Circulation

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Membership Survey Results

A big thank you to all members who filled in the online survey in February/March. We had 180 respondents (16% of the total membership), which is a reasonable response for a survey like this, and the results will really help us to develop BHS in coming years.

Generally the responses reflect a positive view of the Society and there are no strong indications of discontent. However, there were some really useful suggestions for new services and other benefits we could provide members and the committee are already considering which of these we can take forward in the coming months.

One of the areas of concern was how few people have access to *Hydrological Research,* the Society's journal. Not many members have a personal subscription, and the number who can access it through their employer is small and, we suspect, diminishing. The committee discussed recently how this situation can be improved and we hope to be able to make some positive changes in the future.

There was also some interesting variation in perceptions of local and regional meetings, and

regional representatives have been able to look at responses from their areas to help plan and improve the meeting arrangements.

The results of the survey are available from the front page of the BHS website.

Bob Sargent
President-elect.

Travel Grants – *one* of the benefits of BHS membership

Travel.... and let BHS help take the strain of the costs involved!

We can't help everyone; and we don't pay it all (applicants are expected to seek co-funding from other sources and/or contribute to costs themselves). We also expect judicious planning of travel dates, routes and accommodation arrangements to help minimise the costs, but one of the benefits of being a Member of BHS is that it opens the door to potential grants to assist in attending national and international meetings with your peers to both share your research or work experiences with, and to learn from, them. All we expect in return is that you share your experiences with fellow-members by writing a brief report for *Circulation* when you get home.

The locations of these multiple conferences, symposia, assemblies, workshops, summer schools, etc. may read like an exotic wish-list of global destinations (San Francisco, Quebec, Vienna, etc…) but includes UK venues. Our funds are also not unlimited so, of course, there are conditions attached (see the web page at **www.hydrology.org.uk/about_awards.htm** for details and downloadable form) but, in the financial year 2009-10 15 awards totalling over £6000 were offered out of 21 applications. So far during 2010-11 a total of 21 out of 22 applications have been successful and grants totalling more than £10 500 have been offered to applicants from 14 institutions. Whilst many applicants are from universities across the UK, you don't have to be an 'academic' to qualify: Members practising applied hydrology qualify as well as researchers.

BHS also administers the Exeter Fund which is maintained for the specific purpose of assisting attendance at IUGG/IAHS meetings: the same rules/form apply and, since grants are funded solely from interest accrued on the capital investment, funds can be even more restricted so deadlines for application are published in advance of these meetings.

If you wish to make use of this opportunity please ensure your application is submitted in good time.

Nigel Goody
Hon Treasurer

2011 BHS Student Prize

Nominations are invited from all UK university departments with an interest in hydrology at the undergraduate level to enter our student prize. Only one outstanding dissertation, commended by the student's supervisor, may be nominated per department. Prizes are awarded on the achievement, relevance, originality and presentation of submitted final-year dissertations addressing scientific and applied issues in hydrology, judged by a panel drawn from the BHS Main Committee. Entries must be received by 8 July 2011. For further details see: http://www.hydrology.org.uk/about_awards.htm

President's piece

I write this soon after our national discussion meeting on 'hydrology in a changing economic climate'. I've remarked before that a lot seems to be changing around UK hydrology, particularly as a result of the policy changes following the 2010 general election. It was encouraging to have a meeting where the much of the focus was on members' views, and equally positive that many members attended, often at their own expense, to be part of that discussion. A meeting report appears elsewhere in this issue.

One of the issues that arose at the meeting was the withdrawal of NERC funding for MSc training across the board. It's a subject that clearly concerns many members, and with good cause. Discussions are taking place regarding a possible role for BHS in coordinating some alternative mechanism for putting together funding to support students wishing to specialize in hydrology. This would be new territory for BHS. It certainly presents us with an opportunity to make a positive difference, but only if employers in hydrology consider it worthwhile to offer funding into any such scheme. This is a matter which we will be working on in the coming weeks and months: if you would like to discuss or make any suggestions, please do get in touch.

AGM time is approaching once more: details will be included with this mailing. As usual, we are keen to recruit some new members into elected committee member roles. Do put yourself forward, or discuss with a colleague if you know someone who might be able and interested in making a contribution.

Finally, you will find a membership leaflet or two in your mailing. Don't worry – we do know that you are a member! However, we also now know, more clearly than ever before (thanks to the responses to the membership survey) that the most effective mechanism for recruiting members is through word of mouth. So, if you have colleagues or students working with you who you think would benefit from joining, or perhaps people you know who have been thinking about it for a while, now it the time! Please pass them a leaflet. More copies available from Tim Fuller. We'll also be making the PDF available on our web site.

Andrew Black
President

Connecting UK hydrology nationally and internationally

Since the 1970s, NERC-chaired committees have met annually to provide a platform for coordination of UK activities in hydrology nationally and internationally, particularly research in hydrology and water resources management. At present this committee is the *UK Committee for National and International Hydrology,* with its secretariat at the Centre for Ecology and Hydrology (CEH) in Wallingford. The membership is drawn from a wide range of departments of national government, devolved governments and agencies, together with UK representatives of international non-governmental organizations and of initiatives within international programmes (see Box 1).

At the latest meeting on 2 March 2011, there were two main items on the agenda. The first was news of national initiatives, as follows:

- Progress in forecasting research from the Met Office;
- A study of trends in European streamflows from some 400 natural catchments conducted by CEH in collaboration with an international team as a contribution to the IHP FRIEND programme; the results showed negative trends in eastern and southern regions and positive trends elsewhere.
- The EA touched on work to build capability in hydrology to ensure sufficient hydrologists were available with appropriate skills;
- The proposed establishment of a Scottish Centre of Expertise for Water was one of the items from

Box 1
Organisations represented on the UK Committee for National and International Hydrology

Natural Environment Research Council (NERC)
Centre for Ecology and Hydrology (CEH)
British Geological Survey (BGS)
Department for Environment, Food and Rural Affairs (DEFRA)
Department for International Development (DFID)
Department for Transport (DfT) - Highways Agency
Welsh Assembly Government
Scottish Government
Northern Ireland Environment Agency (NIEA)
Department of Agriculture and Rural Development, Northern Ireland (DARDNI)
Scottish Environment Protection Agency (SEPA)
Environment Agency (EA)
Met Office
British Water
UK Water Industry Research (UKWIR)
British Hydrological Society (BHS)
UK Committee of the International Association of Hydrological Sciences (IAHS)
World Meteorological Organisation (WMO) Commission for Hydrology (WMO-CHy)
UNESCO International Hydrological Programme (IHP):
Flow Regimes from International Experimental and Network Data Programme (FRIEND)
Hydrology, Environment, Life and Policy Programme (HELP)
Water and Development Information for Arid Lands Programme (G-WADI)
International Sedimentation Initiative (ISI)
IHP Ecohydrology Initiative
UNESCO IHP-HELP Centre of Water Law, Policy and Science, University of Dundee
UK National Commission for UNESCO

SEPA; progress on the new Floodline Warnings Direct Service another.

- BGS commented on a number of activities including modelling climate change impacts on UK groundwater resources and a survey of molybdenum in drinking water;
- The Northern Ireland Environment Agency reported on a recent programme of spot gauging at monitoring sites to support WFD monitoring, abstraction and discharge consents, some 1000 requests for flow data having been received during the year;

This part of the agenda concluded with comments from BHS on the Society's programme.

The second major item dealt with international programmes, particularly UNESCO's International Hydrological Programme (IHP) and the Hydrology and Water Resources Programme (HWRP) of WMO. The UK currently has observer status at the IHP Intergovernmental Council, the most recent 19th Session taking place in Paris in July 2010 (see article in *Circulation*, August 2010). Submitted to this meeting were reports of UK activities germane to the IHP, in particular on the FRIEND, HELP, G-WADI programmes and the ISI (see Box 2). A report was tabled from the CEH secretariat on the 19th Session, items of most interest being: progress with the current Phase VII of the Programme (2008-2014), plans for the next phase (IHP-VIII, 2014-2019), the reduced budget for the IHP and the growing number of UNESCO Water-Related Category 2 Centres. An evaluation of IHP-VI (2002–2007) was started in February and more recently the UK has been asked for comments on the concept note for IHP-VIII, a number being forwarded to the IHP Secretariat. One concern is how to incorporate in the new phase what has been learned from evaluations of previous phases; another is tailoring the plans to the money available to execute them.

The UK is involved in a number of activities contributing to the HWRP of WMO, for example, preparing a flood forecasting manual and reporting on techniques for hydrological data rescue, as well as being represented on the Advisory Working Group of the Commission for Hydrology. The Commission regulates the HWRP in its four-yearly sessions, its four main work areas currently being: water resources assessment, quality management, hydrological forecasting and prediction, together with water, climate and risk management. This year is the 50th anniversary of the Commission which will have its next session in 2012. This year the WMO Congress will meet in May and June to decide the Organization's programme and budget for the coming four years.

One of the last items on the agenda was a report from the UK Committee for IAHS. This committee's task

is to link hydrologists in the UK with the Association. IAHS was one of the Convenors of the Exeter International Symposium on Weather Radar and Hydrology held in April and the Association will publish the proceedings in one of its 'Red Books'. Later this year the IAHS General Assembly will be held within the IUGG General Assembly in Melbourne, where IAHS is organizing 10 symposia and workshops, several of which are being convened by UK hydrologists.

The *UK Committee for National and International Hydrology* is always keen to hear from UK hydrologists who are currently/ or would like to be involved in the UNESCO International Hydrological Programme or WMO Hydrology and Water Resources Programme. For more information, please contact Harry Dixon at CEH Wallingford (harr@ceh.ac.uk).

John Rodda, Harry Dixon and Alan Jenkins
Centre for Ecology & Hydrology

Box 2
Some of the initiatives the UK is currently contributing to as part of the UNESCO International Hydrological Programme

FRIEND: Flow Regimes from International Experimental and Network Data
G-WADI: Global Network on Water and Development Information in Arid Lands
HELP: Hydrology for the Environment, Life and Policy
ISI: International Sediment Initiative
Ecohydrology Programme
IHP-HELP Centre of Water Law, Policy and Science, University of Dundee

For more information about the IHP see: http://www.unesco.org/new/en/natural-sciences/environment/water/ihp/

AGU Fall meeting – III*

San Francisco, USA
13–17 December 2010

The wide-ranging annual AGU conference in San Francisco provides an excellent opportunity to attend a vast amount of sessions and there is a lot of science to take in. To summarise the whole hydrological proceedings of the conference would result in a very thick book indeed, so here we give some highlights of the conference which we found interesting and we hope you will to.

Prior to the AGU conference, we took advantage of being in San Francisco and attended the one day Catchment Science Symposium at Berkley, which allowed us to meet up with fellow catchment scientists. Unusually, the focus veered more towards water quality, with presentations by **Kevin Bishop** and **James Kirchner** standing out. Kevin Bishop talked about the importance of the riparian zone and coupled hydrolgical and biogeochemical variations with important implications for physically-based lumped transport models. Kirchner talked of spectral analysis of travel time distributions and showed that catchments typically "exhibit an approximate power-law distribution of travel times, and thus retain a long memory of past inputs" (Godsey *et al.* 2010) which obviously has huge implications.

At the AGU fall meeting, the days begin early and it was well worth getting in early on the first day to visit the ***H11A – Crafty hydrological experiments under financial constraints*** session. This poster session would have been of great interest to most hydrologists looking at the current economic climate. What made this session even more interesting was that it was not just posters on display but the actual low cost sensors. For example, **W. Luxemburg** of Delft University of Technology presented

*This is the third report of the December AGU meeting which didn't quite make the last issue of *Circulation*.

an interesting technique for measuring discharge using rising bubbles. The rising bubble technique is an elegant method to determine the full discharge of a river or a canal in a short moment of time. The ongoing research is focusing on factors affecting the rising velocity, solving practicalities in applying the method in the field and how modern image processing techniques can enhance determining in a glance the distance travelled by the bubbles. Also presenting from Delft was **R. Hut** with his poster on T*he Trans African Hydro Meteorological Observatory (TAHMO)*. The main goal of TAHMO is to design a weather station for the tropics that will cost only $200. The main goal of the TAHMO project is to better understand Africa's environment through participatory sensing, scientific modelling and education. The display featured a prototype and impressive readings from the low cost *disdrometer*.

K. Koski from New Mexico Institute of Mining and Technology presented a *Prototype of a low cost multiparameter probe* which is a multiparameter logger and probe costing $250. The probe is constructed from a single-board microcontroller, a commercially available temperature sensor, a conductivity sensor, and a fabricated optical rhodamine sensor. Using a secure digital (SD) memory card, the probe can record over a month of data at a user specified interval.

Other posters included novel techniques to measure subsurface flow velocity (**S. Bachmair**), acoustic throughfall measurements (**Friesen, J**), distributed landsurface skin temperature sensing (**N. Van De Giesen**), measuring cracks in soils, the 'crack-o-meter' (**R.D. Stewart**) and many other novel measurement techniques.

Another session of interest was the union session ***U13B – Extreme Natural Events: Modeling, Prediction, and Mitigation***. In particular the invited talk from **U. Lall** (Earth & Env Eng, Columbia University) who presented *2010: Why is it flooding everywhere this year? Coincidence or a predictable climate phenomenon, and how can we respond?* He showed how today, climatic aspects of floods, specifically the spatial structure of fields of droughts and floods, the associated ocean-atmosphere circulation conditions and precursors, as well as the recurrence characteristics of these precursors, are beginning to be understood. He offered an early review of how these analyses are emerging, and of examples of selected regions in the world where an empirical flood risk analysis that is climate-informed is feasible in both a correlative and a predictive mode.

We both presented in the ***H32A Appling river and watershed research to facilitate management and guide policy*** session of AGU convened by **Phil Jordan** and **Sim Reaney** which was well attended by a mixed discipline audience. **Jennine Jonczyk** presented the *Demonstration Test Catchment (DTC) approach to land and water management in the River Eden watershed* and gave an overview of the DEFRA-funded project and advertised the public access to data and the development of a research platform to host collaborative research**. Mark Wilkinson** presented the *Belford proactive flood solutions: scientific evidence to influence local and national policy by multi-purpose runoff management.*
Other notable talks in the session were by **John Quinton** on *Evaluating mitigation measures for diffuse pollution across time and space* and **Alice Melland** on *Catchment-scale evaluation of environmental regulations in the agricultural sector in Ireland* who shared her experience of instrumenting catchments to evaluate how policy tools are affecting nutrient concentrations and trends in Ireland.

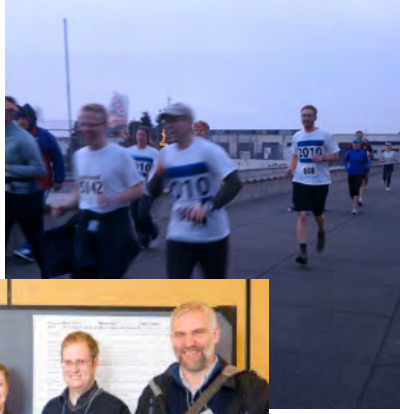
Mark Wilkinson also presented a poster in a public affairs session ***How well is science integrated into the policy of watershed restoration and management? A comparison among systems*** with a poster *A bottom- up approach for engineering catchments through sustainable runoff management* showing a novel catchment engineering toolkit that puts in place novel measures to tackle diffuse pollution and reduce flood risk whilst also collecting the scientific evidence needed to influence policy on these measures. More information on this can be found on research.ncl.ac.uk/proactive/Belford.htm.

Another interesting poster in the session was *Integrating climate change into restoration practices in the Great Lakes Region: Creating a 'climate-smart' Great Lakes Restoration initiative (GLRI)*, presented by **M. Koslow** of Great Lakes Regional Center, National Wildlife Federation. The poster showed how stakeholders from various Great Lakes sectors such as industry, state and city, federal,

non-profit and academia gathered in September of 2010 in Buffalo, New York to provide input on how to integrate climate change into actions of the United States federal agencies.

Another relevant session was ***NH44A – Transmitting hazard science to end users: What works, what doesn't and what's needed?*** which had aspects of all natural hazards, but focusing on flooding in particular during the talk by **R. Holmes** of Office of Surface Water, U.S. Geological Survey, on *Flood hazards: Communicating hydrology and complexity to the public*. Holmes showed how new communications technologies, particularly social media utilizing mobile, smart phones and text devices, for example, could play a significant role in increasing public awareness of long-term risk and near-term flood conditions. The U.S. Geological Survey (USGS), the Federal agency that monitors the Nation's rivers, recently released a new service that can better connect the public to information about flood hazards. The new service, WaterAlert (URL: http://water.usgs.gov/wateralert/), allows users to set flood notification thresholds of their own choosing for any USGS real-time streamgauge. The system then sends emails or text messages to subscribers whenever the threshold conditions are met, as often as the user specifies. In the future, with new GPS-enabled cell-phones, notifications could be sent to users based on their proximity to flood hazards.

Other notable talks were (1) the Science & policy Union lecture: **Scientists, science, advice & science policy in the Obama Administration** by **John Holdren** , chief advisor to President Obama, who gave a very 'rose-tinted' view of how science is central to all decision-making under the current administration. (2) the Stephen Schneider Global Environmental Change lecture on **Scientists, expert judgement and public policy: What is our proper role?** given by **Michael Oppenheimer** was a much more balanced talk and drawing on work by **Pielke** about being an 'honest broker', he heeded scientists not to be 'pushed' into giving advice that they are not qualified to give!





Finally, one of the last AGU sessions of interest – ***H53J – New Challenges for Ecohydrology and Water Quality Investigations at the Watershed Scale*** had a wide range of talks from multi-scale linkages between forest water use, catchment storage, and streamflow dynamics by **C. Hale** from Oregon State University to ecohydrological implications of shallow water uptake by plants in a seasonal tropical montane cloud forest presented by **G.R. Goldsmith** from Univ. of California Berkeley.

However, one talk of particular interest was the invited talk from **S. Reaney** (Durham University) on *Science in the clouds: UAVs and cloud computing methods for spatial diffuse pollution risk assessment*. This presentation showed how the use of a semi- autonomous helicopters (UAV) can be used to photograph catchments to detect areas with bare soil, tractor wheeling, etc. These areas are key sources for diffuse agricultural pollution. The images contain information on the vegetation cover that can be extracted with the use of standard image processing techniques. This work is part of the Defra Demonstration Test Catchments project and the NERC Pilot Virtual Observatory project.

The 2010 AGU was a great chance to present our research, listen to other findings and for Jennine, along with 300 others, to take part in the first ever AGU 'fun' run — a 5K flat run down the Embarcadero Walk Way looking over the scenic San Francisco Bay. Certainly a great way to start the day! We should like to thank BHS for providing us with a travel grant to help with our costs in attending this worthwhile meeting.

Mark Wilkinson and Jennine Jonczyk, Newcastle University

REF 2014

If you are working in the academic world then you will already be well aware of REF2014 and its potential consequences. If not, then here is a quick overview of a process that could have significant impact on hydrological research teams in universities throughout the UK.

The Research Excellence Framework (REF) is a new system for assessing the quality of research in UK higher education institutions. It will replace the existing Research Assessment Exercise and will be completed in 2014. All higher education research in the UK will be assessed, and expert sub-panels have been set up to carry out the assessment. Hydrology comes under the Earth Sciences sub-panel and Bob Sargent, the President-elect of BHS I have, has been appointed a member of this sub-panel.

Like the earlier Research Assessment Exercise, REF will primarily judge the quality of research and the strength of the research team from an international perspective. However, REF will go on to consider the wider impact of research, which will be based on expert review of case studies submitted by higher education institutions. The case studies may include any social, economic or cultural impact or benefit beyond academia that has taken place during the assessment period (January 2008–July 2013), and was underpinned by excellent research..

Although this system has been piloted, the wider impact assessment will only account for 20% of total marks in the first assessment exercise in 2014. Subsequent assessments will award 25% of marks through consideration of the wider impacts of the research output.

Hydrological research has a number of very significant wider impacts, from understanding and managing flood risk and water resources to understanding environmental impacts and providing a good, healthy environment for us all to enjoy. Providing an assessment of these various impacts will be challenging but will help raise the profile of hydrological research and the beneficial outputs it has.

Bob Sargent
President-elect

AGU Fall meeting – IV**

San Francisco, USA
13–17 December 2010

This report focuses upon some of the hydrology, earth surface processes and natural hazards conference sessions.

On the first morning I attended a workshop on *Visualisation Aided Data Analysis*, chaired by **John Clyde** (USA National Centre for Atmospheric Research). The workshop introduced a range of visual data analysis environments that have been developed for analysis of datasets that are increasingly large due to higher temporal and spatial resolution of numerical simulations, the incorporation of uncertainty assessment into modelling, and a tendency for many simulations to integrate greater complexity. The capabilities of NCL, VAPOR, VisIt and Google Earth Engine were discussed and demonstrated.

During the conference I attended three keynote lectures. **Julia Slingo** (UK Met Office) gave the Frontiers Lecture *Society's growing vulnerability to natural hazards and implications for geophysics research*. Julia reflected on the meteorological aspects of natural hazards that occurred in 2010, including the Eyjafjallajökull eruption, the Indus

****STOP PRESS** This is the fourth report of the December AGU meeting which has arrived just in time to be squeezed into this issue

River floods, Russia's summer heatwave, and flooding in China, including the Gansu landslide. Julia argued that society is becoming more exposed to natural hazards due to where we live, and also more vulnerable to natural hazards due to the increasingly interdependent nature of our infrastructure. Julia suggested that ensemble prediction systems, and the integration of meteorological and geohazard simulations, will offer the potential for better natural hazards impact forecasting in the future.

The Langbein Lecture was presented by **William Gray** (North Carolina) on *Trajectories for impacting the trajectory of hydrologic model development.* The lecture considered how the performance of numerical models has improved with developments in finite difference and finite element grid computations. William identified examples of incremental progress and 'distruptive innovations' in relation to the modelling of tides. **Doug Jerolmack** (Pennsylvania) gave the Ropert P Sharp Lecture on *Noise is the new signal – moving beyond zeroth-order geomorphology.* Doug's provocative presentation argued that geomorphologists should celebrate and examine variability in phenomena such as bedload transport rather than averaging it out.

I presented a poster in a session on *Advances in monitoring fluvial morphodynamics*. My poster, *The utility of Terrestrial Laser Scanning for monitoring and modelling braided river evolution at the reach- and multiple-event scales*, illustrated the techniques that I have been developing and applying to analyse the evolution of the braided Rees River, New Zealand, through a sequence of ten consecutive flood events during an eight-month flood season. I discussed my work with numerous researchers with allied interests during the four-hour poster session and made many valuable contacts. The session also included presentations on ground-penetrating radar, radio tagged particle tracing, repeat photogrammetry and grain size measurement using image analysis. During the session, many discussions focused upon the insights that will be yielded from applying complementary methods to investigate earth surface processes.

I would like to thank BHS for providing me with the financial support that enabled me to participate in this diverse and engaging conference.

Richard Williams
Aberystwyth University





Images from my AGU poster: (above) the Rees River, New Zealand; (right) the ReesScan Terrestrial Laser Scanning system, mounted on an Argo All Terrain Vehicle.

Book Reviews

Water Sustainability a Global Perspective by J. A. A. Jones

Hodder Education, 451p, 2010
ISBN 978 1 444 10488 2 Price £39.99

Whilst the world is (and has for some time) focused on issues related to climate change, and in particular ways of reducing greenhouse gas emissions, the important issue of global water resources has been somewhat overshadowed. The UN set out the Millennium Development Goals at the turn of the present century, which included a commitment to halve the number of people without access to safe water and sanitation by 2015. With roughly a third of the world's population living in environments considered as water stressed, a figure predicted to increases to fifty percent by 2025, it is apparent that fast-approaching targets are nowhere near being met. This book has arrived at a critical point in time to promote awareness of the wider, global scale issues surrounding available water resources. The book is also an official contribution from the IGU Commission for Water Sustainability to the UN designated International Year of Planet Earth (2008-09) and aims to promote and encourage further debate in this vital field.

The book is easy-to-read and structured into three individual parts with an additional introduction and conclusion. Part one: *Status and Challenges,* presents an in-depth picture of some of the problems surrounding the availability of 'safe' water resources, by exploring economic, political and environmental issues, these are discussed under sub-headings such as; w*ater and poverty, governance and finance, and water, land and wildlife* to present a global picture. It is evident from this section that Jones believes that an increasing world population and rapidly developing economies are the fundamental factors behind shortages in available water resources. Interesting thought-provoking concepts and discussions, such as; 'peak water' (local rather than global) and 'should access to water be a basic human right or simply a need?' are presented.

Part two: *Nature's Resources,* is a detailed discussion of the global water cycle. Beginning by placing the water cycle in a historical context, from the time when humankind first occupied the world in one of the atmospheric water cycle's most changeable phases. Key components of the cycle are then discussed including; precipitation, evaporation and runoff and are all exemplified with contemporary data and analysis to show global seasonal patterns. A valuable cautionary note is provided under the sub-heading *regional variants of the water cycle,* to remind us that the nature of the water cycle is vastly different in different regions around the globe and a one-solution-fits-all to water problems is a precarious approach. The chapter concludes with *the shrinking of freshwater stores,* which explores various issues surrounding frozen water resources and groundwater stores, with an emphasis placed on highlighting the value of groundwater resources.

The final part three: *Towards Sustainability,* focuses on exploring the most appropriate ways towards achieving greater sustainability and water security. A range of topics from; *cutting demand, increasing supplies, controlling the weather, improving prediction and risk assessment,* to *aid for the developing world* are explored. As with part one, the broad range of topics discussed within this chapter are interesting and informative including a range of viable options for us all to become more sustainable users of freshwater.

As with any good text book chapters are illustrated with a range of figures, maps and images with case study examples included written by world renown specialists exemplifying key concepts and points, these represent a valuable contribution as they illustrate some of the specific challenges faced. Discussion points are given at the end of each chapter, which are both thought provoking and useful as a resource for revision. Whilst the majority of the images used are high quality, in a few places these are too small or grainy detracting from their potential value.

This book will represent a valuable contribution to the academic literature and will be invaluable to many an undergraduate student addressing these key concepts and themes. From a research student perspective this book has been a fascinating, easy read, which was highly informative

presenting global scale issues related to sustainable water resources - often a scale that gets neglected when one is engrossed in a regional or catchment scale research project!

Beverley Todd

Letters in applied hydrology by Duncan W Reed

This is an 88pp A4 book published by DWRconsult. It is available for £26-99 plus P+P from the print-on-demand supplier Lulu (www.lulu.com/product/paperback/letters-in-applied-hydrology/14681689).

A reviewer of any book, paper or report is faced with a number of challenges including: where it is to be published, the target audience, the type of document and the overall opinion of the work that the reviewer wishes to convey. But the reviewer rarely is faced by the unique style, format and content found in this book, which is acknowledged in the descriptions on the back cover:

"*Letters in applied hydrology is no conventional textbook…..*";
and
"*A quirky book…..*"

Although at first a bit frustrating, the format, page numbering and indexing does become a bit easier to follow with the growing familiarity that comes from reading through the book. The rather restricted code used by the author and the message to take from the sometimes oblique references to selected catchments, hydrological events, types of analysis and photographs is at times difficult to follow and appears somewhat convoluted. This may put off a reader with a general, rather than a very specific understanding of hydrology, but thoughts such as "I had not realised that", or "That is an interesting way of looking at these data", are stimulated.
The unique page referencing system means that it is not easy to leaf through the index to identify a topic of interest and then find the appropriate page; but with the material contained on 76 pages, this should not be too much of a burden.

On balance though, the main message that I take from this interesting collection of examples, anecdotes and the author's opinions, is that despite the tremendous advances in computing power, spatial datasets, analytical methods and means of presentation, the fundamental principles of hydrology that were drilled into us at IH in the early 1970s (and it is good to see the outline of ih water drop reproduced in the symbols on the front cover) remain the same, and we disregard them at our peril.

In summary, the book reminds us to:

- Examine the physical characteristics of the catchment(s) of interest;
- Examine all the available rainfall and streamflow data and don't disregard data without good reason;
- From this develop a conceptual understanding of how the catchment responds to rainfall, be it extreme rainfall, average conditions or drought; and
- Only then attempt to develop a model.

Another theme I took from the book is the need to communicate clearly the outcomes of hydrological analysis. It is too easy to hide behind jargon, without explaining to a lay audience familiar hydrological terms, particularly those related to extreme events and risk.

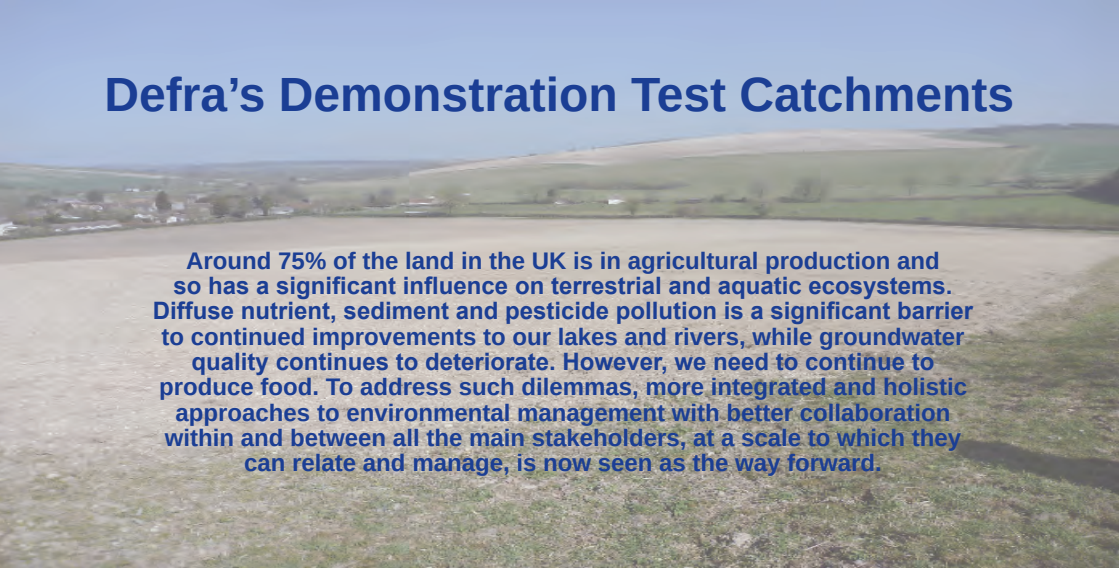
At times when budgets are tight, there is increasing pressure for cutting the number of locations where rainfall, streamflow and groundwater levels are observed. Such cuts are often explained as 'network rationalisation' or 'efficiency savings' and, as the book reminds us, they are not just a feature of 2011 but have occurred in the past.

The book gives us numerous salutary reminders that models should not replace observations, but that they are only as good as the data that are put into them.

Ben Piper
Atkins

Note: Duncan has a number of copies which he can supply individually to UK addresses at a special BHS member's price of £20 for those able to pay by cash or cheque. Please contact him by web-searching on DWRconsult, making any cheque payable to Duncan W Reed.

Defra's Demonstration Test Catchments



Around 75% of the land in the UK is in agricultural production and so has a significant influence on terrestrial and aquatic ecosystems. Diffuse nutrient, sediment and pesticide pollution is a significant barrier to continued improvements to our lakes and rivers, while groundwater quality continues to deteriorate. However, we need to continue to produce food. To address such dilemmas, more integrated and holistic approaches to environmental management with better collaboration within and between all the main stakeholders, at a scale to which they can relate and manage, is now seen as the way forward.

Last month the Government announced its new, more locally-focused catchment-based approach to be trialled in ten areas in England. Such an approach requires good evidence and good research to support it and so Defra, the Environment Agency and the Welsh Assembly Government are undertaking the Demonstration Test Catchments (DTC) project to take agricultural research to a landscape scale. The project has now been running for 18 months of its 5 year, £6.5M, funding span. Its primary objective is to provide underpinning research that informs both policy and practical approaches for the reduction of agricultural diffuse pollution, and the improvement of ecological status in freshwaters, at the scale of river catchments, whilst maintaining economically viable food production.

Some of the answers to the research questions will not be resolved within five years and so there will be a need to maintain the facilities, the data, the knowledge and the understanding built up within the research community, needs to be maintained to investigate and verify long-term changes and refine remedial actions. This leads to two linked objectives. Firstly as a sustainable research platform to host longer-term collaborative research and add value to the initial investment in both capital (monitoring equipment) and people (communities of practice engaged with the local stakeholder community). Secondly, the resulting community of practice that emerges, centred on an interest in, and understanding of the river and its interaction with the land, is the basis of one model of Integrated Catchment Management which we will trial in the project.

The project has established monitoring and research activities in three river catchments: Eden (Cumbria), Wensum (Norfolk) and Avon (Hampshire), which represent a broad range of landscapes and hydrological regimes as well as covering a range of farm types. The DTC consortia in each catchment have been receiving excellent support from CSF officers to identify suitable sub-catchments, engage with co-operative farmers and select locations for detailed monitoring. The Consortia bring together around 40 organisations across the country, getting everyone to come together to tackle a common problem: scientists, farmers, regulators, policy makers, NGOs and industry groups.

Automated remote samplers and sensors are deployed throughout the sub-catchments with the associated telemetry. From 2012, assemblages of measures will be gradually installed and tested for their effectiveness in improving water quality. There are several different land management measures that can be used to help reduce diffuse pollution. These can be grouped into a number of different categories:

Land use measures — e.g. converting vulnerable areas of land to uses with lower fertiliser/pesticide requirements.

Soil management measures — e.g. to reduce compaction, maintain ditches and drainage; adopt minimal cultivation systems; retain stubble; plant cover crops.

Farm infrastructure measures — e.g. fence off watercourses from livestock; establish sediment traps; improve/ cover slurry and manure storage; control waste water.

Livestock management measures — e.g. avoid poaching; reduce stocking rates on wet fields; improve livestock housing ; modify grazing regime; modify livestock feed.

Fertiliser/nutrient management measures — e.g. use precision technology to minimise excess applications; analyse soils regularly; use clover in place of grass.

Manure management — e.g. modify manure application; site heaps away from watercourses; improve effluent/manure storage.

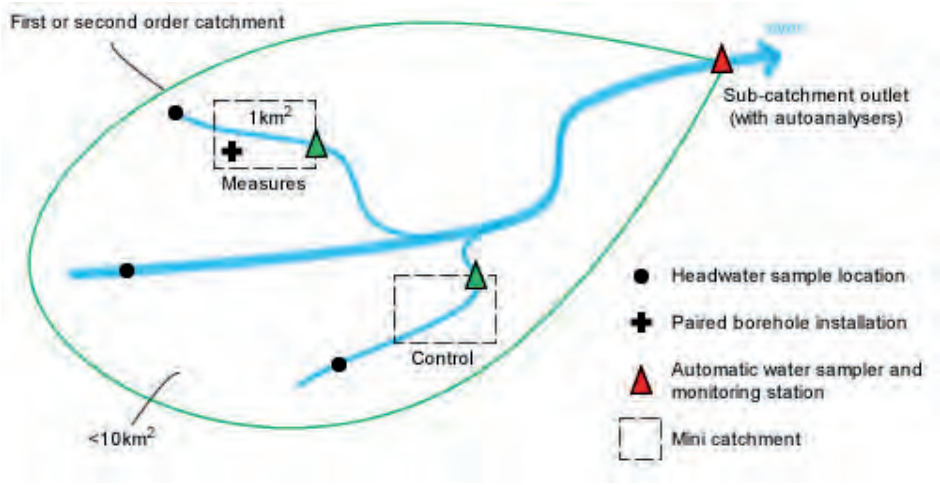
Crop protection measures — e.g. adopt recognised crop protection management plans.

The Freshwater Biological Association, in partnership with Kings College, London, is setting up a data platform to capture and store the hydrometric and water quality data. The database will also store 'softer' information — videos, photos, etc. Researchers within and outside of the existing consortia will be able to access the data and are being encouraged to use external funding to carry out additional but complementary research. This concept of the DTC as a research platform will allow it to be sustained beyond its current five-year lifespan. The knowledge exchange component of the project is a vital central component to help with the wider engagement with stakeholders and to capture some of the social science learning. This is being led by the University of Newcastle in concert with Lancaster University.

The basic monitoring design uses the 'before-after, control-impact' (BACI) comparison approach. It features automatic water sampler and monitoring stations in both a 'control' mini-catchment and in a similar mini-catchment where measures to reduce diffuse pollution can be introduced. Impacts of the measures on groundwater are evaluated from borehole monitoring and/or soil water monitoring. State-of-the-art monitoring equipment will be used for long-term measurements to both identify and record pollutants and to evaluate the effectiveness of measures to reduce it.

Working at the catchment scale means working on real farms and in close collaboration with the farmers and other local groups. Because water pollution from agriculture is a localised problem it requires local solutions and so the DTC project gives us the opportunity to test a truly 'bottom-up'/'big society' approach to managing the land.

Prospective new research partners are requested to contact Consortia leaders (see below) in the first instance



to discuss farm liaison so that farmers are not contacted by multiple organisations. To encourage the development of a 'community of practice', research partners are expected to engage through knowledge exchange activities, including attendance at annual stakeholder meetings. In addition, in the spirit of a participatory approach, researchers are requested to deposit copies of reports and datasets within the DTC data platform for dissemination to stakeholders through its website and newsletters.





The initiative also aims to eventually bring in researchers working on other related issues to ensure that the work we do on water is balanced against the need to reduce greenhouse gasses, protect biodiversity, reduce flooding and produce food.

For more information and updates on progress see the DTC Consortia websites:

www.avondtc.org;
www.edendtc.org;
www.wensumalliance.org.uk

Contacts

Secretariat (Defra) — Bob Harris (robert.harris@defra.gov.gsi.uk)
Avon DTC Consortium — Adrian Collins (adrian.collins@adas.co.uk)
Eden DTC Consortium — Phil Haygarth (p.haygarth@lancaster.ac.uk)
Wensum DTC Consortium — Kevin Hiscock and Andrew Lovett (k.hiscock@uea.ac.uk) and a.lovett@uea.ac.uk) Knowledge Exchange — Liz Oughton (e.a.oughton@newcastle.ac.uk)
Data Platform — Mike Dobson (director@fba.org.uk)

New literature source

WIT Press has announced that, effective immediately, Wessex Institute of Technology papers in their e-library published from 1993 through 2009 are available on an Open Access basis.

The WIT Press e-library consists of six sets of Transactions containing papers presented at Wessex Institute of Technology conferences, as follows:

* Biomedicine and Health
* The Built Environment
* Ecology and the Environment
* Engineering Sciences
* Information and Communication Technologies
* Modelling and Simulation

A seventh set of Transactions, State of the Art in Science & Engineering, contains selected chapters from WIT Press books on the latest developments in various fields of science and engineering.

More details on the WIT Press website:

http://www.witpress.com/

Editorial

As always in times of economic stress, we agonise about how to do our jobs better/cheaper/faster. Can't do much about cheaper/faster but it's worth thinking hard about the 'better' bit. In particular, improving the speed at which research results get taken up by — or at least brought to the attention of — users, and whether there is a modest role here for *Circulation*. We don't have a huge print run but we do reach a specific audience, so please consider us as a sensible publication outlet: it won't attract the same impact factor as a paper in a refereed journal but it will get into print quite fast and get straight to your peers.

And on the same topic, we'd like to explore the feasibility of including brief details about useful ideas coming out in theses/papers/reports.

But how to do this? More work definitely required here, but if you have ideas on how best to achieve this, I'd like to hear from you.

Celia Kirby

British Hydrological Society: Pennines

The Pennines Hydrological Group has formed a committee with the intention of increasing the range and breadth of meetings held within the region. It is hoped that the new committee will be able to increase not just the number of meetings, but also the type of meetings available to members. It is intended that 5-6 meetings will be arranged each year, with a range of national and afternoon/evening events located throughout the Pennines region.

Dr Maxine Zaidman kindly has offered to act as the chair for the Pennines committee, with Rob Burton and Dr Miranda Foster taking the positions of meetings co-ordinator and secretary/treasurer respectively. Dr Neil Macdonald will continue as the Pennines representative on the BHS National Committee.

The Pennines main committee consist of:

Committee
Dr Maxine Zaidman — Chair
maxine.zaidman@jbaconsulting.co.uk
Rob Burton — Meetings co-ordinator
rburton@hydro-logic.co.uk
Dr Miranda Foster — Secretary / Treasurer
miranda.foster@yorkshirewater.co.uk
Dr Neil Macdonald
Neil.macdonald@liv.ac.uk
Dr Rebecca Slack
r.slack@leeds.ac.uk
Dr Claire Walsh
claire.walsh@newcastle.ac.uk
Emma Wren
emma.wren@mottmac.com

Members within the Pennines region are invited to contact the committee with suggestions for themes they would like to see covered within future regional meetings.

Don't forget to pass round the membership leaflet among your colleagues: a bigger membership will benefit all of us!

Early Career Hydrologists' Workshop

Adapting water management to climate change: Putting our science into practice

University of Loughborough
12-13 April 2011

The Peter Wolf Early Career Hydrologists' Workshop marked a return of this event to Loughborough University after a gap of 21 years. As originally conceived, most delegates were post-graduate researchers, but on this occasion we benefited from participation by colleagues in CCW, Defra, the Environment Agency, and the water industry. A contingent of research hydrologists also joined us from Maynooth, Ireland, and one delegate came all the way from Portugal. The workshop gave attendees an opportunity to share ideas about evaluating risks of climate change to freshwater systems, and for discussing practical ways of applying latest hydrological science to adaptation.

Paul Whitehead (Oxford University) set the scene by showing how science had in earlier decades shaped policy and practice in the mitigation and catchment management of acid rain impacts, a theme revisited by another guest speaker, **Nick Everall** of Aquascience, this time from an ecological perspective.

The following talks by post-graduates stressed the high levels of uncertainty surrounding future greenhouse gas emissions scenarios, climate projections and downscaled hydrological impacts. Some urged caution when trying to detect climate signals in small catchments, especially if using short-term hydrological records affected by large, inter-annual variability.

Other delegates noted that with long detection times within freshwaters it may not be possible to corroborate model projections for decades to come. **Mark New** (Oxford University) posed the question as whether we should rely on models with such high uncertainty. Several presentations showed ways of exploring and quantifying uncertainty within different climate impacts frameworks. Others considered whether this conventional 'top down' approach is, in practice, the most fruitful way to approach adaptation to climate change.

This prompted a vigorous discussion about the roles of 'the scientist' and 'the policy-maker'. Many recognised the need for transparency about the uncertainties in climate science. However, there was less agreement about how scientists might communicate these uncertainties to policy-makers without stymieing adaptation. Some put forward the idea that scientists should simply express their best understanding of data. Others felt that scientists should never trespass into the realm of the policy-maker. Most agreed that there is a need for clearer lines of communication between the two parties, as well as for adaptation measures that are robust to uncertainty.

Two guest speakers highlighted the need for greater *adaptive capacity* and *willingness* for adaptation to occur. Presentations referred to non-climatic pressures that will affect our adaptive capacity, such as population growth, and socio-economic change. **Doug Wilson** (Environment Agency) remarked that as environmental systems may be slow to show benefits of adaptation, the challenge is to engage stakeholders and the public in ways that improve willingness to adapt. **Jim Hall** (Oxford University) stated that capacity building is underway in the UK but there is still a need to show the wider benefits of adaptation. **Kristina Sodomkova** (Cranfield University) explained how this might be achieved by referring to PSI-Connect – a project offering tools for simulation games, group model building and scenario planning with stakeholders.

The Prizes

An important adjunct to these events is the award of prizes to delegates for outstanding contributions. Accordingly, the organisers gave prizes (Lboro T-shirts) to the following speakers:

Shaun Harrigan, Maynooth
Alex Nicholson, Newcastle

We gave a bottle of wine to a highly commended speaker, Fiona Thompson from Stirling and voted the following as best poster but the winner (Ashley Woods, UCL) had already left so no award was possible:

All Loughborough students were excluded from the prizes because of their affiliation, but the talk by Jenny Sandberg was voted in top three by all judges, and the poster by Julian O'Neill was voted second overall.

Despite the challenges associated with adaptation, the final session of the workshop focused on a range of practical, low-regret adaptation measures for water management under climate change. For instance, **Lenka Anstead** (University of East Anglia) described the ancient method of willow spiling as a low cost erosion control method with inherent ecological benefits. **Alex Nicholson** (Newcastle University) illustrated methods of 'catchment engineering' known as Runoff Attenuation Features (RAFs) to reduce flood risk, whilst **Nick Barber** (Newcastle University) pointed to the water quality benefits of such structures.

To conclude the event, delegates considered how close we are to producing a 'manual' that government agencies might use in adaptation planning. It would seem that some headway is being made, but continued dialogue is needed to translate hydrological science into practice. We were left with several open questions: How can we better engage the public on adaptation despite current levels of uncertainty? How can we better communicate scientific evidence to policy-makers? How can we design and test local-scale adaptation interventions that will help realise benefits now and/or counter adverse climate change? Hopefully, we will have some answers before the event returns to Loughborough in another two decades!

Kath Turner and Rob Wilby,
Department of Geography,
Loughborough University

New members

Amy Lauren Burt.....Environment Agency,Solihull
Samuel William Buckland.....University of Cardiff
Victoria Coates.....Young Archaeologist Club, York
Nuno Eduardo Cruz Simoes.....Imperial College London
Catriona Louise Fyffe.....University of Dundee
Richard Gosling.....SEPA, Muir of Ord
Verity Grimsey.....Colchester
Katharine Hill.....Imperial College London
Matthew Holmes.....Didcot
Ratlunku Gabriel Lekalakala.....Precision Agriculture Research, South Africa
Bastian Johann Manz.....Imperial College London
Edward Nelson.....University of Stirling
Gareth Owen.....University of Newcastle upon Tyne
Hsin-Hung Pao.....Orpington
Ismal Safkan.....London
Dustin Sammy Schinn.....University of Aberdeen
Andrew Jack Stevens.....University of Southampton
Dessai Suraje.....University of Bristol
Supattra Visessri.....Imperial College London
Li-Pen Wang.....Imperial College London
Martin Anthony Wilkes.....University of Worcester
Paul James Wood.....University of Loughborough

EGU General Assembly



Vienna, Austria
3–8 April 2011



This year's annual General Assembly of the European Geosciences Union took place at the Austria Centre, Vienna and again was a trully massive event, with 4333 oral and 8439 poster presentations in 707 sessions involving 10725 scientists from 96 countries. As in previous years, the EGU hydrology section put a lot of effort into addressing young scientists with courses such as "Short-course on field instrumentation in research catchments" and "How to write and publish a scientific paper in hydrology". A conference highlight was the John Dalton Medal Lecture by **Peter A. Troch**.

We have three separate accounts from Vienna, from Imperial College London, from University of Aberdeen and the University of East Anglia. Each has a different take on the event and all make for interesting reading.

First, **Susana Almeida** writes:

Attending the EGU General Assembly held in Vienna from 3rd April to 8th April 2011 was a great experience. For the first time I had the opportunity to present my work to the scientific community. Attending such an important conference was very interesting and of incalculable value, because I had the opportunity to discuss ideas with other researchers and receive feedback from researchers with a long experience in my current field of research. Attending a conference of such size also gave me the chance to listen to innumerable high level scientists working in different topics of hydrology and with different perspectives.

I presented a poster "A Bayesian framework for PUB" in the session *HS2.1: Hydrologic Similarity at the Catchment Scale*. The oral programme of this session was very interesting and I found it useful to hear about hydrological similarity, a key notion in many areas of hydrology. **Andréassian Vazken** (Cemagref, France) gave a very interesting talk about how apparent similarity differs from behavioural similarity. Most of the time and for practical reasons these two notions are used in an undistinguished way. Andréassian Vazken not only discussed the reasons why these two concepts are different, but also the consequences for regionalisation when it is assumed that physical similarity implies hydrological similarity. He also stressed in the discussion period that, despite the limitations regarding data availability and methods used in regionalisation, we should do our best with what information is readily available.

From a different perspective, **Genevieve Ali** (University of Aberdeen, UK) also showed that physiographically similar catchments are not necessarily hydrologically similar. Her research examined different metrics for catchment similarity assessment, specifically using a clustering algorithm to assess similarity in catchment physiographic and flow characteristics for 36 catchments located in Scotland.

Murugesu Sivapalan (University of Illinois, USA) talked about the importance of the Flow Duration Curve (FDC) in characterizing hydrological similarity and differences at the catchment scale. A new regime curve classification was introduced, based on the idea that FDC can be broken into two parts:

(1) FDC of fast flow, governed by precipitation duration curve and (2) FDC of slow flow, governed by total flow regime curve.

Another session that I found particularly interesting was *HS1.6: Metrics and the Use of Data to support Model Structure Improvement* with two presentations particularly relevant. In the first, "Utilizing signatures of hydrologic function in hydrological model identification and evaluation", **Thorsten Wagener** (Penn State University, USA) highlighted that, despite the fact that there is a convergence of methods towards using signature information for model testing and identification in gauged and ungauged catchments, many questions still remain. Secondly, the talk given by **Andràs Bàrdossy** (University of Stuttgart, Germany) presented a method to identify hydrological data complexity and defined an indicator "Cumulative Number of Strange Events" (CNS) for hydrological model calibration.

Other presentations such as "Meteorological and hydrological processes controlling stormflow at the Panola mountain research watershed, Georgia" by **Jim Freer** (University of Bristol, UK) and "The perils of poor numerics in catchment hydrology: On the interplay between temporal data aggregation, time stepping schemes, objective functions and hydrological model reliability" by **Dmitri Kavetski** (University of Newcastle, Australia) were thought-provoking. I also went to a number of talks that, although not completely related to my current field of research, were very interesting and included: "Assessing the impact of historical and land cover changes on the water balance, comparing two methodologies" presented by **Jef Dams** (VUB, Belgium), and some presentations in the final afternoon in session *HS1.2/EOS08: Challenges for the Future Hydrology Education in a Changing World*. Most of the discussions here were about different people sharing their educational experiences. Although I have never taught hydrology, as a student I came to appreciate the challenges faced by lecturers in teaching such a wide ranging and complex topic.

I also attended the John Dalton Medal Lecture by **Peter A. Troch,** University of Arizona, USA, entitled "On the evolution of catchment hydrology and the hydrology of catchment evolution" and the presentation by the winner of the Young Scientist Award, entitled "Forecast (in) consistency in a hydro-meteorological chain: Curse or blessing?" by **Florian Pappenberger**, European Centre for Medium Range Weather Forecasts, UK. These longer format talks allowed the speakers to explore in more detail some of the challenges they have faced in their research.

Different poster sessions were held at the end of each day of the conference. This allowed proper time for discussion with the poster authors and for networking. In general the posters were of high quality. I found two posters particularly relevant: "Estimation of daily streamflow time series at ungauged basins using the map correlation method", by **Stacey Archfield** *et al.*, and "On the value of MO optimisation from soft information in ungauged basins" by **Laura Lombardi** *et al.*

I would like to express my gratitude to BHS for providing me with the opportunity to attend and participate in such an interesting conference.

Susana Almeida
Department of Civil and Environmental Engineering
Imperial College London

Second, **Christian, Rene, Laura and Scott** from the University of Aberdeen report on four different sessions within the EGU Hydrological Sciences division.

Observational hydrology: Recent development in isotope and other tracer methods

The successful Observational Hydrology sessions continued to be of great interest to field experimentalists and modellers alike, concerned with new measurement techniques and data suitable to better describe and simulate catchment systems. The Monday programme included oral presentations and all posters in the evening opening space for extended discussion among all participants. Stable water isotope tracer methods were presented in efforts to characterise flow pathways in agricultural watersheds (**Roman Teisserenc**, University of Toulouse, France) and to account for time-variant transit time models (**Ingo Heidbuechel**, University of

Arizona). **Christoph Kuells** from the University of Freiburg, Germany, presented a novel method to measure stable isotope profiles in the unsaturated zone.

The solicited talk by **Brian McGlynn** (Montana State University, USA) applied tracers to study spatio-temporal dynamics of nutrient retention. Infrared imagery in combination with isotope and geochemical tracers was shown to have great potential in differentiating sources of streamflow (**Jay Frentress**, Lippmann Institute, Luxembourg). **Michael Rode** (Helmholtz Centre Magdeburg, Germany) linked new online water quality monitoring techniques to improved hydrological and water quality modelling.

Hydrological Similarity at the Catchment Scale

Proving to be one of the busiest sessions in the Catchment Hydrology subdivision, "Hydrological Similarity at the Catchment Scale" featured seven oral presentations from an array of invited speakers and young scientists. This session had a diverse focus on the heterogeneity and similarities of catchments at varying temporal and spatial scales. The session was chaired by **Stacey Archfield** with **Thorsten Wagener, Attilio Castellarin, Doerthe Tetzlaff and Richard Vogel** acting as co-convenors. A poster session on the Monday evening also opened up many presentations to a wider discussion and proved to be a very busy session indeed.

The oral session opened with an overview of hydrological similarity in the headwater basins over a 60 year period in the United States, delivered on behalf of **Julia Jones** (Oregon State University) by **Stacey Archfield** (USGS). This initial session generated a good array of discussion and questions upon its conclusion and set a very lively precedent for the remainder of the session. Following Stacey Archfield, **Kelsey Jansco** (Montana State University) presented on runoff generating controls, with specific focus on the role of topographic hydrological connectivity linked to vegetation and geology, with specific focus on the Tenderfoot Creek Experimental Forest, Montana USA. **Vazken Andreassian** (Cemagref HBRU, France) delivered a very engaging presentation, discussing the difficulties in regionalising hydrological models and the issues of utilising catchment similarity measures. Vazken Andreassian was then followed by **Genevieve Ali** (University of Aberdeen, Scotland), who demonstrated a new approach in catchment grouping through the use of an Affinity Propagation (AP) algorithm for a Scottish-wide dataset and discussed how varying characteristics can contribute to the quantification of catchment similarity.

Murugesu Sivapalan (University of Illinois, Urbana-Champaign) discussed the importance of flow duration curves in characterizing catchment similarity across the USA in the penultimate talk of the session which was closed by **Fabrizio Fenicia** (CRP, Luxembourg) who discussed the utility of the SUPERFLEX model to incorporate distinct hydroclimatic and physical characteristics to develop an understanding of catchment dynamics in highly variable environmental conditions.

Water quality at the catchment scale: Advances in measuring and modeling nutrient, sediment, and contaminant fluxes

This session, chaired by **Jim Kirchner** (Swiss Federal Institute for Forest, Snow, and Landscape Research, Switzerland), focused on recent developments in water quality observations and modeling at the catchment scale. A special focus was given to the monitoring needs for reducing uncertainties in model predictions and the benefits of using both high-resolution and long-term observations of water quality constituents. In the opening statement, Jim Kirchner acknowledged the tremendous lifetime effort of Colin Neal, who gave a talk later in the session, in compiling a remarkable high-resolution and long-term water quality data set for the Plynlimon (Wales) experimental catchments, which will be released into the public domain later this year.

The opening talk of the session was given by **Keith Beven** (Lancaster University, UK), who presented a novel modelling approach using random particle tracking. The approach allows for analysing time-variability of velocity distributions depending on antecedent conditions and effects of heterogeneities in the physical configuration of hillslopes.

The following speaker, **Nicholas Howden** (University of Bristol, UK), presented analyses based on an impressive 140-year data set of nitrate concentrations in the river Thames, the world's longest

water quality data set. The talk highlighted the exceptional value of such long-running monitoring projects for inferring catchment-wide controls on water quality and rigorous hypothesis testing. Analyses included the investigation of climatic and anthropogenic pressures on nitrate fluxes. These showed a strong influence of land use changes on nitrate fluxes in the Thames system, while major climatic impacts could not be confirmed.

Sarah Halliday (University of Reading, UK) followed with an analysis of the influence of sampling frequency of DOC and nitrate concentrations on estimations of total fluxes. Both constituents were shown to follow a diurnal cycle which lead to substantial biases in flux estimations at low sampling frequencies.

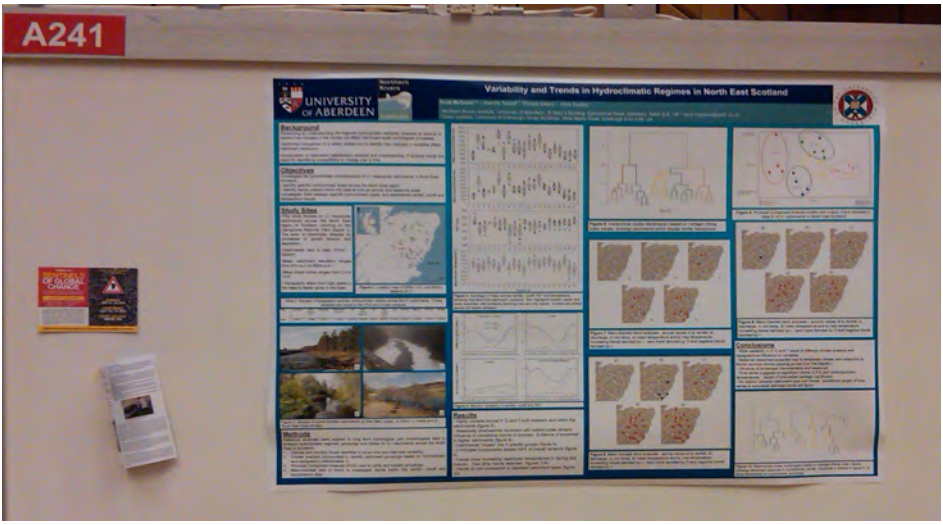
The next speaker, **Gunnar Lischeid** (Leibniz Centre for Agricultural Landscape Research, Germany), then used principal component analysis to separate expected and unexpected behaviour in catchment flow and chemical responses, interpreting catchments as input processing systems. The method could be used to evaluate perceived couplings between different hydrological and chemical processes at the catchment scale. Next, a comprehensive overview of the extensive work on the river Dee during the past decades using multiple, spatially nested data sets was given by **Chris Soulsby** (University of Aberdeen, UK), highlighting the importance of corresponding long-term and objective-specific observation sets to understand the linkages between heterogeneous spatial patterns and emerging catchment responses for biogeochemical and (eco) hydrological functioning.

Closing this series of talks, **Colin Neal** (Centre for Ecology and Hydrology, UK) gave an inspiring presentation of first insights gained from the high-resolution Plynlimon data set. The wealth of observations showed complexity of a system where conventional monitoring would not capture the true variability. The prospect of new high-frequent and high-sensitive monitoring techniques were concluded to lead to a paradigm shift in understanding catchments as complex systems but also provide resources for novel modelling approaches.

Hydrological change: Regional hydrological behaviour under transient climate and land use conditions.
This fruitful session, convened by **Harald Kunstmann** (Karlsruhe Institute of Technology, Germany) involved a series of contributions on past, present and prospective changes in regional hydrological behaviour due to climate and land use changes. Several case studies were presented. The first presenter, **Ralf Merz** (Vienna University of Technology, Austria), presented a series of methodologies analyzing climate change impacts on Austrian water resources. This included trend and scenario analyses, the elasticity method and 'space for time' methodologies. This was followed by **Pere Quintana Seguí** (Universitat Ramon Llull, Spain), who presented "Comparison of past and future, high and low extremes of precipitation and river flow for the Mediterranean as projected using different statistical downscaling methods". This talk looked at how current tools and methodologies are able to reproduce high and low hydrological extremes and their future evolution on Mediterranean basins in France.

Kerstin Stahl (University of Freiburg, Germany and University of Oslo, Norway) gave a talk on a model inter-comparison study, WaterMIP, where water balance simulations were compared across basins in Europe. Differences and similarities in runoff and trends among the models were presented.

Luke Omondi Olang (Kenyatta University, Kenya) presented his work on the effects of land cover change scenarios on storm runoff generation in the Nyando River Basin, Kenya. The effects of different scenarios on storm runoff were assessed using hydrological models that utilised a physically based lumped approach. The results showed the impact of different land cover scenarios (agricultural and forested) on flood runoffs. Further modelling insights were presented by **Lu Wang** (Delft University of Technology, Netherlands)on the simulation capabilities of different GCM outputs on current climate condition for the Huai River basin, China. **Joshua Larsen** (National Centre for Groundwater Research & Training, NCGRT and University of New South Wales, Australia) gave a presentation on long term water quality trends in the Murray-Darling, Australia's largest river basin, with particular reference to salinity variability and water flow. Another study evaluating the impacts



of past climatic variability was by **Deniz Bozkurt** (Istanbul Technical University, Turkey) who presented "Hydrological response of past and future climate changes in the Euphrates-Tigris Basin". **Borbala Galos** (Max Planck Institute for Meteorology, Germany, and University of West Hungary) gave an interesting talk on how drought severity may be reduced by afforestration in the temperate zone, as did **Jef Dams** (Vrije Universiteit Brussel, Belgium) on the impact of historical land cover changes on water balance using modelling and land use maps. **Abubakr Salih**, gave an insightful talk showing the potential climatic consequences of water harvesting of the Jonglei Canal in southern Sudan using a modelling approach, where both local and non-local feedbacks were shown.

The session was closed by **Nicola Gedney** (Met Office Hadley Centre, UK) with a key talk on the principal drivers of hydrological change in the 20th Century. This final talk of the session tied in well with all previous contributions on how historical land use changes (deforestation and irrigation, for example) and climate can strongly influence the regional hydrological cycle. The oral programme was followed by a poster session in the evening, where a diverse array of posters were presented and attendees had the opportunity to discuss key topics of the session. We are very grateful to the British Hydrological Society for providing us with Travel Grants to attend and contribute at the EGU conference and for the opportunity to write about our experiences.

Christian Birkel, René Capell, Laura Kruitbos and Scott Mcgrane
Northern Rivers Institute, University of Aberdeen.

And finally, **Tobias Krueger** from UEA

First of all, I would like to take this opportunity to congratulate my friend and fellow BHS member **Florian Pappenberger** (ECMWF, Reading) who received the EGU's **Arne Richter Award for Outstanding Young Scientists 2011** at this year's General Assembly (www.egu.eu/awards-medals/awards-and-medals/award/arne-richter-award-for-outstanding-young-scientists/florian-pappenberger.html) Well deserved, Florian!

Here then is a selection of interesting talks I heard. **Brian McGlynn** (Montana State University) gave a solicited talk: *Tracer additions for quantifying stream nitrogen uptake kinetics from ambient to saturation: The physical, biological, and spatio-temporal dynamics of nutrient retention* in which he introduced a new rapid technique of injecting varying ratios of ^{15}N and Cl tracer for quantifying nutrient uptake kinetics. Uptake here meant the combination of denitrification, actual assimilation, etc. the partitioning of which still seems to be the 'holy grail' of in-stream processes research.

Dimitri Solomatine (UNESCO-IHE, Delft) highlighted the potential and cost-effectiveness (15 cent per hour CPU time if I understood correctly) of cloud computing using Amazon Web Services (http://aws.amazon.com) for computationally intensive modelling in "Experiments with cloud and cluster computing in uncertainty analysis of models". **Steven Weijs** (TU Delft) made an interesting analogy between the objectives of science and data compression in terms of describing patterns in compact form in "'Zipping' hydrological timeseries: An information-theoretical view on data compression as philosophy of science" and used compressed file size as an indication of information content of hydrological time series.

There were a couple of rare chances to catch **Robin T Clarke** (IPH UFRGS, Porto Alegre) and I heard his solicited talk "A critique of some aspects of statistical usage in hydroclimate research" in which he reminded us of the pitfalls of hypothesis testing and misuse of statistics. Almost in passing he also argued that the cost of a study should be balanced against the cost of not knowing the answer which I found refreshing. **Andràs Bàrdossy** (University of Stuttgart) presented a new methodology of calibrating hydrological models on 'strange' events in "The frequency of unusual hydrological events, a measure of hydrometeorological complexity". He defined events as the vector of observations of *n* consecutive time steps in an *n*-dimensional space and found the strange events at the boundary of the set of all vectors using a depth function. The poster "Improving calibration strategy of physically based model by using critical events" by **Ross Wood** (NIWA, Christchurch) demonstrated the application of the technique to a modelling problem.

Stanislaus Schymanski (Max Planck Institute, Jena) presented a vegetation model with parameters optimised for net carbon profit which he then tested against observations in *Optimality theory: a path to calibration-free models?*. He showed how model rejection led to a new hypothesis which so far gave superior results. This was one of the better talks among many on the quest for the calibration-free model. One wonders, though, how much manual 'calibration' went into developing these models in the first place and whether undue emphasis was placed on the 'right' model structure in these cases, points that did not go unnoticed in the discussions, of course!

Alberto Montanari (University of Bologna) talked about *Stochastic physically-based modelling in hydrology: towards a synthesis of different approaches for a new target*, effectively the synthesis of process knowledge with uncertainty assessment. Not a new topic but derived and presented very clearly which might have reached a new audience. **Keith Beven** (Lancaster University) talked about *Data needs for identification of more realistic parameterisations of hillslope hydrology and transport at different scales* using the random particle tracking formulation of the Multiple Interacting Pathways (MIPs) model that he has started working on again with **Jessica Davies** (Lancaster University) who gave some more detail of this promising approach in *Application of a Multiple Interacting Pathways model to a shallow hillslope hydrological tracing experiment at Gårdsjön, Sweden*. **Nicholas Howden** (University of Bristol) presented a monthly-average nitrate time series for the River Thames starting from the 1860s based on an impressive effort of digitising the historic records. His talk, *Nitrate concentrations and fluxes in the River Thames, London UK 1868 to 2008: exploratory analysis of the world's longest water quality time series*, highlighted the considerable time lags that we can still expect between nitrogen inputs and river concentrations.

The session that I organised this year was on **Stakeholder Participation in Hydrology** (HS5.3). It was an experiment to take some of the interdisciplinary ideas developing at the natural/social science interface to a geosciences conference but we attracted quite a number of abstracts and even gained an allowance of oral slots. So we plan to run the session again next year, led by my colleague Gemma Carr (TU Wien). We kicked off the session with a 45min discussion where all presenters could use 1 minute to present a key argument. The discussions that followed centred on the drivers of participatory process in different countries, which may often be the cost of litigation, particularly in the US. The mix of short presentations and plenary discussion turned out to be a good format, but 45 minutes were too short: next year we will see if we can break up the rigid 15-min oral slots of EGU into smaller chunks and allow more time for discussion.

The oral part of our session began with a solicited talk by **Stuart Lane** (University of Lausanne) on *Co-producing knowledge in hydrological science: new forms of public participation in flood risk management*. Stuart introduced very clearly the philosophy behind participatory processes in hydrology and presented compelling arguments why those actively implicated in risk management should be involved in the co-production of the knowledge informing that management.

Next, **Laurence Smith** (SOAS, University of London) presented some estimates of the *The Economic Value of Participation for Water Resource Management*, an area that has so far been under-researched. On a technical level, **Florian Wimmer** (University of Kassel) presented the *Integration of a simplified water resources model into an interactive platform to assess climate change impacts in Europe* which he plans to use interactively with stakeholders in the future. **Raffaele Giordano** (Water Research Institute, Bari) then presented a *Fuzzy Cognitive Map for ambiguity and conflict analysis in drought management* to analyse similarity and dissimilarity between stakeholders' mental models with the aim of informing conflict management. **Christopher Macleod** (James Hutton Institute, Aberdeen) reported back on his role in *Spanning policy, operational and research boundaries for catchment managing*. The session was rounded off by **Jan Sendzimir** (IIASA, Laxenburg) with a critical examination of an apparent failure of a transition to participatory science, the case of *The Stalled Transition in the Upper Tisza River Basin: The Dynamics of Linked Action Situations*. The interesting discussions continued at the posters.

Lastly, can I recommend to everyone the train option of travelling to EGU. You can make it there in 24 hours and back in 17 (including the +1 hour time difference on the continent). I paid £300 but you can get it for about £240 if you book 4 months in advance. In monetary terms, this may be about £90 more than the cheapest flight plus train transfer but a lot less than some flights. A quick back-of-an-envelope calculation we did in 2007 (http://cosis.net/abstracts/EGU2007/11212/EGU2007-J-11212.pdf) showed a carbon saving in the order of one-third compared with the plane. And your time, though more, is arguably better spent. The route we took was as follows: Norwich (Fri, 9:30) – London Liverpool Street – London St Pancras – Brussels – Cologne – Vienna (sleeper, Sat, 09:04) / Vienna – Frankfurt (Sun, 06:36) – Brussels – London St Pancras – London Kings Cross – Norwich (Sun, 23:25). Do get in touch if you would like to join us for this trip next year.

Tobias Krueger
University of East Anglia

WMO hydrology in 2010*

The World Meteorological Organization's structure and programmes as they affect hydrology were relatively unchanged in 2010 and the web site **www.wmo.int** continues to offer an overview of Technical Commission, Regional Association and Geneva secretariat activities. A growing area, following the World Climate Conference-3 of summer 2009, is consideration of the hydrology associated with medium to long planning time scales as well as WMO's more traditional focus on shorter-term operational hydrology.

Key hydrologically-relevant WMO publications launched since last year's reporting include a Manual on Stream Gauging (volume I on fieldwork, volume 2 on computation), a Manual on Probable Maximum Precipitation and the Statement on the status of the global climate in 2009, in addition to reports of Technical Commission and Regional Association sessions and that of WMO's Executive Council.

The full Commission for Hydrology (CHy) last met in 2008 and is working to its 2008–2012 programme which was established by Members, the main categories in this programme being water resources assessment, quality management, hydrological forecasting and prediction, and water, climate and risk management. There has been a change of personnel in CHy with the resignation of the president (**Bruce Stewart**) to move to a secretariat

post and an acting president (**Julius Wellens-Mensah**) in place late 2010.

UK hydrologists who are contributing to the CHy work programme include **James Dent** (independent consultant) who has worked on a forthcoming flood forecasting manual and on a report on climate and meteorological requirements of water managers, **Paul Davies** (Met Office) who has been exploring technology transfer with regard to hydrometeorological hazards in Africa, **Matt Fry** (CEH) who is preparing a report on techniques of hydrological data rescue, **Thomas Kjeldsen** (CEH) who is involved in a WMO extension to an EU COST workshop on river flood frequency under non-stationarity, and myself representing CHy drought interests in meetings with the Commission for Climatology and Commission for Agrometeorology, in addition to working on the CHy advisory group.

The UK is part of WMO Regional Association VI and the main contact point for information on their 2009-2013 work programme is available via the regional hydrological adviser, **Markku Puupponen**, markku.puupponen@ymparisto.fi.
WMO Congress, the key overall management meeting held every four years and open to all Member countries, is to be held in May-June 2011. The papers are made available on the web site in advance of the meeting. Some meetings allow comment to made to the secretariat on these papers in advance; otherwise comment can be made via **Simon Gilbert** (simon.gilbert@metoffice.gov.uk), the Met Office's WMO manager, or, on hydrological matters, to me (anncalver@lwrc.co.uk).

Ann Calver
[as Member of CHy advisory group and UK hydrological adviser]

*Report presented to the UKNIH on 02/03/11 (see page 3)

The IAHS Tison Award

On behalf of the UK Committee for the IAHS, David Hannah (d.m.hannah@bham.ac.uk) would be pleased to receive nominations for the IAHS Tison award.

Established in 1982, the aim is to promote excellence in research by young hydrologists. The Award will be granted for an outstanding paper published by IAHS in a period of two years previous to the deadline for nominations.

Full details are given on the IAHS website: http://www.iahs.info/ but briefly, the key conditions are:

- Candidates for the Award must be under 41 years of age at the time their paper was published;
- The Award will consist of a citation in the name of L.J. Tison, an amount of US $1,000 and a free subscription to HSJ (*Hydrological Sciences Journal*) for one year. If the successful paper is jointly authored by eligible (age) authors, the monetary award will be divided equally between authors;
- The Award will be announced annually and will be presented in a public ceremony, normally during either an IUGG/IAHS General Assembly or an IAHS Scientific Assembly;
- Nominations for the Tison Award may be submitted by the National Committees of IAHS, officers of the IAHS Bureau, officers of the Commissions, HSJ editorial board members, convenors of IAHS symposia or editors of proceedings.

Although the deadline is the end of the year, the Committee would welcome nominations at any time. Nominations should include the full citation of the IAHS publication (Hydrological Sciences Journal, Red Book paper etc.) and a short statement explaining why the article should be considered for the Award.

The last UK recipient of the Award was Dr Linda See in 2001.

David Hannah
University of Birmingham

Big vision of the Environmental Virtual Observatory

If you have ever faced the challenge of finding and making sense of environmental data and information then you will understand the need for the EVO.....

The data and models that underpin the provision of information to solve today's complex and interdisciplinary environmental problems are often available but — all too frequently — not easily accessible.

Many organisations collect data on different aspects of our environment for many different reasons and use it to develop models and tools that help us understand underlying processes, demonstrate compliance, provide evidence for intervention and evaluate a myriad of possible futures. Some of this environmental information is well managed by the host institutions, or in data centres, but much of it is fragmented across unconnected systems and held in incompatible formats. Moreover, interpretation often requires expertise which can be a barrier to interdisciplinary approaches and a reason behind fragmented management of our natural resources.

Emerging information technologies can provide solutions to this fragmentation. The vision of the pilot Environmental Virtual Observatory (EVOp) is to demonstrate this and help the environmental science community to see the potential benefits.

Can you imagine the benefits of a single entry point, via the web, to a range of environmental information including data, models and visualisation tools from different agencies, societies and regulatory bodies?

The challenge is great. New standards and technology will need to be developed and tested to allow easy and appropriate information exchange. The barriers and opportunities to achieve this new way of working will be explored as part of a 2-year NERC funded pilot project.

The project will exploit cloud computing to develop new applications for accessing, filtering and synthesising data to develop new knowledge and evaluation tools. It will investigate possible structures for the cloud environment and develop exemplars at a local and national scale demonstrating how the EVO could make environmental monitoring and decision making more efficient, effective and transparent to the whole community.

A crucial aim of the project is to provide a web-based system that accommodates a variety of different users – from interested public and policy maker to expert scientist. Each group will have a different approach to how they use the EVO and this will generate an output that is appropriate to their different needs. Novel visualisation tools will improve cross-disciplinary communication and illustrate the effects of alternative strategies and solutions from 'town hall to Whitehall'.

Work on the pilot EVO is being undertaken by a consortium of 12 organisations. a stakeholder steering committee to ensure that external linkages with industry, regulatory bodies, government and other research initiatives have been incorporated from the outset.

A conference will be held in conjunction with BHS and other learned societies, including RGS, BES, BSSS and the Royal Meteorological Society, in May 2012. Dates will be announced in the next issue of *Circulation*.

For further information please visit www. environmentalvirtualobservatory.org

Marketing Research and Networking:
Joint working opportunities for British and Chinese hydrologists

Following the discussion about the overseas job market on Tuesday 3rd May at ICE at the BHS National Meeting - Hydrology in a Changing Economic Climate, Andrew Black, BHS President, encouraged the author to explore the collaborative research and consultancy opportunities between British and Chinese Hydrologists.

The Three Gorges Project is well-known for its capacity and the size of the infrastructure, and the world is concerned about the environmental situation there. China's hydropower capacity reached 0.1 billion KW in 2004, and it is estimated that this will double in the next 20-30 years (Li Zhongkui, Ma Jiming, Zhang Ming, Hydropower Structure, Textbook, Tsinghua University).

As a country with rich hydropower resources, China is committed to providing clean energy to her nations. Chairman Hu Jingtao, the current Paramount leader, is a Hydraulic Engineering graduate of Tsinghua University. Most political leaders in the West do not have this hydrology and engineering background.

Bob Sargent (Water Environmental Director from Hyder) said in the meeting that we should not ignore the opportunities. There are many areas in which the author believes that British hydrologists can work with the Chinese hydrologists. For example, Wuhan, the capital city of Hubei Province, has the largest lake area in a Chinese city and has severe water quality problems. It is also one of the important cities along the Yangtze River where The Three Gorges Project is located.

There are many gaps in terms of cultural differences, project management and intellectual property protection issues between the two countries. Thorough market research and networking are necessary to identify the right opportunities. This research and networking needs to be funded, the author welcomes suggestions and comments.

Please contact **Ruth Liu** on ruth.liuyan@yahoo.co.uk or 07897 857203 for a discussion or join the network.

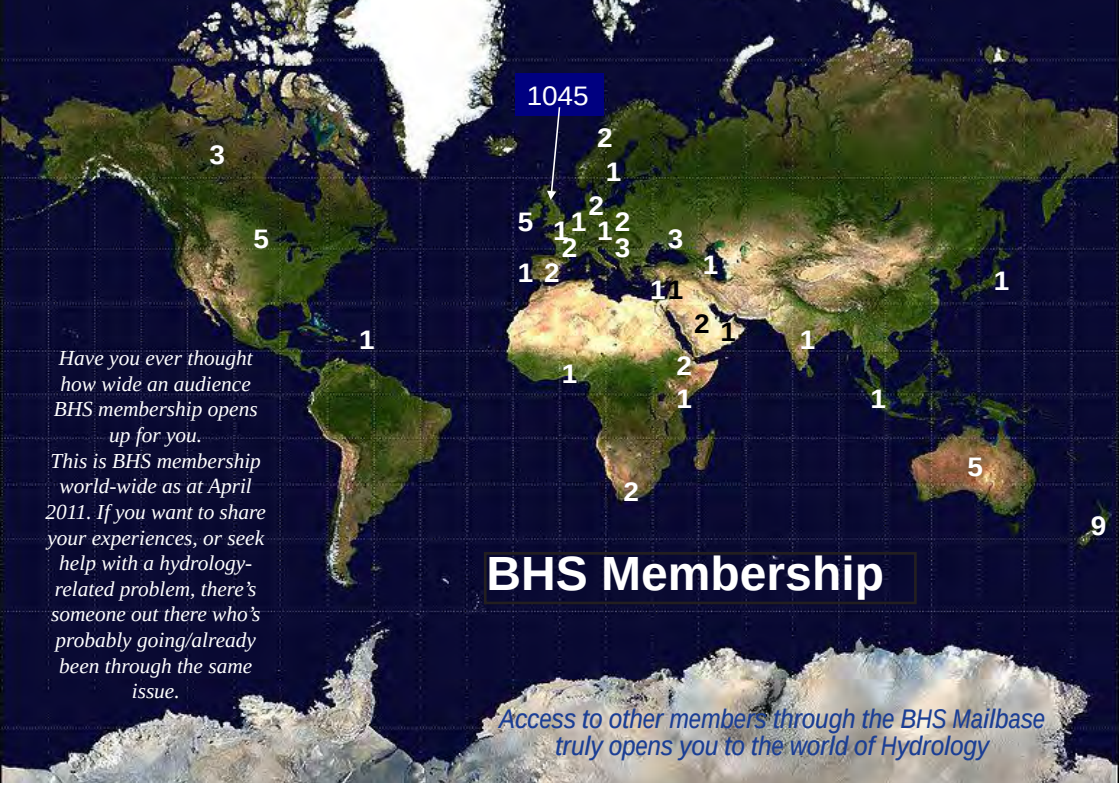
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Copy deadline for Circulation No. 110 22nd July 2011



Diary

6 June 2011
Hydrology of Water Resources
Joint BHS/CIWEM National Meeting
Location: ICE, London
Contact: Bob Sargent (Tel: 0796 764 5533)

17 June 2011
Flood Forecasting for Small Catchments
ICE SW seminar (supported by BHS SW)
Time 13:00
Location: University of Plymouth
Contact: Dr Martin Borthwick (mborthwick@plymouth.ac.uk<mailto:mborthwick@plymouth.ac.uk>
Tel: 01752 586110)

19–23 June 2011
Interactions between Sediments and Water
12th International Symposium organised by: International Association for Sediment Water Science
Location: Dartington, Devon, UK
Contact: Will Blake & Geraldene Wharton (Tel: 01752 585969)

21 June 2011
Historic Landscapes and the Flood & Water Management Act
Conference organised by: Haycock, English Heritage & National Trust
Time: 10.00–16.00
Location: Deer Park Hall, Pershore, Worcestershire
Contact: Laura Haycock (Tel: 01386 750642)

21 June 2011
Providing an efficient and effective hydrometry service
BHS National Meeting
Time: 10.00
Location: University of Birmingham
Contact: Andrew Black (Tel: 01382 309 103)

28 June–7 July 2011
IUGG General Assembly 2011
International meeting organised by: International Union of Geodesy & Geophysics
Location: Melbourne, Victoria, Australia
Contact: arinex pty limited (Tel: + 61 3 9417 0888)

[More details on all these meetings on the Meetings page of the BHS web site]