fulford and P. McCurry (invited experts). C. Caponi (WMO) is the secretary of the project.

CHy, through its Resolution 2 (CHy-XIII) – Project for the Assessment of the Performance of Flow Measurement Instruments and Techniques – decided to continue the implementation of the project and endorsed its proposed Work Plan and Project Outputs, which are as follows:

1. Summary of field discharge measurement instrumentation and techniques
2. Collection of international and national standards and guidelines regarding field discharge measurement instrumentation and techniques
3. Framework for the assessment of uncertainty in discharge measurement and guidelines for its implementation
4. Guidelines for conducting and reporting results of instrument calibration and performance tests on instruments and techniques
5. Collection of test reports on the performance of instruments and techniques
6. Uncertainty analysis of discharge determination via various techniques
7. Guidance and recommendations

The first meeting of the MC took place on 18–19 November 2009 in Geneva. The second MC meeting took place in May 2012 in Manaus, Brazil. Presentations, documentation and reports output by the project are available on the project website (<http://www.wmo.int/pages/prog/hwrrp/Flow/intro.php>). Most of the work of the MC has been undertaken through virtual means, including periodic phone conferences.

CHy, at its last meeting in November 2012, was pleased to learn of the progress achieved in the implementation of the work plan. The Commission meeting report can be found at the WMO website (http://www.wmo.int/pages/prog/hwrrp/index_en.php). They also noted that the MC had reviewed its terms of reference and had recommended changes to them. The Commission also noted that the MC had recommended continuing its work on the existing seven core activities and had suggested a number of new activities for the work programme of the next intersessional period. The Resolution states that the Commission has decided to continue the implementation of the project and approved the revised terms of reference and composition of the MC. The composition of the MC is expected to remain quite stable, including Jérôme Le Coz as the IAHS representative.

J. Le Coz



Members of the expert panel during the Management Committee and Hydrometry conference in Manaus, May 2012: left to right, Patrick McCurry (Water Survey Canada), Marian Muste (IAHR), Jérôme Le Coz (IAHS), Janice Fulford (USGS), Paul Pilon (WMO CHy).

6th IAHS International Symposium on Integrated Water Resources Management

EVOLVING WATER RESOURCES SYSTEMS:

Understanding, Predicting and Managing Water–Society Interactions

4–6 June 2014, University of Bologna, Bologna (Italy)

The International Symposium on Integrated Water Resources Management (IWRM) is a regular event organized by the International Commission on Water Resources Systems (ICWRS) of IAHS. The next one, in June 2014, will focus on the topic ‘Evolving Water Resources Systems: Understanding, Predicting and Managing Water–Society Interactions’ and aims to bring together experts from different countries in a stimulating



environment to present research ideas and results to bring hydrology into the future by developing an improved connection with society. The conference is included in the framework of “Pantà Rhei – Change in Hydrology and Society”, the IAHS scientific decade 2013–2022.

The symposium will focus on water resources assessment and management in a changing environment and therefore will particularly concentrate on the two-way interaction between water and society. Water resources systems, catchment hydrology, eco-hydrology, groundwater hydrology, water security and socio-hydrology will be the driving themes, and will be defined in detail in the first call for papers that will be made available in May 2013. The conference proceedings will be published in an IAHS Red Book that will be issued before the symposium.

The venue

The meeting will be hosted by the University of Bologna and the organising committee will be coordinated by Alberto Montanari, the Chair of Pantà Rhei for the biennium 2013–2015. Bologna is the seventh most populated city in Italy. It is an important cultural and artistic centre. Its importance in terms of landmarks can be attributed to its many monuments and architectural examples (medieval towers, antique buildings, churches, the layout of its historical centre), as well as works of art, which are the result of a first-class architectural and artistic history. According to the most recent data gathered by the European Regional Economic Growth Index (E-REGI, 2009), Bologna is the first Italian city and the 47th European city in terms of economic growth rate. The University of Bologna, founded in 1088, is the oldest university in Europe. It has about 100 000 students in its 23 schools. The International Airport Guglielmo Marconi of Bologna is located 10 minutes by bus from the city centre.

Important dates

First call for papers and web-site activation: 15 May 2013.
 Deadline for abstract submission for papers to be published in the Red Book: 1 October 2013.
 Deadline for full paper submission: 15 November 2013.
 Notification of acceptance: 28 February 2014.
 Final deadline for abstract submission for other papers (no publication): 15 March 2014.

Information alberto.montanari@unibo.it

5th EGU Leonardo Workshop – Hydrofractals'13 – Statistical Hydrology StaHy'13



Three different events: the EGU Leonardo Conference, held every year in Europe, the IAHS Statistical Hydrology (StaHy) Workshop, held every year in different places of the world, and the Hydrofractals Conference, held every 10 years, will coincide in space and time in 2013 in Kos, Kos Island, Greece, 17–19 October 2013. Each of these events has its own dynamics but all three have been set to focus on a common idea: the uncertainty in natural processes. It is hoped that the different views within the three components of the Kos convention will shed light on the many facets of uncertainty.

Uncertainty has often been regarded as an opponent of science, whose task is to eliminate it or reduce it as much as possible. However, it has also been argued that uncertainty is intrinsic in nature, impossible to eliminate, and also a quality with positive aspects. Understanding and quantifying uncertainty could make the understanding of Nature more feasible and its modelling more realistic. Therefore, the focus of the Kos convention is not to contribute to uncertainty elimination, but rather to show how deterministic modelling approaches can be combined with uncertainty estimation to improve the quality of models and predictions.

There will also be a Round Table: **The legacy of Harold Edwin Hurst in hydrological stochastics**

Details at the conference website: <http://kos2013.org> Please direct any questions to info@kos2013.org

FRIEND-Water2014: 7th Global FRIEND-Water Conference

Hanoi, Vietnam, 24–28 February 2014

Hydrology in a Changing World: Environmental and Human Dimensions



ORGANIZED BY

UNESCO's International Hydrological Programme
German IHP/HWRP Hydrological Committee
IRD
Hydrosciences Montpellier
Hanoi University
UNESCO Office, Jakarta, Regional Science Bureau for Asia and
the Pacific
UNESCO Office Hanoi
Vietnam National Committee for IHP

BACKGROUND – What is FRIEND-Water?

FRIEND-Water (Flow Regime from International Experimental and Network Data) is an international collaborative network of experts, which started 25 years ago, and that aims to generate new understanding about regional hydrology and multi-scale water cycle processes. FRIEND-Water is investigating long-term variations and changes in hydrological variables to better understand the climate, river basin and human controls on the spatial and temporal distribution of water. The science and training supported by the FRIEND-Water programme are critical for: water resources management, socio-economic development, safeguarding the environment, and assessing the impact of global change, including climate change and human impact. As a cross-cutting theme of UNESCO's International Hydrology Program (IHP), FRIEND-Water contributes to research on: regional water resources, droughts, global change and the water cycle, and water education and capacity building. The FRIEND-Water programme complements and interacts with many national projects and international initiatives.

SCIENTIFIC OBJECTIVES

People around the world face a non-stationary environment due to global change (e.g. climate change, land-use change, urbanization). Impacts of hydrological processes change. More

extreme events (drought, floods) are reported in many places around the world. Deterioration of wet terrestrial and aquatic ecosystems is hard to reverse under the increased pressure on land.

Many reservoirs are filling up with sediment quicker than planned. This requires society to critically evaluate current water management practices and to prepare for implementation of change in the management of the water resources at different time horizons. Hydrological science generates vast bodies of new understanding about changes, but faces challenges to share this knowledge with operational water management, stakeholders and policy-makers. On the other hand, the latter groups have difficulties raising and highlighting their demands.

The FRIEND-Water2014 Conference aims to share knowledge about change in hydrological processes (e.g. regimes, hydro-extremes), their impacts (e.g. ecological flows, erosion–sedimentation), and how this knowledge can be streamlined to let water management and policy adapt to it.

CONFERENCE TOPICS

1. Hydrological databases: how to cope with future questions
2. Trends in hydrological regimes and extremes
3. Changes in ecological flows and coastal ecohydrology
4. Erosion and sediment transport processes and trends
5. Regional observational-hydrological modelling frameworks
6. Water resources and prospective scenarios

FRIEND Publications

In addition to the conference proceedings published in cooperation with IAHS (IAHS Red Book Publication Series), a web-based brief summary of the FRIEND programme facts per Regional FRIEND Groups, such as project groups, list of members per project group, meetings and a list of publications will be available for the conference:

<http://www.unesco.org/new/en/natural-sciences/environment/water/ihp/ihp-programmes/friend/>

CALL for Papers for FRIEND-Water2014

Papers are invited which address one of the six topics of the conference.

Participants intending to present a paper or poster are requested to complete the provisional registration form (see [website](#)) and send an extended abstract (300 words), in English or French, to the Conference Secretariat b.lwanga@unesco.org. Abstracts should arrive by 26 April 2013.

Authors should identify whether the paper is submitted for oral presentation or as a poster and state the topic number that the paper is submitted to. Papers will be selected following a review of submitted abstracts and will be pre-published in the IAHS Red Book series. Papers may be submitted and presented in English.

Important Deadlines:

26 April 2013: Receipt of abstracts by the Conference Secretariat
16 August 2013: Submission of accepted papers to IAHS Press

International Conference on Water Sustainability in Arid Regions

Lanzhou, China

12–14 August, 2013

Abstract submission deadline: 15 May 2013

<http://wel.lzu.edu.cn/igu>

Water scarcity, pollution, conflicts and water-borne diseases are increasing in the arid regions of the world, affecting the welfare of over 2.5 billion people. The International Conference on Water Sustainability in Arid Regions aims to bring scientists, scholars and practitioners together to address the intensifying water crisis facing the global arid regions. The conference objectives are to:

- 1) present cutting-edge theories, methods and technologies;
- 2) foster interactions among conference participants;
- 3) explore comprehensive solutions to achieve water sustainability; and
- 4) promote adaptive strategies to global change.

Setting water sustainability in arid regions as the guiding principle, the main themes of the conference are:

1. Climate change and the hydrological cycle

- Hydrological monitoring, observation and transmission systems
- Hydrological processes in mountain-oasis-desert areas
- Climate variability and the water cycle
- Hydrological modelling and forecasting

2. Landscape processes and patterns

- Chemical, biological, and physical processes and landscape patterns
- Soil heterogeneity and vegetation patterns
- Impacts of dams and reservoirs
- Remote sensing and geographical information systems

3. Water resources management

- Integrated water resources management
- Water saving technology and agricultural irrigation
- Water conservation and municipal water demands
- Nonpoint source pollution

4. Water and ecosystem services

- Water and maintenance of ecosystems
- Values of ecosystem services
- Water security and economic development
- Water and human health

Venue

Located on the shores of the Yellow River, Lanzhou is a modern industrial city and transportation hub in Northwest China, and was a major stop on the Silk Road in ancient times. As the geometric centre of China, it borders the Loess Plateau, Mongolian Plateau and the Qinghai-Tibet Plateau. Post-conference excursions will be organized to explore the physical and cultural characteristics of unique mountain-oasis-desert systems in Northwest China.

Scientific sponsors and institutional supporters:

Lanzhou University
International Geographical Union

International Association of Hydrological Sciences

The Chinese Geographical Society
The Natural Resources Society of China

Jointly Organized by:

Key Laboratory of Western China's Environmental Systems (MOE), Lanzhou University
Cold and Arid Regions Environmental Engineering and Research Institute, CAS
Institute of Geographical Science and Natural Resources Research, CAS
Xinjiang Institute of Ecology and Geography, CAS

Important Dates

Abstract submission deadline: 15 May 2013
Acceptance of abstract notification: 15 June 2013
Early bird registration deadline: 15 July 2013
Conference: 12–14 August 2013
Excursions: 15–17 August 2013

Post-Conference Excursions (optional)

Route 1, 15–16 August, 2013 (2 days) Lake Qinghai including visit to Tar Temple, a famous Buddha temple, Moon and Sun Mountain Range, and Lake Qinghai aquatic system. Fee: 1000 CNY/160 USD.

Route 2, 15–18, August, 2013 (4 days) Silk Road and Dunhuang, including visits to, Mogao Grottos in Dunhuang, a UNESCO World Heritage Site, about 1110 km northwest of Lanzhou, Dunhuang Yadan National Geopark, Sounding Sand Dunes and Crescent Spring. Fee: 2000 CNY/320 USD

Secretariat

Dr Juan Gu, Key Laboratory of Western China's Environmental Systems (MOE), Lanzhou University, China
Email: qujuan@lzu.edu.cn



Global Hydrological Monitoring Trends Report

As an IAHS member, you are invited to read the recent report, "[Global Hydrological Monitoring Industry Trends](#)" by AquaticInformatics

This 30-page report delivers the most up-to-date information on water monitoring. Over 700 water professionals from 90 countries participated in the study. Get an inside look at the current industry challenges, standards and best practices.

Discover current salary trends. Learn which continuous monitoring and real-time communication technologies are most popular. Find out how modern water monitoring programs meet stakeholder expectations.

REPORT HIGHLIGHTS

- ▶ Networks are expected to grow by 53% more stations by 2022
- ▶ 40% of stations will have web enabled sensors, satellite, and telephone
- ▶ 66% are implementing USGS standard operating procedures

- ▶ 49% reported an increase in hydrologist salaries since 2002
- ▶ 83% reported an increase in the importance of data modeling
- ▶ 46% expect to report daily means and unit values dynamically by 2022
- ▶ 28% use a commercial hydrological data management system

Today data consumers and stakeholders want immediate access to real-time, quality controlled data and higher level analysis. This report can help you understand how to best prioritize your investments in 2013, and over the next 10 years, to meet the growing demands of end-users and to optimize the performance of your hydrological monitoring program. Benchmark your program today.

Aquatic Informatics Inc.
 tf: 1.877.870.2782 | p: +1.604.873.2782
sales@aquaticinformatics.com | www.aquaticinformatics.com

FREE USGS Webinar: Modernizing Water Time-Series Data Collection & Processing

Tuesday, 21 May 2013 | 20:00 CEST | 19:00 BST | 2PM EDT | 11AM PDT

Online Registration | Post-Event Recording Available to All Registrants

All IAHS members are invited to join hydrology expert Joe Nielsen for a free online presentation on May 21st as he shares USGS best practices for modernizing water time-series data collection and processes. A post-session recording will be available to all registrants, to view at their convenience.

The US Geological Survey publishes the most widely adopted methods and standards for hydrometric data collection and processing. Industry methods and processes are changing. This webinar will present proven ways for updating hydrological data monitoring programs.

Session Highlights:

- How emerging trends are changing the water monitoring game
- ▶ Tips for delivering real-time data without compromising quality
 - ▶ USGS strategies for collecting better data in the field
 - ▶ Best practices for effective continuous data processing
 - ▶ Tips for making hydrometric data production 100% paperless

- ▶ Future USGS directions in time-series data management

In real-time, the USGS collects, processes, quality controls, and publishes data from nearly 15 000 continuous monitoring gauges nationally. Hosted by leading water data management software provider Aquatic Informatics, this 1-hour webinar will highlight proven practices for efficiently meeting stakeholder expectations for real-time water data that can be trusted.

Space is limited to 1,000 attendees. Register today:
<http://pages.aquaticinformatics.com/Webinar-USGS.html?source=IAHS-news>



Follow IAHS!

IAHS now has the following social-media accounts – do follow us.





Joint Assembly IAHS - IAPSO - IASPEI
Gothenburg Sweden 22-26 July 2013

The IAHS Scientific Assembly at Gothenburg runs from Monday 22 July to Friday 26 July 2012. In addition to the IAHS-led joint events and IAHS symposia and workshops, there will be many others run by IASPEI and IAPSO in which IAHS members are welcome to participate. The IAHS events are summarized below; see full details at <http://iahs-iapso-iaspei2013.com/>. The schedule for the week will be available in early May.

Copies of the Red Books to go with symposia **HP1, H01, H02, H04 and H09** can now be pre-ordered via the IAHS online bookshop for collection in Gothenburg: <http://www.iahsmembers.info/shop.php>. The special conference price is 40 GB pounds per book. This price applies ONLY to books collected in Gothenburg during the Assembly. If you have difficulty ordering via the bookshop, please contact jilly@iahs.demon.co.uk. The books will be available to purchase after the Assembly at the normal retail price.

Code	Event	Lead convener(s)
IAHS-led Joint Events		
HPS1	Advanced statistical methods for hydrology, oceanography and seismology Organiser: IAHS Co-sponsor: IAPSO, IASPEI	Salvatore Grimaldi
HP1	Deltas: landforms, ecosystems and human activities Organisers IAHS and IAPSO	Gordon Young & Gerardo Perillo
HP2	Land-ocean interaction Subtitle: Hydrodynamics and biogeochemistry Organiser: IAHS, Co-sponsor: IAPSO	Christophe Cudennec
HP3	Implications of sea-level change for the coastal zone Organiser: IAHS, Co-sponsors: IAPSO, CCEE	Dan Rosbjerg
IAHS Symposia and Workshops		
<i>The IAHS Symposia are coded H0x and Workshops are coded Hw0x</i>		
H01	Climate and land-surface changes in hydrology (ICCLAS, ICRS, ICSW)	Eva Boegh
H02	Cold and mountain region hydrological systems under climate change: towards improved projections (ICSIH, ICCLAS)	Alexander Gelfan
H04	Understanding freshwater quality problems in a changing world (ICWQ, ICCE)	Berit Arheimer
H09	Considering hydrological change in reservoir planning and management (ICWRS, ICCE, ICSH, ICRS, ICSW, ICWQ)	Andreas Schuman
Hw03	Characterizing water quantity and quality: new approaches and future directions (ICWQ, ICGW, ICSW)	Kate Heal
Hw06	Anthropogenic radionuclide contamination of water and sediment: short-term and long-term consequences (ICCE, ICWQ)	Valentin Golosov
Hw07	Tracer hydrology as a tool for understanding and quantifying flow-paths and biodegradation processes in groundwater systems (ICT)	Piotr Maloszewski
Hw08	Subsurface warming, heat energy and groundwater (ICGW)	Makoto Taniguchi
Hw10	Adaptative water resources management – system design and operation (ICWRS, ICSH)	Barry Croke
Hw11	Environmental information systems for hydrology and water resources (ICSW, ICWRS, ICRS)	Jean-François Boyer
Hw12	The Third Pole Environment – Remote sensing and modelling of hydro-meteorological processes in high elevation areas Co-sponsor: TPE, GEWEX	Bob Su
Hw13	How can models help to solve water quality problems? (ICWQ, ICSW)	Valentina Krysanova
Hw14	Regional modelling in hydrology using statistical tools (ICSH)	András Bárdossy
Hw15	Testing simulation and forecasting models in non-stationary conditions (ICSH, ICSW)	Vazken Andréassian
Hw16	Hydrology education and capacity building in developing countries Organiser: IAHS (Education Working Group)	Thorsten Wagener

Codes: H = IAHS (Hydro), P = IAPSO (Physical oceanography), S = IASPEI (Seismology), and w = workshop

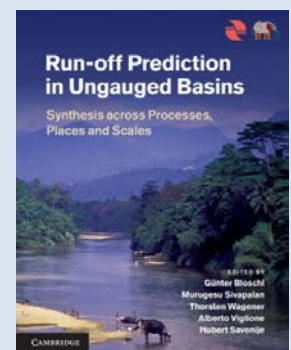
Calendar of meetings Organized/Sponsored by IAHS

2013	Conference	Contact details
Rennes, France 13–16 May	HydroEco2013, 4th International Multidisciplinary Conference on Hydrology and Ecology: Emerging Patterns, Breakthroughs and Challenges	Dr Gilles Pinay, Observatoire des Sciences de l'Université de Rennes Université de Rennes 1, Rennes, France, tel: +33 2 23 23 68 69; gilles.pinay@univ-rennes1.fr Mr Karel Kovar, PBL Netherlands Environmental Assessment Agency Bilthoven, The Netherlands, tel: +31 30 274 3360; karel.kovar@pbl.nl
Golden (CO), USA 2–5 June 2013	MODFLOW and More 2013: Translating Science into Practice	MODFLOW and More 2013: Translating Science into Practice
Koblenz, Germany 3–7 June	Water and Sediment – VI International Conference on Water and Environmental Research	Johannes Cullmann, IHP/HWRP Sekretariat, Bundesanstalt fuer Gewaesserkunde, Am Mainzer Tor 1, 56068 Koblenz, Germany tel: +49 261 1306 5313; cullmann@bafg.de
The Hague, The Netherlands 10–13 June	LuWQ2013, International Interdisciplinary Conference on Land Use and Water Quality: Reducing Effects of Agriculture	Dico Fraters, RIVM National Institute of Public Health and the Environment, Bilthoven, The Netherlands tel: +31 30 274 4039; dico.fraters@rivm.nl Karel Kovar, PBL Netherlands Environmental Assessment Agency, Bilthoven, The Netherlands tel: +31 30 274 3360; karel.kovar@pbl.nl
Wageningen, The Netherlands 1–3 July	IPC11 – 11th International Precipitation Conference	Contacts : Remko Uijlenhoet remko.uijlenhoet@wur.nl and/or Sabine Meijerink sabine.meijerink@wur.nl
Gothenburg, Sweden 22–26 July	Knowledge for the Future. Joint IAHS-IAPSO-IASPEI Scientific Assembly	Joint Assembly Secretariat, Congrex Sweden AB, IAHS/IAPSO/IASPEI 2013 PO Box 5078, SE-402 22 Göteborg, Sweden, tel: +46 31 708 60 00; fax: +46 31 708 60 25. iahs.iapso.iaspei2013@congrex.com
Lanzhou, China 12–14 August	International Conference on Water Sustainability in Arid Regions	International Conference on Water Sustainability in Arid Regions
Perth, Western Australia 16–20 September	IAH 40th International Congress – Solving the Groundwater Challenges of the 21st Century	
Kos Island, Greece 17–19 October	Facets of Uncertainty 5th EGU Leonardo Conference • Hydrofractals'13 • Statistical Hydrology—StaHy'13	http://kos2013.org Please direct any questions to info@kos2013.org
Kathmandu, Nepal 27–29 November	International Conference on Climate Change, Water and Disaster in Mountainous Areas	Mr Deepak Paudel, General Secretary, info@soham.org.np Mr Jagat K. Bhusal, Chairman, bhusaljagat@yahoo.com
2014		
Hanoi, Vietnam 24–28 February	FRIEND-Water2014 Hydrology in a Changing World: Environmental and Human Dimensions	7th Global FRIEND-Water Conference
Washington DC, USA 7–9 April	Weather Radar and Hydrology International Symposium	ASCE's Environmental and Water Resources Institute (ASCE-EWRI)
Bologna, Italy 4–6 June	Evolving Water Resources Systems: Understanding, Predicting and Managing Water–Society Interactions	alberto.montanari@unibo.it
Manaus, Brazil 21–25 July	International Conference on the Status and Future of the World's Large Rivers	International Conference on the Status and Future of the World's Large Rivers worldslargerivers@boku.ac.at
New Orleans, USA 11–14 December	Sediment Dynamics : From the Summit to the Sea	Sediment Dynamics : From the Summit to the Sea Prof. Y. Jun Xu, School of Renewable Natural Resources, Louisiana State University, Room 227 Renewable Natural Resources Building, Baton Rouge, LA 70803, USA tel: +1 225-578-4168; fax: +1 225-578-4227; yjxu@lsu.edu
2015		
Prague, Czech Republic, June–July	XXVIIth IUGG General Assembly, including the IAHS Assembly	

Run-off Prediction in Ungauged Basins Synthesis across Processes, Places and Scales

Edited by Günter Blöschl, Murugesu Sivapalan, Thorsten Wagener, Alberto Viglione & Hubert Savenije
ISBN: 9781107028180 Price £85.00; Publisher [Cambridge University Press](#) – now available

Predicting water runoff in ungauged water catchment areas is vital to practical applications such as the design of drainage infrastructure and flooding defences, runoff forecasting, and for catchment management tasks such as water allocation and climate impact analysis. This important new book synthesises decades of international research, forming a holistic approach to catchment hydrology and providing a one-stop resource for hydrologists in both developed and developing countries. Topics include: data for runoff regionalisation, the prediction of runoff hydrographs, flow duration curves, flow paths and residence times, annual and seasonal runoff, and floods. Illustrated with many case studies and including a final chapter on recommendations for researchers and practitioners, this book is written by expert authors involved in the prestigious IAHS PUB initiative. It is a key resource for academic researchers and professionals in the fields of hydrology, hydrogeology, ecology, geography, soil science, and environmental and civil engineering.

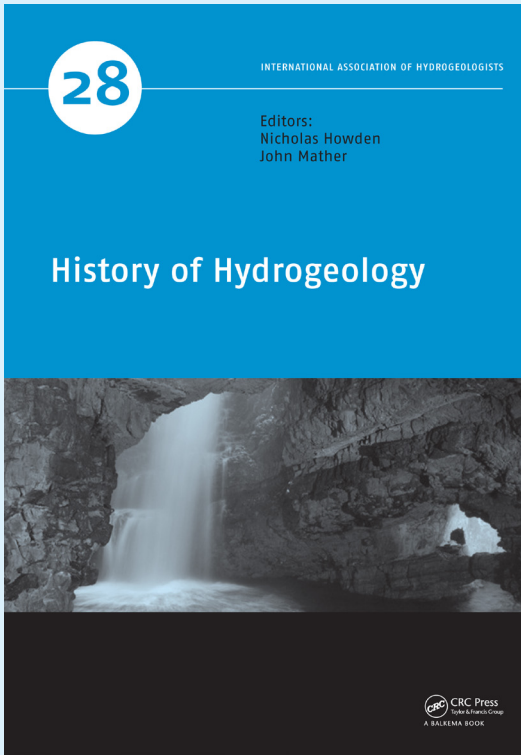


Just released in the IAH Book Series

International Contributions to Hydrogeology (IAH-ICH)

Series editor Nick Robins, *British Geological Survey, Wallingford, UK*

 CRC Press / Balkema
Taylor & Francis Group



History of Hydrogeology

Edited by **Nicholas Howden**, *University of Bristol, UK*
& **John Mather**, *University of London, UK*

Lessons can be learnt from the past; from time to time it is useful for practitioners to look back over the historical developments of their science. Hydrogeology has developed from humble beginnings into the broad church of investigatory procedures which collectively form the modern-day hydrogeologist's tool box.

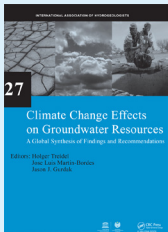
The *History of Hydrogeology*, is a first attempt to bring the story of the evolution of the science of hydrogeology together from a country or region specific viewpoint. It does not cover history to the present day, nor does it deal with all countries involved in groundwater studies, but rather takes the story for specific key countries up and until about the period 1975 to 1980. This is when hydrogeology was still evolving and developing, and in some areas doing so quite rapidly.

November 2012, Hb, 424 pp

ISBN 978-0-415-63062-7, £76.99 / \$119.95

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