Circulation

No. 103
November 2009

Contents

New images from SNIFFER

President's piece

Catchment Change Network

Integrated Catchment Management in the River Quaggy Catchment

HRj Editor's visit to Hohai University, Nanjing

Communication and dissemination of probabilistic flood forecasts

Peat Hydrology: the current and future role of peat

BHS Student award for 2009

News from members

River Science Conference

BHS 27th Annual General Meeting

IAHS-AISH Joint International Convention

New BHS Main committee members

Diary of forthcoming events

Circulation is published quarterly. It is free to members of the British Hydrological Society and costs £25 to nonmembers on annual subscription.

■ Membership enquiries: Tim Fuller, BHS Secretary, Institution of Civil Engineers, 1-7 Great George Street, London SW1P 3AA. Tel: 0207 665 2234 Email: bhs@ice.org.uk

■ Editor: Celia Kirby Tel: 01544 230053
Email celia.kirby@btinternet.com

■ Web pages: **http://www.hydrology.org.uk/**

Circulation is indexed in *Geosystems' Hydrotitles* & *GeoArchive* and *NISC HydroROM.*

New hydrogeological images from SNIFFER

SNIFFER (Scotland & Northern Ireland Forum for Environmental Research) has recently added a brand new suite of images for karst, floodplain, fluvial and coastal settings to its WFDVisual I website, **www.wfdvisual.com**. There are over 70 new images, grouped together into storyboards to convey some commonly encountered hydrogeological scenarios. In jpeg format and accompanied by descriptive text, the images can be downloaded as a storyboard or individually. They are freely available to the public for non-commercial, not-for-profit use and have been developed to help communicate the complex processes underpinning the water environment and its management under the Water Framework Directive (WFD).

Each storyboard starts with an overview of the landscape: the landscape is then cut away to help explain the hydrogeological processes. As the user moves through the images, the descriptive text helps to explain the evolving conditions — see samples overleaf.

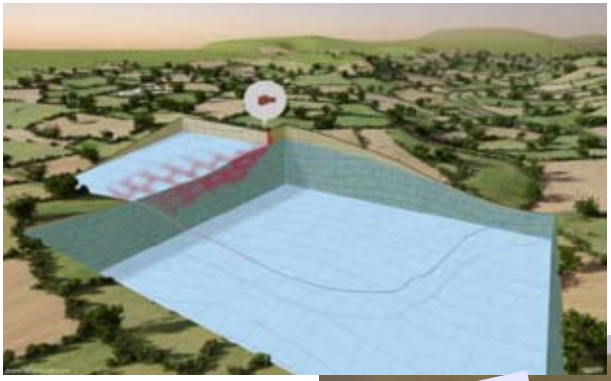
There are seven settings for the new WFDVisual storyboards:

- Groundwater flow,
- Floodplains,
- Surface water & groundwater interactions,
- Saline intrusion,
- Groundwater pollution,
- Karst, and
- Monitoring.

SNIFFER would be pleased to hear any feedback about WFDVisual, including requests or suggestions for new images. SNIFFER would like to explore additions to this website and or continued support for existing content with potential partners. Please contact **info@sniffer.org.uk** with any enquiries about WFDVisual.

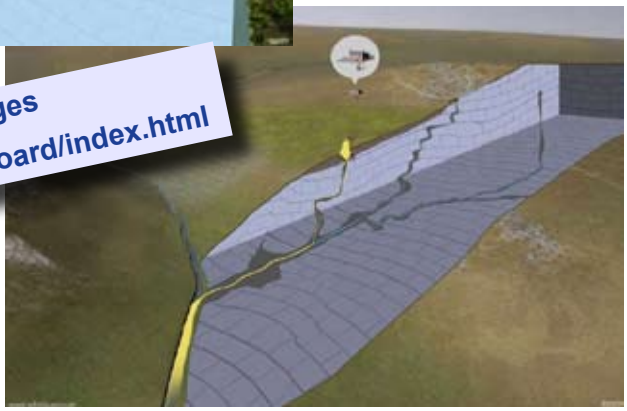
Groundwater pollution

The groundwater pollution stories display pollution incidents in groundwater in varying strata. Different plume diffusion means pollutants enter the stream via different routes.



This image shows an area of agricultural country, overlying a chalk aquifer. The stream across the middle of the image flows from left to right and enters the main river off the right of the picture. There is an aqueous phase pollution plume, which can been seen from two perspectives in the cut-outs. The pollutant is diffusing into the chalk blocks, and has entered the river.

Storyboard images
www.wfdvisual.com/storyboard/index.html



Karst

The suite of karst images show how pollutants can find their way into river-beds via multiple routes and potentially avoid detection.

This image shows a general view of a karst upland scene. There is an upland farm, a limestone pavement and a number of dolines. A spring is situated near the river, at the bottom of an underground cave system. There are streams at the top of the hills which are feeding into an active doline. The area below the farm is underlain by a raised mire or peat giving a low vulnerability area shown in green - but there is a doline developed in the area next to the farm. The doline gives direct access to the well developed conduit system through the normally protective clay layer. It enables a pollution incident to pollute the stream very quickly.

President's piece

A Society for hydrology and hydrologists

Hello. I find myself writing this piece as the new President of your Society. It's my great honour to be able to serve the membership of BHS in this capacity, and I look forward to carrying that role throughout my two-year term.

This first of my President's Pieces gives me an opportunity to share some perspectives on BHS — what it is and how it might evolve in the future. Straight away, let me pay tribute to Frank Farquharson and the committee who have worked with him over the past two years. They have seen BHS mark its 25th anniversary, launch *Hydrology Research* as its house journal (with the Nordic Hydrological Association), hold a successful biennial symposium in Exeter and deliver on several other important strategic developments such as the production of guidance for members seeking chartered status. With Peter Ede's careful attention to the finances and Claire Walsh's vigorous management of the meetings programme, it is also a Society that is in excellent financial shape and can boast a great deal of engagement with and delivery of services to Members. I hope the same can still be said in two years' time.

I come to my new role impressed by the considerable achievements of this relatively small Society and wondering why in name it's a *hydrological* Society rather than perhaps a *hydrologists'* Society. Given our membership of over 1000 and a modest annual subscription of £25, I honestly believe we achieve a huge amount. Our meetings programme now has an established hierarchy of regional meetings typically comprising about 20 events per year, several national meetings each year, and then also a biennial national symposium and an international symposium every six years. We publish information for members and others through our quarterly newsletter *Circulation*, symposium proceedings, our web site, an email list service and, with the inception of *Hydrology Research*, through an international journal backed by an international editorial board of 30 and a larger number of specialist reviewers.

We support hydrologists with travel grants, awards for student performance at the undergraduate and postgraduate levels and by recognising special contributions to hydrology with the President's Prize. We provide support for those interested in careers in hydrology at various stages, and respond to consultations when in the interests of Members. For a small Society with a staff of less than one (small but significant fractions of the working lives of Tim Fuller and Celia Kirby), it seems a lot, particularly once one begins to look at the details involved in delivering some of these outputs. The list would not be anything like so long if it were not for the crucial support of our Membership and the impressive commitment, expertise and enthusiasm of our Committee.

Conscious that all this lot takes a great deal of effort to maintain, I asked members at our recent Main Committee meeting how they thought BHS was doing — what we were doing well, anything that we might be having difficulty in delivering, and anything we are not be delivering but should consider for the future. The response was characteristic of the Committee I've come to know over the years: yes, we are doing a lot (some newer members were particularly impressed when all — or indeed not even all of — the elements were listed together), but we can do more, we have strong foundations on which to build, and there are good reasons why we should do so now.

There are two important ways in which I hope BHS can develop in the next couple of years. The first is that I hope we can raise the profile of hydrology. Given that BHS describes itself as a 'Society for the advancement of hydrology', that objective has to be spot-on. I was heartened by the enthusiasm for this objective from the Committee, and indeed many of their ideas went significantly beyond my own. Evidence of the need for hydrologists to serve the needs of our society (small 's') and the interests of our environment is all around us — such headline issues as climate change, population growth and environmental degradation.

While there are undoubtedly energised, motivated youngsters

emerging from our schools keen to make their contribution, few identify hydrology at that stage as their intended destination. Even at the first degree level, the numbers probably aren't huge, though measurement is difficult. Hence the need to raise our profile. Let's see what can be done to get hydrology and hydrologists more into the media. Let's see what can be done to work more with schools and their pupils and students. Let's see what we can do to help ensure that there are more hydrologists in coming decades with the right skills and enthusiasm to effectively address the needs of the future. We'll have a limited life working group reporting to Main Committee on this topic. I'd be delighted to receive any thoughts from members about what could be done.

The second area that I'd like to see some progress on is the size of our membership. While it's impressive that we have more than 1000 members, anecdotal evidence from across the spectrum of hydrological activity suggests that there is still scope for considerable further growth. Such growth is not essential to the Society's survival, but each addition to the membership is a success as measured by the number of people finding value in what BHS offers. For those hydrologists not presently members, I'm keen that we promote the range of benefits offered by membership, and am keen to know about other activities which we could consider offering in future. We'll have a separate limited life working group to address membership. Again, views from members are most welcome as we begin the work of these groups.

As a Society for the advancement of hydrology, it's clear that BHS is also a Society for hydrologists — in providing support as we approach and enter the early stages of our careers, in providing forums for the exchange and discussion of hydrological ideas of all sorts, in providing a means of making contacts and joining networks, and much more besides. Members are at the heart of all that BHS does. It's my firm belief that BHS has much to offer everyone involved in hydrology in Britain today and, as we approach our next international symposium, it's an exciting time to be involved.

I look forward to BHS continuing to increase its engagement with members in coming years, and would be pleased to hear from any member who would like to become more involved personally, or who has ideas about the future development of what BHS offers.

Andrew Black

Catchment Change Network

Announcing a professional development platform for improvements in decision-making relating to environmental change

There are increasing demands to predict the response of catchments to future change whether due to climate, land management or urbanisation – for decision making and policy setting. Such predictions are inevitably uncertain, if only because the future inputs to the catchment cannot be known accurately. A Catchment Change Network (CCN) is being set up to exchange knowledge on the latest ideas within the NERC research base and science user community to improve such risk-based predictions and help understand and manage uncertainty and risk related to future changes in catchments.

Supported by Atkins, Cascade Consulting, JBA Consulting, Northumbrian Water, United Utilities, CIWEM, Environment Agency, Envirolink Northwest, Jacobs, the Northwest Development Agency, OFWA, and the Royal Town Planning Institute, this three-year NERC Transfer Project will concentrate on three Focus Areas — change in flood risk, change in water scarcity and change in diffuse pollution. The project will be led by Keith Beven, Enda O'Connell and Phil Haygarth.

To find out more about the CCN, contribute to the Focus Area discussions and comment on the Guidance Documents as they become available, go to www.catchmentchange.net. You can also contact the CCN facilitator, Dr **Ruth Alcock**, directly at r.alcock@lancaster.ac.uk (Tel: 01524 510285).

Integrated Catchment Management in the River Quaggy Catchment

BHS South East Section Summer Field Visit 17 June 2009

The River Quaggy is an eastern tributary of the River Ravensbourne that flows northwards to join the Thames at Greenwich. The objective of visiting this catchment, located in a very densely populated urban area of south-east London, was to examine the results of an on-going integrated catchment management programme that began in 2002. This aims to decrease flood risk whilst also taking the opportunity to improve biodiversity, recreation and amenity. Through their formal presentations before lunch and during the site visit, speakers from the Environment Agency and their consultants, Halcrow, provided a background to the studies, investigations and river modelling that led to the hydraulic designs and the construction and conservation work that has been undertaken in the catchment over the past seven years

Roger Simpson (Ercon) welcomed the attendees and introduced the first speaker, **Trevor Odell** (Technical Specialist in the River Mole and South London Asset Systems and Management Team of the Environment Agency) who outlined both the historical and the present physical characteristics of the Quaggy catchment. The catchment has a steep gradient of 1:200 from its ephemeral source at 270 mOD in the North Downs chalk ridge near Bromley in Kent from where it flows northwards to Lewisham where it joins the Ravensbourne. In the past there were several mills in the upper catchment which, to a degree, controlled the flow of water but these have all been abandoned as urban development spread southwards from central London to Orpington at the foot of the Downs.

There is a population of 1 million people in the Ravensbourne catchment with less than 30% of the river system being in a semi-natural condition. Consequently, the river is extremely impoverished in flora and fauna even though more restoration schemes have been undertaken here than in any other catchment in the Thames region. In terms of the Defra land use classification system, most of the catchment is in band A and B. This has been caused by the extensive urbanisation since the 1950s in North Croydon, Beckenham, Bromley, and Lewisham. As a result, the River Quaggy catchment has become significantly impermeable and much of the natural river channel replaced by pipes and culverts. Consequently, the river responds rapidly to rainfall events with very high flow velocities occurring principally in concrete channels that create both flooding problems as well as health and safety issues. Over the years, flood events have become more frequent and a significant flood occurred in 1968, as shown below, when 600 homes and businesses in the Lewisham town centre were flooded: 2500 people were directly affected by flood water that in some places was up to 1 metre deep. , There was another, although smaller flood, in 1992 but all these flood incidences can be attributed to the historical development in the floodplain that has caused an increase in flood risk.

Since 1992 a number of individual channel improvement measures have been undertaken to reduce the local flood risk in the Ravenbourne catchment but the principal schemes are those carried out in the Quaggy catchment where the first scheme

© Environment Agency



Flood in Lewisham Town Centre 1968

was completed in 2002 at Chinbrook Meadows. This was subsequently followed by another three schemes further downstream at Sutcliffe Park, Weigall Road and Manor Park.

Very recently, in May 2009, the Environment Agency produced a flood strategy for the Ravensbourne. This Delivery Plan outlines a long-term sustainable approach to manage flood risk in the Ravensbourne catchment, in line with the policies of the Thames Catchment Flood Management Plan and the River Ravensbourne Policy Unit. In the meantime, there are constant flooding and environmental problems caused by large amounts of rubbish being tipped in watercourses and many of the 40–50 trash screens becoming blocked with debris and rubbish, further exacerbated by the frequent subsidence of river banks. Other water quality problems arise from combined sewer overflows and illegal connections of foul discharges to watercourses.

Trevor stated that there is a strong possibility that water quality problems will continue, both from combined sewers and illegal connections as well as from fly tipping, although enforcement remains an on-going and active issue for the team with a number of prosecutions pending. The Agency will continue to work with Planning and Development Control in London to regulate and bring about improvements.

Joanna Heisse (Conservation Officer, South East Area, Environment Agency Thames Region) described the restoration and conservation aspects of the principal flood alleviation schemes in the River Quaggy catchment.

One of the first river channel improvement schemes to be constructed was the Chinbrook Meadows site, completed in 2002, where an existing park was redesigned to improve the flood storage and to reduce the flood risk to adjacent properties. The original channel comprised a straight concrete channel lined with tall evergreen hedges that had significantly subdivided the park and this was replaced with a more natural channel together with landscaping, improved public access and the introduction of new meadow and riverine species. The new landscaping has not only increased the biodiversity value of the park but has added to the health and social benefits.

Additional river improvement works and flood protection measures further downstream not only provide environmental gains and channel improvements but also provide storage upstream of Lewisham to alleviate flooding in the urban area.

These were the components of the Quaggy River Flood Alleviation project which, over a 10-year period from inception through planning, fund raising and design to project completion, created a fundamental change in the strategic approach to flood alleviation from the previous procedure of wall raising to contain culverted flows to an improved environmental and flood alleviation approach by providing channel improvements and flood water storage facilities.

The principle objective was to reduce the risk of flooding to some of the area affected by the 1968 flood in the London Boroughs of Lewisham and Greenwich and to improve the then current standard of service of about 1 in 5 years (20% probability) to a new standard of 1 in 70 years (1.4% probability).

The complete scheme combines the creation of flood storage areas linked by channel improvements and environmental features such as raised areas and excavated depressions, together with the planting of a wide range of aquatic plants. The scheme was carried out in stages, starting upstream so that the flood storage areas could be used before the whole scheme was complete and thereby reducing the risk of flooding downstream.

The first project to be completed was the Sutcliffe Park Flood Storage Area in Eltham which was constructed in 2003 and extends across over 35 acres of parkland with several wetland zones. It has an earth embankment 2.5 m high and 480 m long that surrounds an excavated site where floodwater is diverted into a 85 000 m^3 storage area from the river culvert that borders the site along the bottom and right-hand side of the site, as shown above right.

The photograph, taken soon after construction was complete, also shows the low and high flow inlets and outlets, the restored river channel that has a gravel bed with riffle and pool sequences and a variety of marginal edges, the wetlands and lake with reed margins, the set-back footpaths and buffer zones, the wild flower meadows and native shrubs and trees. Also shown are the flow control structures that allow the excavated areas to contain and release flood water.

The next construction phase took

place further downstream at sports fields in nearby Weigall Road. The fields are still available for use as sports pitches, but in times of flooding a channel in the river diverts water into the site, which is capable of holding up to 65 000m^3 of water. Reed beds were added to improve water quality where the storm water joins the river.

The final phase of the scheme was the stretch of river that runs from Weigall Road into Lewisham town centre, through built-up suburbs. In this part of its course the Quaggy flows under roads, along urban open spaces, and between people's back gardens, many of which were at high risk of flooding. To improve water quality and to increase the biodiversity and enhance the geomorphology, more natural meanders were introduced, where possible, and shoals were created by depositing soil and gravel at the sides of the culvert, thereby improving the wildlife habitat and reducing flow velocities. Additionally, where practicable, hard defences were replaced by soft defences but where this was not possible, bird nesting areas and planting boxes have been added to create valuable wall communities including humid fern habitat and Mediterranean species.

With advice and assistance from the Environment Agency, some riparian owners have gained access to the watercourse through the practice of set-back defences which have been to the benefit of both parties, as shown below.



© Envrionment Agency

River bank set-back property protection



© Envrionment Agency

Sutcliffe Park Water Features (flood storage area with the River Quaggy flowing from bottom left to top right along the tree-lined border of the park, soon after construction and without full environmental development)

Joanna concluded that the improvement works have been designed and managed on a catchment wide basis with multidisciplinary teams being involved. Continuous consultation with the public had occurred throughout which was of educational benefit to all,

Bruno Venturini, (South East Market Sector Manager, Halcrow) **stated that o**ver the past few years Halcrow have had a varied involvement in work within the Ravensbourne catchment; from surveying and providing flood defence and river restoration works on the River Quaggy, to modelling future fluvial flood risk using 1D-2D ISIS-TUFLOW hydraulic modelling software. Current work is to provide a strategic overview of potential development for the catchment which will identify opportunities for river restoration. New modelling techniques have been developed to assess flood risk due to surface water flooding to provide a complete overview of the flooding issues -fluvial, pluvial and tidal - for the Ravensbourne catchment.

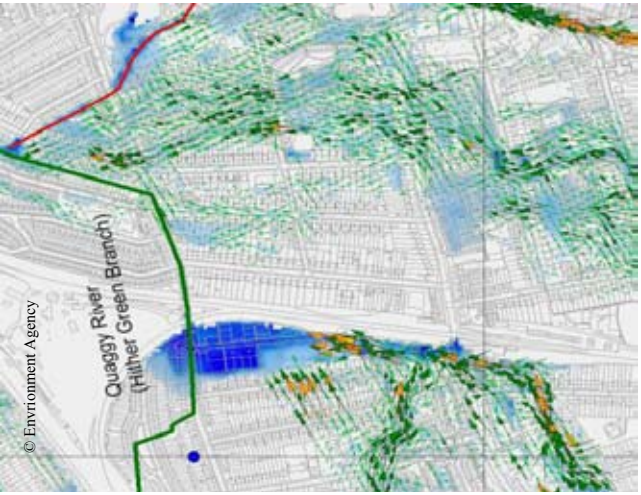
Bruno then described the catchment-wide 2D pluvial modelling, mapping and flood risk modelling that Halcrow has recently completed on behalf of the Environment Agency in the Ravensbourne catchment which has involved the use of a distributed hydrological model with a 2D terrain model which has been tested using the July 2007 storm event to enable comparison with historical events.

Surface water flooding has occurred frequently every year in the catchment. This could have been the result of insufficient drainage capacity, backwater effects from the channel or badly designed outfalls into the watercourses. The short and high intensity storm, experienced in

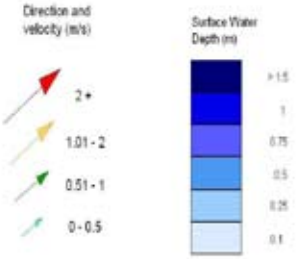
summer 2007, confirms that the concrete channels are becoming increasingly ineffective against intense rainfall events, as the channels were at full capacity at many locations. This situation is expected to worsen in the future due to estimated increases in rainfall depth of 30% in the next 100 years.

The studies have provided a reasonable representation of flood damages for high intensity surface water flooding and this has led to a set of new maps which include the following outputs for a range of stakeholders:

- a flood extents critical hazard map,
- a critical depth map for use in emergency response plans with a map showing all return period events
- a critical duration map showing locations where duration exceeds 2 hours
- a climate change hazard map for use in spatial planning and flood risk policy
- a drainage infrastructure failure hazard map that is of use in asset maintenance and asset replacement programmes



Model predictions of depth, direction and velocity of flood water.



In May 2007 the Ravensbourne Delivery Plan was issued by Halcrow on behalf of the Environment Agency, the aim of which is to outline a long-term sustainable approach to manage flood risk in the Ravensbourne catchment in line with the policies of the Thames Catchment Flood Management Plan and the River Ravensbourne Policy Unit. The main objectives for this Delivery Plan are to understand potential flood risk in the catchment, to identify initial appropriate actions, opportunities and measures to address these risks and to prioritize the proposed options based on flood risk and resources.

The Delivery Plan has considered a number of component plans that could be developed to address the potential flood risks within the catchment having regard to spatial planning and planning policies such as the asset management plan, asset investment strategy, surface water management plan, water cycle strategy, catchment strategy, flood awareness plan, flood forecasting and warning plan, emergency response plan and the disaster recovery plan.

All in all, it is a fundamental step towards a better understanding of all sources of flooding and identification of responsibilities, which will result in a more integrated management of flood risk in the future, as recommended in Sir Michael Pitt's review of the summer 2007 floods.

Roger Simpson

Hydrology Research Editor's visit to Hohai University, Nanjing



At the invitation of Prof Liliang Ren, I made a presentation "Preparation of manuscripts for submission to journals: an Editor's point of view" to a Summer Course for about 120 post-graduate students from all over China held at Hohai University, 25 July to 8 August 2009. Prof Ren is Dean of the College of Hydrology and Water Resources at Hohai University, a Hydrology Research Editorial Board member, and Principal Investigator of the 111 Project *Hydrological Cycle and Water Security in a Changing Environment* approved by the Ministry of Education and State Administration of Foreign Experts Affairs, China.

I also gave talks on "Characterisation of river flow regimes for environmental and engineering hydrology: unit hydrographs for rainfall-streamflow modelling" and "Precise but inaccurate rainfall–streamflow model parameters: a neglected uncertainty issue" (see *Circulation* 100, 1–5).

'Ho' means 'river' and 'hai' means 'sea'. Hohai University is the premier Chinese research and teaching university for hydrology and water resources, coming top in the past three assessments by the Ministry of Education. Among other excellent research facilities at Hohai University there is a physical hydraulic scale-model hall (like HR Wallingford had) and a rainfall simulator hall at the State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering. The rainfall simulator stands about four stories high with a floor space of about 40 m by 30 m and has automated flow control and measurement facilities, providing flexibility for experiments, e.g. on a variable-tilt tank filled with soil and the option of different vegetation types (see below).



There was a field trip on Sunday 2 August. In the morning the party visited Wudaogou Hydrology and Water Resources Experimental Station near Bengbu (Anhui Province), about two hours by coach to the northwest of Nanjing. The Station was established in 1953 and there is now a substantial database of hydrometeorological observations and streamflow. The building that can be seen over the left shoulder of Prof Wen Wang, the field trip leader (above) is the lysimeter facility. The structure extends to a depth of about 5.5 m (11 m diameter), where there is a gallery of measurement devices (below) for monitoring the drainage from many lysimeters (different soils/vegetations).



Lysimeter measuring gallery

In the afternoon the field trip headed back toward Nanjing, to the famous Hydrohill research catchment near Chuzhou. The 490 m^2 Hydrohill catchment was created by digging out the soil and replacing it over an installed concrete seal. Systems were installed for measuring flows entering the channel from different depths



Looking at a Hydrohill channel



The Hydrohill flow measurement hall

in the re-filled catchment (for details of Hydrohill see *Hydrol. Proc.*, **15**, 1877–1902; 2001 for example: for application of IHACRES to Hydrohill see *Water Resour. Res*., **29**, 2637–2649; 1993). Prof Weizu Gu and Jay Frentress — the latter was visiting from Oregon State University to undertake experiments using Hydrohill — gave presentations to the students. Hydrohill instrumentation is currently being refurbished.

In discussions with Liliang Ren (studied at UCG, Galway, Ireland), Qiongfang Li (Deputy Dean – studied at Newcastle, UK), Wen Wang (studied in the Netherlands) and Fei Yuan (studied in Germany), the links between Hohai and the UK and other western European countries were often mentioned. The College of Hydrology and Water Resources, Hohai University, is keen to strengthen its links with the UK.

A forthcoming Special Issue of *Hydrology Research*, to be Guest Edited by Profs Ren and Li, was discussed in some detail. Work has started on the Special Issue and it is expected to be published before the end of 2010.

My thanks to Prof Liliang Ren, Prof Qiongfang Li, Prof Wen Wang and Assoc. Prof Fei Yuan for providing information for this article and for their hospitality during my stay in Nanjing.

Ian Littlewood
Editor (BHS) Hydrology Research

Communication and dissemination of probabilistic flood forecasts

BHS members might like to know that reports from the joint EA/Defra Flood Risk Science Programme are now available. The overall objective of this project was to establish from relevant sources and consultation with the public, professional partners and internal practitioners, the comprehension, requirements and mechanisms of communicating risk and uncertainty with flood forecasting and warning.

The following summaries and reports are available via Claire Sunshine (Project Manager Flood Risk Science) on 07799 133129.

- Literature Review - Science Summary
- Final Report - Science Summary Literature Review - Science Report 1: How the public and professional partners make sense of information about risk and uncertainty
- Report 2: Communicating risk and uncertainty in flood warnings: a review of Defra/ Environment Agency FCERM literature
- Literature Review - Science Report 3: Literature review of international material
- Final Report

Travel grants

To apply, use the form at *www.hydrology.org.uk/about_awards.htm* or contact **Nigel Goody**, SEPA, 7 Whitefriars Crescent, Perth, PH2 0PA *(tel 01738 448806, email nigel.goody@sepa.org.uk).*

Peat Hydrology: the current and future role of peat

BHS National meeting, Newcastle University 9th July 2009

This one-day meeting brought together a wide-ranging audience with different interests in peat. The morning session was designed to "warm up" the audience with presentations on different aspects of peat such as research on hydrology and water quality, modelling approaches, practical peatland restoration, biodiversity, and policy. Speakers were **Joe Holden** (University of Leeds), **Fred Worrall** (Durham University), **Caroline Ballard** (Imperial College London), **Jillian Labatz** (Nottingham Trent University), **Nick Mason** (North Pennines AONB Partnership), **Tim Allot** (Manchester University) and **Aletta Bonn** (Moors for the Future), **Pat Thompson** (RSPB) and **Rob Brotherton** (EA).

After lunch, the two-hour discussion session was expertly chaired by **David Rimmer** (Newcastle University) and current and future issues were frankly debated with full audience participation. The discussion was broadly split into categories following the topics from the morning session and is reported here.

"***How do you think policy might change*? *What are the likely new developments in policy?*"**
The first point raised was that public money was used to fund restoration, conservation and research and so it should it be valued by the public. **Aletta Bonn** spoke about work 'Moors for the Future' have done on this and liked the £ per household approach. Could the provision of ample supplies of good quality water lead to some payment to the landowner for providing these ecosystem services? The conflict between ownership of the assets, if society is paying for them, and the 'polluter pays' principle was also raised.

There was consensus that long-term investment was necessary to answer what and how the uplands provide for society. Water company representatives voiced the opinion that it should be written into business plans and not viewed simply as efficiency savings. It was argued that there were economic drivers to change perception and as a society, we could 'value' the benefits of reduced flood risk. Also, the public purse should be used to fund agri-environment schemes for positive environmental benefits. This should benefit the uplands and peat management too, but to achieve this, research, management and policy need to be joined up for progress to be made. Generally, there was agreement on the need to integrate and that perhaps the best way to re-connect people to the land was by putting a value on it.

"What are the challenges faced by land managers/restorers?"
Practitioners do the best they can at the time but sometimes feel that policy is a swinging pendulum—'drain the uplands' 'block the uplands'. The point was also raised that the heterogeneity of the uplands should be remembered and that different parcels of land are managed for different objectives, e.g. grouse shooting and grazing. These are important habitats and livelihoods whose practices and management have shaped the landscape for hundreds of years. Can restoration and livelihood practices co-exist? Is there a panacea?

Scientists felt that it all depends upon where in a catchment but that it was possible for an area to provide multiple services. Models were suggested as a way to look at different scenarios. But models were also seen as a major barrier between science and the public. If they couldn't be used by practitioners then their usefulness was questioned. Further, the best models were expensive and license agreements made it difficult for anyone to use



them. Whose job is it to distil models, research and science to practitioners?

Other data sources that are often overlooked, such as local knowledge and experience, were discussed. It was felt that they are not utilised by policy and science. There was a consensus that 'fine tuning' was needed, and not necessarily wholely new ideas, e.g. grip blocking was good on the whole. Land managers thought that a ground-up approach was best and questioned why modelling grip blocking was necessary.

There was consensus that we need to move on swiftly to achieve 'favourable condition' and stop thinking in 18-month time-steps but rather in terms of decades. The modellers present reassured others that they do now go out in the field and use their models to look for answers and then disseminate them to end-users. It was pointed out that these decisions are being made now and that we should look to the leaders in the field to come up with guidance on how to manage our uplands. There is a need for a brainstorming session with experts in the field to come up with a viable answer and attach a degree of uncertainty to it so land-mangers/end-users could continue; but apparently Research Councils do not want to fund this kind of research. It was also felt that end-users delivering these outcomes need to be 'locked into the process'. This is the IMPACT of the research and policy.

The lack of interest in this work by funders caused a lot of frustration in the room as it was felt there was a real need to link the science with end-users and there was outrage that this was not high enough up a political agenda, despite the urgent need to 'adapt' and 'mitigate' for climate change, to reach 'good ecological status' and assess the 'impact' of research.

"***Are the questions posed clearly enough for scientists to answer? Are they impossible questions?"***
Generally, scientists ask their own questions and sometimes they attempt to answer questions that inform policy. Generally, scientists do not deliver multi-disciplinary answers as it is difficult to get that type of work funded. It was thought that there would be some benefit in doing lots of different research in one location. We heard about a RELU project where the scientists were questioned by practitioners and, using this combined approach, there was good knowledge transfer between the researchers and end-users.

In a nutshell, scientists want policy people to listen to the limitations of their research whereas policy people want scientists to sum up their research in a sentence!

The question was posed of whether we should continue with blocking work or wait for more data. Most people agreed with a 'yes' but this then posed even bigger questions: "What do we mean by restoration?"; "What are we trying to achieve?"; "What will success look like?", "Who should decide?"

It was suggested that where policy has met practice, we get 're-wilding'. Land managers in the audience didn't think this was an appropriate way to manage land as it was not good for certain habitats and they believe that the landscape needs to be managed. This again raised the question of what will success look like? There are many goods and services that could be delivered, but maybe not simultaneously. This related back to the point raised by the practitioners that different areas of land are managed with different aims.

Summary
Overall, I felt that people enjoyed the opportunity to take part in a lively discussion and identify how we can move forward. I think that the outcomes were nicely summarised by **Pat Thompson**, who wrote after the meeting:

"I think you guys made a good fist of teasing out some of the big issues

we need to focus on. Yes, there is loads of research that still needs to be done. But, the big challenge is joining up research and policy in a way that informs future practice. I'm going to try and use the BHS meeting as basis for arguing that we need, quite urgently, to get our collective acts together. I had often wondered if the research community aren't bothered about policy questions, but I think I've heard enough now to feel that the research community have a major role to play (a) in asking and answering good questions, (b) in helping policy makers develop fit-for-purpose policies, (c) informing restoration and management. Alas policy-makers are consistently absent from these meetings, I think because too few of us know who they are!

I think the thing is we have been waiting for somebody to pull it all together. It is clear that we need to make this happen rather than wait for it!"

Jennine Jonczyk
University of Newcastle

News from members

In what seems a fascinating career change, we learn that **Emma Neachell** will be leaving her current post as a hydrologist with the Environment Agency to start fire-fighter training with the London Fire Brigade. Gratifyingly, she wants to continue her membership of BHS. **Oliver Pollard** has kindly let us know that presentations from the recent BHS South West Section meetings are available to download from www.bris.ac.uk/civilengineering/research/water/bhssw/bhssw.htm. These include diverse subjects such as Water Cycle Strategies, Urban Hydrology and Challenges in Hydrometry, etc. An easy way to find this website is to type in the words "bristol water bhs"

BHS Student award for 2009

The Society's student award was launched in 2002 to promote the study of hydrology and raise awareness of the Society at undergraduate level. 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 main BHS Committee.

This year we received 15 entries which is more than in any previous year. All entries were of a very high or good standard and covered a range of hydrological aspects. The judges awarded the winner's prize to **Christopher Fitzsimmons** from the University of Cambridge for his excellent piece of work on 'Subglacial drainage system structure and morphology of Midtdalsbreen, Norway.' Christopher's work was described by our judges as 'an exceptionally well developed project which integrated both field based and remotely sensed data'. Christopher was able to join us at our AGM in Oxford to receive his prize of £400, an engraved quaiche and a certificate.

Two runners-up prizes were also awarded to **Kate Reilly,** University of Edinburgh for her work on 'Hillslope hydrological processes and flowpaths in the Borthwick water catchment, and their implications for the effectiveness of natural flood management' and to **Jeffrey Wilkinson** from UCL for his project 'Modelling climate change impacts and uncertainty on hydrology: application to the Mekong river basin, Asia'.

It was very encouraging to see the high standard and enthusiasm for hydrological research at the undergraduate level and I look forward to receiving entries for the prize in 2010. The abstract from the prize-winning dissertations are to be found on the BHS web pages.

Editorial

I'm sorry to report that we have had to amend the 'Gateway' page on our web site and delete the offer to find work experience placements for aspiring hydrologists. This is because our network of contacts find that the current work climate makes this possibility problematic.

If any member is able to be more positive and has helpful suggestions that I can pass on to enquirers, I'd very much like to hear them: it seems such a pity not to be able to respond to potential future members.

Celia Kirby

River Science Conference

St Pete Beach, Florida 13–17th July 2009

This was the first biennial symposium for the International Society for River Science (ISRS). The ISRS was founded at the tenth meeting of the International Symposium on Regulated Streams in 2006 (Stirling, Scotland) to promote integrated research on the structure and functioning of lotic ecosystems as a basis for wise stewardship of freshwater resources. This, and the ISRS's ethos of encouraging communication, education and professional development, were amply demonstrated during the week. The symposium attracted 90 international speakers and covered a diverse range of topics including environmental flows, faunal responses in dynamic rivers, vegetation in riverine landscapes, food web dynamics, river management and assessment, flows and ecological responses in dryland rivers, conservation and rehabilitation, river classification and characterisation and fluvial geomorphology.

The opening address was delivered by **Geoff Petts** (Vice-Chancellor, University of Westminster) who received a lifetime achievement award for his outstanding contribution to river science. His inspiring presentation gave an insight into the breadth of his research and set out the challenges for regulated river science in facing an era of water scarcity. River science now needs to focus on developing biological-led models of habitat dynamics and monitoring flow variability over decadal scales to provide the basis for more accurate predictions and better water resource management. He spoke passionately about the need for greater communication and collaboration between scientists and practitioners, suggesting the onus is on scientists to research the real questions faced by practitioners and to present scientific knowledge in a usable way.

These themes were echoed in talks by **Mary Davies** (The Nature Conservancy, US), who reported encouraging progress in the integration of ELOHA flow management tool into regional water resource planning in Southern US states and **Sarah Yarnell** (University of California, Davies) who discussed the successful development of a conceptual model capable of identifying potential impacts of flow regulation and climate change on key ecosystem processes governed by the spring-snowmelt recession limb.

Kirk Winemiller's (Texas A&M University) keynote speech discussed the challenges and urgency of making river ecology a predictive science. He stressed the importance of empirical work to test theoretical models, in particular, to determine the spatial scales over which biological processes operate. He gave a fascinating account of experiments that had successfully unlocked some of the mysteries of the complex ecology in the Rio Cinaruco, Venezuela, including the influence of benthic meiofauna, migratory fish, seasonal flood pulse and spatial habitat complexity on the food web. Further examples were provided by **Jack Stanford** (University of Montana), who reported a strong influence of marine derived nutrients, in the form of salmon runs, on the biodiversity and productivity of Pacific Rim rivers and **Bradley Pusey** (Griffith University) who identified the main sources of variation in the trophic structure of fish assemblages in sub-tropical Australian rivers with variable flow regime.

Ken Lubinski (US Geological Survey) discussed the role of science in defining and delivering river conservation goals. He spoke about the need for scientists to identify essential ecosystem characteristics with the highest priority for conservation, define critical terms such as 'ecological health' more clearly, devise and implement monitoring systems to assess current conservation strategies and inform on-going adaptive management practices, and communicate the science underpinning river conservation in such a way that it influences societal values.

Samantha Chilcote (University of Montana) presented an inspiring example of how scientific research from several salmon science projects

had been integrated and developed into a practical management tool whereby the economic benefit of proposed developments could be weighed up against the ecological cost of salmon habitat loss.

Martin Thoms (University of Canberra) presented a conceptual framework for interdisciplinary river science. He discussed a fascinating application of the framework to the study of water birds in the Narran ecosytem, which demonstrated the importance of a multi-scale approach.

I also presented my own research which aims to develop a protocol for the spatio-temporal assessment of hydraulic habitats and assess the impact of hydromorphological modification on habitat dynamics. Attending the conference provided me with a valuable opportunity to meet and discuss my work with river science experts from a range of backgrounds. Many thanks to the BHS for their generous travel grant which enabled me to attend and present at this conference.

The next symposium will be held in Berlin, August 2011.

Caroline Wallis
University of Worcester

BHS 27th Annual General Meeting

The 27th AGM of the British Hydrological society was held on 28th September 2009, at Oriel College, Oxford

The formal business of the meeting included reports by the outgoing President, Frank Farquaharson, the Secretary, Claire Walsh and outgoing Treasurer, Peter Ede. The key issues raised are presented here, with complete texts available on the BHS web site.

The outgoing President, **Frank Farquharson** began by acknowledging that the society is certainly flourishing, with a stable membership of over 1000 and adequate financial reserves, despite the very modest current subscription rates. When he took up his post he had two main aspirations: the availability of a scientific journal for the society, and to help members understand how to achieve chartered status.

The new journal has been achieved through the merger between BHS and the Nordic Hydrology Association and we are now co-owners of *Hydrology Research*, published through IWAP.

The second issue of professional development and possible chartered status for hydrologists has, as many members know, run and run ever since the society was formed. He was delighted to say that with the help of an excellent external working group and strong inputs from the immediate Past President, Rod Hawnt and Neil McIntyre, we were able to finally launch a draft guidance document at the Exeter Symposium last year which is available on the website (**www.hydrology.org.uk/BHS-PDT-Guide-v1.1Sept08.pdf**)

Our Hon Secretary, **Claire Walsh** reported that this year has seen a wide range of National and Regional BHS meetings. The AGM in September 2008 was held during the successful 10th National Symposium at Exeter University. Since then, there have been eight further national meetings.

Committee nominations were received from four Members for the ordinary committee positions on the Main Committee and one for Honorary Treasurer. On behalf of the Committee, she welcomed **Claire Beloe** from Mott MacDonald, **Hannah Cloke** from Kings College London and **Simon Palmer** from Peter Brett Associates as ordinary committee members (see page 19) and **Matt Horritt** who is now a co-opted member. We also congratulate **Nigel Goody** on his election as Honorary Treasurer.and **Andrew Black** commencing his term as President of the Society.

Peter Ede, the out-going Hon. Treasurer was once again able to report a healthy financial position,

with General Funds having risen by about £7,500 over the year, to £109,500. Over his four years in the post the total has risen by about £20,000, an average of about 5% per year. The initial forecast for 2009/10 shows a loss of about £5,000. This reflects several factors, including:

- An anticipated reduction in income from bank interest and website advertising due to prevailing economic conditions.
- An increase in Trustee meeting expenses, due to the expectation that more committee members are likely to have to claim from BHS rather than their employers, and the greater restrictions on off-peak rail fares.
- £1000 estimated contribution towards the UK subscription to IUGG which the Royal Society is devolving to relevant Learned Societies.
- An increase in ICE charges. These will double from January 1st 2010, so the effect will only be fully felt in the BHS accounts for 2010/11.

ICE's financial position has worsened dramatically during the recent economic downturn and one of the measures they have taken is to reduce the subsidy given to Associated Societies such as BHS (on normal commercial rates for room hire etc.) from 75% to 50%. The view of the Committee is that this change does not require BHS to review its relationship with ICE, but charges for National meetings held at ICE may have to rise slightly. The forecast does not include any income or costs in relation to the Newcastle International Symposium, but this should yield some surplus for the 2010/11 accounts because some costs have been taken in 2008/09.

2009 President's Prize

This was awarded at the AGM to Dr **Hilary Smithers**, currently working for SEPA.

Hilary has a long and distinguished service record with Main BHS Committee, having served as an ordinary member, as Hon Sec (the most demanding officer role!), and then in various 'representative' posts for the Pennines Hydrological Group, the Scottish Hydrological Group, and CIWEM, where she continues to contribute as a member of its Water Resources Expert Panel. She has contributed to, or organised, a number of BHS meetings, and convened a session at the first International Conference. Hilary also worked hard to support the initiatives to provide routes to professional, chartered status for hydrologists.

After a varied career with the water industry and the EA, some five years ago Hilary cleverly managed to get a job with SEPA in Scotland, a country she always loved through holidays, and is now helping Scotland get to grips with the demands of the Water Framework Directive, and helping SEPA develop a first water resources plan for Scotland, starting to look at drought planning (and yes, Hilary insists they do have droughts up there!), and helping Scotland develop its own privatised water utility.

New members

George Berry.....Weetwood Services,Tadcaster
John Bottomley.....University of Aberdeen
Lorna Cork....Nottingham Trent University, Southwell
Tony Dean.....Environment Agency, Tonbridge
Jonathan Eden.....University of Birmingham
Nick Everard.....Environment Agency, Wallingford
Emily Farquharson-Smith.....Westwood Services Ltd Amersham
Tracey Haxton.....Wallingford HydroSolutions Ltd
Darroch Kaye.....Scottish Environment Protection Agency, Perth
Daniel Kimani.....London
Lucila Lantschner.....Envirocentre Ltd, Glasgow
Martin Langdon.....Independent Consultant, Cheltenham
Jeff Pacey.....Environment Agency, York
Jongsook Park.....Swansea University
William Purnell.....Enviroment Agency, Tonbridge
Caroline Ridgway.....Enviroment Agency, Tonbridge
Rosemary Smith.....University of Bristol
Ian Thornhill.....University of Birmingham
Iain Tinniswood.....Mott MacDonald, Glasgow
Susan Wagstaff.....Skipton

IAHS-AISH Joint International Convention

Hyderabad, India
5–12 September 2009

The Joint International Convention of the 8th IAHS Scientific Assembly and 37th IAH Congress was held this year under the theme of "Water: A vital resource under stress – how science can help". Five BHS members attended the conference and here report on their experiences.

At the opening ceremony, the Minister of State for Human Resource Development in India, **Smt. Daggubati Purandeswari**, highlighting the importance of freshwater and its proper management, gave examples of ways in which the Indian Government is committed to effective water usage, including desalination and harnessing the monsoon rains. The minister encouraged participants to develop methods for integrated water resources development and management. The Government of India, she said, has high expectations for the outcomes of the conference, with a hope that they will be of great benefit to policy makers in India, and countries, particularly developing countries.

The inaugural lecture was delivered by **Ghislain de Marsily** (Emeritus Professor, University of Paris IV), who spoke about the increasing pressures on freshwater supplies and proposed some controversial measures. On a fundamental level, he argued, there is no shortage of freshwater, but the challenge is simply getting the water from where it is available to where it is needed. Water supply and food supply are intricately linked, and the more serious problem, in his view, is the availability and protection of fertile soils. If we all became vegetarian's we could significantly reduce freshwater usage, a message that seemed to fit in well in India.

The International Hydrology Prize for 2009, for outstanding contributions to hydrology, was awarded by the (now ex-) IAHS President, **Arthur Askew**, to **Keith Beven**. Receiving the prize, Keith encouraged young researchers not to get discouraged when their first papers are rejected by scientific journals, since one of his first papers was rejected by the Journal of Hydrology in 1979. He resubmitted it to the Hydrological Sciences Journal and it is now one of the most highly cited papers.

Young scientists were also encouraged to input suggestions for increasing participation in IAHS at a Young Scientists meeting at the Convention. The meeting was lively and well-attended by 27 young scientists (including 13 PhD students) who contributed many useful suggestions. A report of the meeting is at http://iahs.info/ and the suggestions will be considered by the IAHS Bureau.

The conference hosted delegates from more than 84 countries, as well as more than 100 local delegates. 600 papers were presented in 22 sessions making the joint conference the biggest Earth Sciences conference in India since the IUGG conference held in Delhi, in 1964. Among other topics covered in the sessions, downscaling and uncertainty of GCMs was reported by **P.P. Mujumdar**.
As part of the flood risk session, **Kuniyoshi Takeuchi** presented a new programme, already underway, of transferring ownership of flood forecasting to local communities.

In the groundwater surface water interactions session, **J. Delsman** presented the Netherlands Hydrological Modelling project which is a coupled surface and groundwater model for the whole of the Netherlands, produced in collaboration with many different organisations and with input from policy makers. As part of the mountain snow and ice hydrology session, investigations into the unique hydrological systems of the Canadian prairies were presented by **John Pomeroy.**

The transboundary water management session opened with discussions around the new laws for managing transboundary aquifers described by **Shaminder Puri** and **Bhanu Neupane**. Further sessions covered a diversity of topics including ecohydrology, groundwater in highly stressed aquifers, water resource management, hydroinformatics, impacts of global



change on water resources, isotope tracing, prediction in data sparse regions, sediment management, remote sensing, precipitation variability, new statistics and hydrogeology of hard rock aquifers.

The related topics of prediction in ungauged basins (PUB), prediction in data sparse regions and regionalisation were a major feature of the conference, with four sessions devoted to them, including talks, extended discussion sessions and in the case of PUB (an IAHS initiative due to conclude in 2012, see http://pub.iwmi.org) progress meetings.

Thorsten Wagener, describing regionalisation as the most challenging area in hydrology, proposed a method of catchment classification using hydrologic 'signatures' These signatures are particular characteristics of a catchment's streamflow, such as base flow index, runoff ratio, slope of flow duration curve, and so on. Having identified 5 or 6 such signatures for a number of catchments in the US, cluster analysis was then be used to obtain meaningful groupings of similar catchments, and thus enable regionalisation. **Keith Beven** in one talk described different pooling group approaches to regionalisation of rainfall runoff models, and in another presented a PUB case study. In the latter, behavioural parameter sets from three donor catchments, modelled using PDM, were obtained using GLUE. Different combinations of these parameter sets were then applied in the test catchment, and the simulated uncertainty bounds were found to encompass most of the observed streamflow.

However, PUB is still an immensely challenging area, as demonstrated by numerous contributors, including **John Pomeroy** who presented efforts to apply PUB to the Canadian Prairie Basin. The PUB benchmark report is being prepared, and a Comprehensive Theme Conclusion Symposium is planned for 2011 in Melbourne.

The third day of the conference was reserved for a field trip to Osmansagar Lake, one of Hyderabad's 530 lakes. This is a man-made lake, formed after the construction of a dam on the Isa in 1920 by Mir Osman Ali Khan, the 8th and last Nizam of Hyderabad. The area receives minimal rainfall throughout the year until the monsoon arrives (June through to September), so the lake is vital to the region in terms of water supply and flood protection. Water stored is needed for both irrigation and drinking water for the population of Hyderabad (3 686 460 according to the 2001 census) and a parallel city Secunderabad.

The need also for sustainable management of Indian groundwater resources was highlighted in **Stephen Foster**'s Special Lecture. A massive expansion from the 1970s to the 1990s of tubewells tapping shallow groundwater in hard rock terrain had provided real benefits through hunger alleviation by increasing crop yields from irrigated land. Although the yields from many tubewells are now unsustainable, encouraging case-studies of community-based groundwater management in India may allow more sustainable groundwater use to be achieved in the future.

The conference ended with **Arthur Askew** passing over the role of president to the newly elected IAHS President **Gordon Young**, and the resolve to continue to host such successful conferences into the future.

Anita Asadullah, Halcrow,*
Michaela Bray, University of Bristol,
Andrew Ireson and Piet*
Kenabatho,Imperial College*
London,
Kate Heal, University of Editburgh.*
**Contributors gratefully acknowledge travel grants provided by BHS*

New BHS Main Committee members



Claire Beloe is a Senior Groundwater and Surface Water Hydrologist with Mott MacDonald, based in Cambridge. Claire joined Mott MacDonald in 2003 having completed an MSc at Imperial College. Prior to this she worked for Veolia Water Partnership as a Water Resources Graduate. Claire has worked in water resource management and development for the past eight years, with international experience in Indonesia, Madagascar and the Ukraine. She recently undertook a two-year sabbatical, working for an international humanitarian organisation as a Water and Sanitation Manager in Madagascar and Aceh, Indonesia. Since returning to the UK, Claire's main responsibility has been managing Mott MacDonald's hydrodynamic surface water modelling component of the National Reservoir Inundation Mapping project for the Environment Agency.

Hannah Cloke is a Senior Lecturer in the Department of Geography at King's College London specialising in hydrological modelling. She has a BSc (1999) and PhD (2003) from the University of Bristol and did her postdoctoral research with the European Flood Alert System of the European Commission's Joint Research Centre. Her current research interests include climate impact on water resources, flood forecasting, streamflow generation mechanisms, large scale hydrology, flood risk communication, and sensitivity and uncertainty analysis techniques





Simon Palmer has a BSc in Geography from the University of Wales, Aberystwyth, where he specialised in glaciology, spending a term studying in the High Arctic. Simon also has an MSc in Water Resources Technology and Management from the University of Birmingham and has worked for the past four years at Peter Brett Associates as a consultant in flood risk management. His main role is undertaking hydrological and hydraulic modelling for floodplain mapping, flood risk assessments and the development of flood management schemes.

Forthcoming events

International Congress
Environmental Modelling and Software
5–8 July 2010,
Ottawa, Ontario, Canada.

The theme of the conference is "Modelling for Environment's Sake".

Web site: http://www.iemss.org/iemss2010/

BALWOIS 2010 Conference
Water Observation and Information Systems for Decision Support
25 – 29 May
Ohrid, Republic of Macedonia.

Web site: www.balwois.com/2010

2nd International Conference
Flood Recovery, Innovation and Response
26 – 28 May 2010
Milano, Italy

Web site: http://www.wessex.ac.uk/friar2010rem2e.html

Diary

11th November 2009
'The Severn Barrage Proposal'
BHS South West Section
Time: 2pm
Venue: Bristol University
Contact: jturner@southwestwater.co.uk (01392 443647)

24th November 2009
'Lakes and Reservoirs: hydro-morphology and ecology'.
BHS / Scottish Hydrological Group
Venue: Thistle St James' Hotel, Edinburgh
Contact: Andrew Black (a.z.black@dundee.ac.uk; 01382 309103)

14th January 2010
'Bridging troubled waters: hydrology and planning'
BHS Pennines Section
Time: 10.00
Venue: Liverpool University
Contact: Neil MacDonald (0151 794 2510)

12-14 January 2010
Water and Risk Workshop
Organised by Durham University
Venue: Durham University
Contact: Sim Reaney (0191 334 3480) or www.dur.ac.uk/water.risk

20th January 2010
'Climate change projections for hydrological applications: what UKCP09 can and can't do'
Scottish Hydrological Group
Venue: Royal Society of Edinburgh
Time:18:30
Contact: Paul Hart (0141 222 5960)

21st January 2010
'Geohydrology issues in South East England, current studies and future outcomes'
BHS south East Region
Time: 18.30
Contact: Helen Proctor (01372 756478)

13th February 2010
Some New Perspectives on Climate Change
Joint BHS/Royal Meteorological Society meeting.
Venue: TBA (London)
Contacr: Claire Walsh

18th February 2010
'Remote Sensing and Flood Mapping'
BHS South West Region
Time: 14.00

Euromediterranean Network of Experimental and Representative Basins 13th Biennial Conference
Hydrological Responses of Small Basins to a changing environment
5 – 8 September 2010
Seggau Castle, Austria

Contact: erb2010@boku.ac.at
web: http://erb2010.boku.ac.at

And finally, don't forget...

BHS Third International Symposium
Newcastle University
19–23 July 2010

Use the link on the BHS web site under Meetings & Events for more information

Copy deadline for Circulation No. 104 18th January 2010