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THE NEWSLETTER OF THE BRITISH HYDROLOGICAL SOCIETY

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Flood issues in Scotland

Station Hotel, Perth
15 December 1998

A one-day seminar was organised jointly by the Scottish Environment Protection Agency (SEPA) and the Convention of Scottish Local Authorities (COSLA), in conjunction with the Association of British Insurers (ABI), to bring together the key practitioners with an interest in flood issues in Scotland. The aim was to clarify roles, set out the extent and nature of the various responsibilities, exchange best practice and explore opportunities for cooperation, collaboration and sharing of resources.

Flood risk assessment

The first session, on flood risk assessment in Scotland, was chaired by **James Curran** (SEPA), who introduced the Memorandum of Understanding (MoU) between SEPA and COSLA and explained how this related to flood issues. The first paper, presented by **Nick Evans** (Scottish Office), described National Planning Policy Guideline No. 7 (NPPG 7). Nick explained that flood risk was the underlying theme behind its production, and the guidelines were aimed at raising awareness amongst planners, developers and the public. It



Intrepid explorers in Perth, January 1993

has two core policies: avoid granting planning permission on land that will flood, and build flooding into all local authorities' structure and local plans.

Ian Snodgrass (Renfrewshire Council) gave a Local Authority's perspective on NPPG 7. Renfrewshire Council has established Flood Appraisal Groups following the advice given in the guidelines, and Ian explained that, in his experience, these groups have been necessary to establish cooperation between the interested parties on such matters as flood warning systems, flood prevention schemes and development plans.

During the first question session, **Bob Sargent** (SEPA) asked whether the Flood Appraisal Groups Ian's Council have established had considered policies on restricting surface runoff from new developments. Ian said that the Water Authorities are moving in that direction and have raised the issue of limiting the water they accept into sewers. Councils will look at alternative solutions to this when planning new developments.

Ian Fox (SEPA) continued with a presentation under the same theme by introducing SEPA's Flood Risk Assessment Strategy. SEPA's strategy (Policy No. 22) has been drawn up in response to the responsibilities it holds under the Environment Act (1995) to assess the risk of flooding in Scotland and to provide Local Authorities with advice on flood risk based on the information that it holds. Ian detailed a number of strategic commitments that the policy outlines, but he stated that the strategy is demanding on resources and it would be sensible for SEPA to explore partnership opportunities with other organisations with an interest in flood risk assessment.

Veronica Jones (National Development Planning Manager, Environment Agency) gave an English and Welsh perspective on flood risk and land use planning. She explained that the Environment Agency aims to reduce the risk of flooding in any new developments by having an effective input to the planning system, raising awareness and understanding of the risks. One of their actions is to provide floodplain maps to local planning authorities, and in particular to provide "Best Indicative Floodplain Maps" by September 1999.

The issue of flood risk maps was raised by several delegates. **Neil Deasley** (Clackmannanshire Council) asked whether the Agency had experienced any problems in defining flood risk areas on maps, **Councillor Gordon McDonald** (Moray Council) noted that they had been advised *not* to place flood risk zones on maps, following legal advice; **Roland Bean** (Perth and Kinross Council) suggested that the main issue with flood risk maps is the question of what return periods to use. Veronica noted the first question and said that on the whole Local Authorities are very positive about including Environment Agency information (whether on a flood map or in supplementary planning guidance) and suggested that it gave people an understanding of the flood risk they are dealing with. Ian Fox concurred and indicated that where SEPA has information this is far better than no information at all, although even if SEPA could define exactly where a 1-in-100-year flood line was now, he suggested that it might not be in the same place in ten years' time.

Flood warning

Bob Sargent chaired the second session, which was aimed at demonstrating the role of various organisations in flood warning. He reflected that flood warning was a cost-effective way of flood management, given that we already have many developments in flood risk areas.

In the first paper, **Richard Brown** (SEPA) illustrated SEPA's role in flood warning in Scotland. Flood warning schemes in Scotland have been established to meet local needs, but, on the whole, are run in partnership with the Police and Local Authorities. Using its hydrometric network, SEPA receives alarms via telemetry, monitors rising river levels and uses flood forecasting models to predict the likely progression of flood events. Information and warnings are then passed onto the Police and Council's emergency planning officers, who, in most instances, are responsible for disseminating warnings to the public.

Sergeant Callum Scott (Northern Constabulary) continued the theme by discussing the role of the Police in flood warning. Sergeant Scott introduced the recently agreed MoU between SEPA and the Association of Chief Police Officers In Scotland (ACPOS) which provides a framework to achieve the best coordinated response from participating authorities during a flood event. It outlined that the Police Authorities are responsible for disseminating flood warnings in Scotland and would coordinate responses during the emergency phase. The Police recognised that SEPA does not have the resources at present to disseminate flood warnings to the public directly; however, they do hold the long term view that SEPA should mirror the level of responsibilities, particularly in terms of notification, that exist in England and Wales.

The role of the Local Authority emergency planners in flood warning was outlined by **Bill Maddox** (Perth and Kinross Council). Following flood warnings from SEPA the emergency planner instigates the Integrated Emergency Management aimed at a coordinated response to a flood, as it is recognised that no single organisation could cope with an emergency on its own. As well as coordinating Council services, Water Authorities etc., emergency planners also need to make the flood warnings they receive from SEPA useful to the authorities who are responding to a flood event. Bill Maddox praised the flood warning service in that it provides advanced warning of floods and real time information on river levels. However, he also stated that there were problems with the service as there is little consistency throughout Scotland in



Flooding in Perth, 17 January 1993

terms of standardisation and types of warning. Also in relying on the Police to distribute flood warnings, there may be delays in dissemination caused by other non-flood emergency situations and finite Police resources.

In discussion, **Tom Walker** (Scottish Borders Council) praised the role that SEPA has in flood warning but wondered if the Local Authorities should lobby for its role to become a duty (rather than a power) so that they can have confidence that the service will still be there in the future. Bob Sargent stated that it would be difficult to have a duty for flood warning as it is not always technically possible to provide warnings to many areas because the lead time is too short. **Campbell McDonald** (Scottish Hydro-Electric) asked if there are plans to harmonise flood warning systems as they receive different types of warnings from different offices. Ian Fox stated that SEPA's Flood Warning Strategy raises the possibility of harmonising on the types of warnings across Scotland (similar to the system adopted in England and Wales); however, SEPA needs to be sure that this will not detract from the level of services currently provided.

Flood alleviation

The third session, chaired by **Tim Stone** (COSLA), focused on the recent flood prevention legislation that impacts on Local Authorities in Scotland. **Alan Burdekin** (Scottish Office) introduced the background to the Flood Prevention and Land Drainage (Scotland) Act, 1997 and how this placed new duties on the Local Authorities which previously existed only as discretionary powers under the Flood Prevention (Scotland) Act, 1961. The act requires Local Authorities to assess watercourses, exercise powers of maintenance (if this will reduce the likelihood of flooding) and prevent flooding of non-agricultural land.

Sandy Ritchie (Moray Council) presented a Council view of the recent legislation and stated that the Moray floods of June 1997 strengthened the Council's need to implement the act, especially by recognising that it was not just the large rivers that caused flooding but smaller watercourses as well. Moray Council has undergone a programme of assessment and maintenance of watercourses and has included policies on flooding in its draft development plan. The Council has also established a flood prevention working party which considers development plans, maintenance work and emergency planning issues.

Andrew Black (University of Dundee) asked Sandy Ritchie whether it is the Council's policy to consider the definition of flood risk defined in terms of a return period, or if it discouraged development when there is knowledge of flooding, irrespective of a return period. Sandy stated that in respect of flood prevention schemes, the Scottish Office would be seeking a minimum standard of a 1 in 100 year return period. Also, there needs to be some financial benefit demonstrated in terms of our responsibility to Council members as to why we should require a higher standard than the 100 year level. **Peter Pollard** (Scottish Wildlife Trust) queried whether any Local Authorities have considered restoring natural catchment floodplains as flood storage. Sandy Ritchie stated that Moray Council sees soft engineering approaches as extremely useful and cost beneficial and has encouraged this approach in commissioned studies.

Discussion

The closing discussion gave **David Crichton** (Association of British Insurers) an opportunity to discuss Flood Appraisal Groups, NPPG 7 and the Insurance industry's perspective. He welcomed the opportunity for delegates to participate in a general discussion of flood issues in Scotland. David stated that the Insurance industry is genuinely concerned about climate change. The effect of this may be that some developments could become uninsurable in 50 years time.

David's paper covered many topics including insurance and flood damage costs, planning issues, urban drainage systems, flood mapping and a suggested template for flood policy. In conclusion, David asked the delegates to consider:

- Establishing Flood Appraisal Groups on a catchment basis (rather than on administrative boundaries);
- Listening to SEPA's hydrological advice and involving the emergency planners;
- Not placing too much reliance on flood defences;
- Minimising flood risk by avoiding development in hazardous areas;
- Raising the awareness of flood risk for people living in hazardous areas.

Ruth Rush (SEPA) asked whether the inability to insure a future development will affect planning consent. David Crichton replied that, while this threat has certainly affected decisions, he was not aware of this being the case. However, one participant was keen to point out that generally the person who built the house was not the same one who ends up living there, to which David noted that the building society might refuse a mortgage on the grounds of an unacceptable flood risk.

Seminar proceedings

If you are interested in obtaining a full copy of the seminar proceedings please contact the authors for details (tel 01738 627989, email michael.cranston or david.faichney@sepa.org.uk).

Michael Cranston and David Faichney
(SEPA East Region, Perth Office)

BHS Life membership

For the one-off sum of £400 we are now able to guarantee (as well as any such society or charity can) that you will be looked after for life as well as any other annual member!

All that our Secretary, **Richard Howard** at the Institution of Civil Engineers (email howard_r@ice.org.uk) needs is your full name and title, address for correspondence, date of birth, sex, academic and professional qualifications (and honours, if any), existing BHS membership number (if any), and any other existing ICE membership number.

If paying by credit card (from the limited choice of Visa or Mastercard), he needs the card number and expiry date, the account address (if different from the applicant's address for correspondence) and a statement authorising the collection of £400.

If paying by cheque, it must be in Sterling, drawn on a British bank, payable to *The Institution of Civil Engineers*, and mailed to BHS, 1 Great George Street, Westminster, London SW1P 3AA, United Kingdom.

Optional extras for inclusion in our Members Handbook are your employment and your hydrological specialities or interests.

It is worth noting that institutional payments for BHS life membership on behalf of an individual are acceptable (if they are permitted by the paying organisation of course!).

Life membership might appeal at different times in a career and for different reasons. This has been set up now after a suggestion from a member overseas, but the committee hopes that others may also find it helpful.

Frank M. Law
President, BHS

Climate and water

2nd international conference Espoo, Finland 17-20 August 1998

Organised and hosted by the Helsinki University of Technology, the 2nd International Conference on Climate and Water followed the success of the First Conference held in 1989 and attracted almost 200 papers, presented by delegates from 67 different countries.

The opening address by **Professor Obasi** (WMO Secretary-General) highlighted the need to reverse the growing trend of national hydrometric network decline, facilitate the international exchange of hydrological and related data and products, intensify consideration of climatic impacts at the spatial level of a river basin, and ensure that climate-water issues are adequately addressed.

The conference centred around three main themes: *1* Uncertainties of climate change — a hydrological perspective, *2* Impacts of climate variability and change, and *3* Beneficial impacts and losses for water resources and water management as a result of climate change. These were followed by round-table sessions discussing research/water policy and education/training issues. The subject areas encompassed in the themes were:

1
- Scale issues: global to mesoscale and then to local;
- Water resources research and management;
- From global scenarios to local hydrology.

2
- Extreme events: diagnostic tools, simulation/forecasting, floods, droughts, storms and temperature extremes;
- Ecosystem impacts: aquatic and terrestrial ecosystems, lake studies;
- Hydrology and the atmosphere;
- Water balance of large river basins;
- Case studies from across the world;
- Detecting changes using historical records: palaeontological/ climatological, hydrological balance, runoff, ice and snow.

3
- Global perspectives and ENSO;
- Adaptation strategies;
- Country and case studies.

Many of these studies were based on specific rivers, catchments or nations. Problems identified by many delegates concerned spatial scale and uncertainty in the application of GCM scenarios to hydrological studies, leading to the suggestion that a more detailed evaluation of existing long-term records and a consideration of the trends and variability in them might be more valuable. The abundance of results from the case studies presented could also provide an excellent basis for work if these results were amalgamated more coherently.

There were several presentations originating from British institutions which might interest *Circulation* readers. In theme 1, work by **Skellern, Kneale** and **Kirby** (University of Leeds) used climate scenarios for the last 9000 years to forecast global peat distributions and depths, commenting on problems arising from the accuracy and lumping of data in coarse global digital elevation models (DEMs). **Colin Clark** (CHRS) considered potential impacts of climate-induced evaporation changes on water resources in south-west England. **Sarah Dunn** (Macaulay Land Use Research Institute) described a distributed hydrological model aimed at exploring the effects of altered snow regimes for the headwaters of the River Dee in Scotland.

Theme 2 was a popular subject area, with more papers than 1 and 3 put together. **S. Hughes** (University College of North Wales, Bangor) considered the effects of natural and simulated summer droughts on sulphate and dissolved organic carbon in peatland, finding a significant decrease in the natural summer DOC peaks and an increase in natural autumn/winter sulphate peaks in peat water. **Nick Reynard** (Institute of Hydrology) described the application of climate and land-use scenarios to a semi-distributed rainfall-runoff model in order to evaluate the impacts of climate change on the flood characteristics of the River Severn. Results predicted the magnitude and frequency of flood events would rise, and suggested that land-use changes would have less impact on flow regime than climate change. **David Collins** (University of Oxford) described rainfall-induced flood events in a glacierised Alpine basin (Gornera, Switzerland) during warm summers, highlighting the influence of the snow-free fraction of the basin, determined by the interaction of the transient snowline with basin hypsometry. **Michael Steel** (University of Dundee) evaluated recent flooding in Scottish rivers, using historical rainfall series to simulate peak flow series for eleven of them. Results suggested that catchments in the west have recently experienced their highest frequencies and magnitudes of flooding since rainfall records began (in 1885), with a concentration of events in winter, often partly generated by snowmelt.

Robert Malcolm (University of Aberdeen) used groundwater modelling techniques to examine the possible effects of climate change on the ecology and geomorphology of a coastal dune slack in north-east Scotland. Changes in groundwater elevations were shown to influence the spatial distribution of the plant communities and the geomorphic stability of the system. **Chris Collier** (University of Salford) discussed the use of satellite data to couple meteorological and hydrological models by aggregating surface fluxes for the more reliable weather prediction and climate models, and providing a means of disaggregating model convective rainfall for input into high resolution hydrological models.

Mike Edmunds (British Geological Survey) described the potential for coastal groundwaters to be used as archives of Holocene and late-Pleistocene climatic and environmental conditions in Europe, by providing evidence of former deeper circulation during periods of lowered sea level and/or ice cover. **Alan Werritty** (University of Dundee) presented recent work by himself and **Miranda Foster** (formerly University of Dundee), studying trends in rainfall and river flow across Scotland. He described the relatively 'flood-rich' 1980s and early 1990s and the intensification of the east-west climatic gradient, linking these changes to variations in atmospheric circulation over the Atlantic.

In theme (3), **Chris Kilsby** and colleagues (University of Newcastle upon Tyne) addressed the problems of hydrological process modelling across a range of scales, describing a method of rainfall downscaling from GCM output using GCM atmospheric circulation variables, and a system of 'upscaling with a physical basis' (UP) for large-scale hydrological modelling. Finally, **Adebayo Adeloye** (Heriot-Watt University) discussed the sensitivity of the storage-yield of multiple reservoirs (in England and Iran) to climate-change-induced variations in reservoir surface evaporation and rainfall fluxes. Perturbing baseline conditions using climate change scenarios produced different impacts at high and low yields for both systems.

The hospitality of our Finnish hosts was very impressive, and we were lucky enough to visit the Helsinki wastewater treatment plant, which (according to an Environment Agency representative) smelt more fishy than its British equivalent! Yet despite that technical excursion, I am very grateful to the BHS for a travel grant, which made my attendance possible.

Michael Steel (Geography Department, University of Dundee)

A further report on the BHS Exeter conference

I am grateful to the BHS for a student travel grant towards the costs of attending the BHS international conference at the University of Exeter 6-10 July 1998. In my opinion, this meeting was one of the most exciting that I have been to.

I attended for the whole week, but my main interest was in Theme 3, Groundwater at risk, and we presented a paper under this theme. The first two sessions on 9th July were chaired by Dr Paul Younger (Newcastle University). Prof. Ken Rushton (Birmingham University) started with an excellent keynote paper, describing why it is difficult to identify situations when groundwater is at risk. He presented some of the challenges and case studies faced by groundwater scientists all over the world. He also warned hydrologists about modelling, asking them to guard against the ill-informed application of models.

The other papers covered aspects of groundwater risks, such as the future sustainability of groundwater resources, groundwater pollution, anthropogenic influences of groundwater resources and groundwater uses in various parts of the UK and overseas.

The second two sessions, chaired by Bob Harris (Environment Agency), included a number of case examples relating to groundwater vulnerability, protection and environmental aspects in different parts of the world. Among these I especially enjoyed Dr Bari's presentation about groundwater vulnerability to pesticide leaching in Northwest Bangladesh.

In the first two sessions on 10th July, case studies were presented from various third-world countries. Dr M. Hoque evaluated the groundwater conditions of Dhaka City, Bangladesh. M. Assaduzzaman presented a successful case study of a huge amount of groundwater abstraction from Northwest Bangladesh (Barind) for an irrigation project. Dr Burgess (University College London) described the limits on the sustainability of groundwater development of both the Dhaka and Barind aquifers. He stressed the importance of continuous monitoring, which is absent at the moment. His presentation was very well received by the audience. I was a co-author of that paper and the discussion about various issues in it helped me a lot. I benefited from the conference in other ways too: the other presentations gave me an insight into related problems, and I was able to meet many leading authorities in the groundwater field and discuss my research with them.

The symposium was very well organised, and the conference centre at Exeter University was very picturesque with its green open spaces, and very beautiful. The meeting covered a wide range of the various fields of hydrology. The conference banquet, social events and other evening functions were fantastic, and I enjoyed the conference very much.

M. Kamrul Hasan
PhD student, Dept of Geological Sciences, University College London

New CEH director appointed

Professor Mike Roberts is to be the new Director of the Centre for Ecology and Hydrology, the grouping within NERC that includes the Institute of Hydrology. Mike has been Director of the Institute of Terrestrial Ecology for the last ten years. His personal research interests cover the ecological effects of air pollution, contaminated land and land use change; he also manages a wide range of research projects in land use, conservation of biodiversity and environmental pollution. He is the Chairman of the UK 'Man and the Biosphere' Committee.

Mike will take over from **Professor Brian Wilkinson**, who is retiring at the end of March. Brian came into the NERC fold from Cranfield University to be IH's second Director in 1988; before that he was with the Water Research Centre. He is the government's hydrological adviser and the UK representative to WMO on hydrological affairs. Brian also has many important committee obligations, working for the advancement of environmental science. His achievements through the major NERC science programmes, such as TIGER, LOIS and URGENT, are nicely augmented by the current construction of enhanced permanent facilities for the Institute on its Wallingford campus.

Frank Law

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BOOKS

New IH evaporation report

Modelling evaporation from plant canopies, IH Report No. 132 by J. D. Cain, Institute of Hydrology, 1998, 50 pp. Price £18. ISBN 0 948540 85 0.

This report presents an extremely thorough review of the evaporation research topic that will be of interest both to practising hydrologists wishing to catch up with recent research developments, and to students who are new to the subject.

The first section of the report is concerned with a review of general methods, and provides an up-to-date description of the underlying methods in a similar fashion to good textbook treatments of the subject. This section would make an excellent reference for undergraduate students. In recognition of the fact that the Penman-Monteith equation predominates in evaporation research, and indeed has recently been adopted by FAO as their recommended method, the next two sections present an in-depth review of methods used to determine canopy and aerodynamic resistances. Modifications to the standard Penman-Monteith equations, to address multiple layers and sparse canopies, are also discussed.

Sources of experimentally derived Penman-Monteith equation variables are presented for specific common UK crop types, such as cereals, before attention turns to the specific problem of modelling forest evaporation. There is first a detailed description of the characteristics of forest evaporation is presented, followed by a review of interception models, followed in turn by a description of the different methods of estimating the canopy resistance, leaf area index and aerodynamic resistance transpiration terms. The distinct effects of altitude on evaporation are also briefly covered in a section on evaporation from highland grass.

Finally, the topical issue of scaling is tackled, with a review of current land surface evaporation scaling research, which can broadly be categorised into effective parameter and distributed modelling approaches.

This welcome report will certainly be on our Hydrology MSc core reading list alongside **Jim Shuttleworth**'s IH report on *Evaporation* (IH Report No. 56), which provides a complementary summary of the principles of evaporation physics.

Matthew Lees
Imperial College, London

Forgotten flows of the River Severn: 1672 & 1770

Many a member of a hydrometry team out in the Severn/Wye floods last autumn will have a fellow-feeling for this early colleague. (Indeed do you know of an earlier employee in our profession in this country — excluding climatologists of course?) The quote is preserved by William Marriott in the *Quarterly Journal of the Royal Meteorological Society* Vol **XII** (1886), but he states that he is quoting Berrow's *Worcester Journal*, one of the country's earliest newspapers. Naturally the flood was at night at the weekend!

"1770, November: The excessive rains occasioned an extraordinary overflow of the rivers Severn, [Warwickshire] Avon, Teme, etc., and a most alarming flood ensued, being the highest and most extensive ever known in these parts. In order that it might be known how much the present flood exceeded that of 1672, the Dean [of Worcester] engaged a proper person to watch the rise of water against the wall, and to observe its utmost reach, which, it seems, was about two o'clock last Sunday morning, when it rose ten inches above the high water mark of the year 1672."

Frank Law

News from members

We welcome **Dr John Sutcliffe** as an Honorary Member of BHS, in recognition of his contribution to hydrology in Britain and overseas.

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Congratulations to **David Collins**, who is now a Professor in the Geography Department at Salford University. David is still spending one day a week at the School of Geography in Oxford.

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Graeme Boyce has moved west from Exeter to the Environment Agency's office in Bodmin. He has now been joined there by **Stephen Marks**, who recently left the Institute of Hydrology Plynlimon office in mid-Wales.

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Rob Scarrott has been seconded from Sir William Halcrow & Partners to the Water Resources and Environment Department at Southern Water in Crawley for three months, ending in March.

Members list & handbook

The 1998-99 BHS main committee list is now being issued to replace last year's list. On the back are details of other committees and sub-committees, including a Meetings sub-committee to coordinate the programme of National, regional and collaborative meetings: **Peter Walsh** (chair), **Steve Parsons** and **Howard Wheater**.

This sheet will replace pages **i** and **ii** of the Members Handbook.

Because there were some errors in the List of Members issued last year, there will be an update later this year. Please tell **Richard Howard** (see front page) of any errors in the list, so that they may be included.

Hydrological Research in the UK 1995-99

Celia Kirby is producing a reference booklet listing current research projects in the UK. This will be published as a BHS Occasional Paper, in time for the IUGG meeting at Birmingham in July.

If your organisation or department has not been approached and would like to be included, please contact Celia at the Institute of Hydrology (tel. 01491 692460, email ck@mail.nwl.ac.uk).

To make it easy for you to provide input there is a template document on the BHS web site, which you can fill in and send by email.

Travel grants

Travel grants of up to £200 are available to help members whose travel expenses are not met by an employer to attend scientific meetings. The BHS committee has allocated a budget of £2000 for the coming year. The scheme is primarily intended to help younger members, who will be given priority, but it is open to all. Successful applicants will be expected to produce a short report for *Circulation*. Applications should be received by *31 March 1999* for the coming year's awards.

Anyone wishing to apply for money from the Exeter Fund or a BHS travel grant should contact the Hon. Treasurer, **Terry Evans** *(Tel. 01353 862723, email TEEVANS100@AOL.com)*

EGS membership & journals

The European Geophysical Society is a pan-European, international scientific society for the promotion of the physics of the earth and its environment as well as planetary and space sciences.

BHS members can join the Society and subscribe to EGS journals at reduced rates. Members benefit from a quarterly bulletin of news and articles, greatly reduced subscription rates to 11 refereed journals, 30-35% discount on all books published by EGS, reduced registration costs at EGS general assemblies and other meetings and the right to participate in all the society's activities.

As BHS is affiliated to EGS, the annual subscription is 40 DEM (£16.80 if paying by Sterling cheque).

Journals include *Hydrology and Earth Systems Science* (quarterly, 180 DEM per annum), *Annales Geophysicae* (monthly, 170 DEM p.a.), *Climate Dynamics* (monthly, 120 DEM p.a.) and thematic issues of *Physics and Chemistry of the Earth* (Part B covering *Hydrology, oceans and atmosphere* is 190 DEM p.a.).

In fact *Hydrology and Earth Systems Science*, edited by former IH Director Dr Jim McCulloch, is available at the member's subscription rate above to ***any member of a hydrological society***, whether you subscribe to EGS or not.

Full details may be obtained from the EGS office at Max-Planck-Str. 13, D-37191 Katlenburg-Lindau, Germany, or on the EGS web site at http://www.copernicus.org/EGS/EGS.html

Independent consultants

Every year the British Hydrological Society publishes, for the convenience of members, a register of independent consultants which is circulated with *Circulation*. Anyone who would like to be included in the next register should contact Terry Evans, Honorary Treasurer BHS *(Tel. 01353 862723, email TEEVANS100@AOL.com)*.

Publications received

Water in the Netherlands

The Netherlands Hydrological Society and the Netherlands National Committee of IAHS have published an attractive 185-page book (in English) on the hydrology and water resources of the Netherlands. It includes colour maps, photographs and tables and is a fascinating picture of a country which water and water engineering have done so much to shape. The price is 45 Guilders and copies (or further information) may be obtained from Ir. G. van Ee, NHV, p/a Grontmij (kantoor Dijnselburg), Postbus 203, NL 3730 AE De Bilt, The Netherlands (tel. 030 699 96 39, fax 030 699 00 61).

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IHP documents from UNESCO

These are now in the IH library:

Monitoring for groundwater management in (semi-)arid regions by Henny A J van Lanen (Wageningen), Studies and reports in hydrology No. 57.

Soil and groundwater pollution from agricultural activities (learning material), IHP-V Technical document No. 19, and

Ecohydrology: a list of scientific activities of IHP-V projects 2.3/2.4, (edited by Zelewski and McClain), No. 21.

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Risk to aquifers from de-icing and dust-binding chemicals

The Nordic Hydrological Programme has brought out NHP report No. 43, the proceedings of a symposium in Helsinki last October. The subject, as part of the programme "Groundwater resources at risk" was the particular risk from chemicals used on roads and airports in the winter. This is available in the IH library or on inter-library loan. The ISBN is 952 11 0348 5.

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Water Lines — a new look

This well-established magazine featuring appropriate technologies for water supply and sanitation, published by *Intermediate Technology Publications*, has been re-vamped to give it a modern 'image' and a more pro-active interface with its readers. This is being achieved by using more contributions from people working in the field with the aid agencies. The overall aim is to make this a highly practical publication with wide appeal. Certainly, it makes a refreshing break from some of the scholarly publications which form the bulk of our Library acquisitions and (as I can testify, through finding it in offices in not so well-endowed organisations abroad) it is achieving a broad distribution. Long may that continue.

Celia Kirby

New members

We welcome the following members to the Society:

John J Aston ..... Dept of Civil & Environ. Engineering, Imperial College
Brian A Cox ..... Dept of Geography, University of Reading
Brian B Darling..... WS Atkins
Liam Foster ..... Dept of Civil Engineering, University of Birmingham
Richard Hodgkins ..... Dept of Geography, Royal Holloway, University of London
Martin H Hollingham ..... Centre for Arid Zone Studies, University of Wales
Demetris F Lekkas ..... Dept of Civil & Environ. Engineering, Imperial College
James G O'Brien ..... Monson & Locks
Annabel Ross-Jones ..... Occupational Health, BBC TV Centre, London
Vladimir Y Smakhtik ..... Institute for Water Research, Rhodes University, South Africa
Barrington D Underwood ..... Weston-Super-Mare, Somerset
Thorsten Wagener ..... Dept of Civil & Environ. Engineering, Imperial College
Dawson Wray ..... Rivers Agency, Belfast, Northern Ireland

FORTHCOMING EVENTS

Meetings

Call for papers/posters
IGU STUDY GROUP ON ENVIRONMENTAL CHANGE AND EXTREME HYDROLOGICAL EVENTS
Aberystwyth, UK
27 June – 3 July 1999

Following the objectives established at the first conference in Lisbon, August, 1998, this second conference aims to increase understanding of the effects of atmospheric and land surface change on the frequency and severity of extreme hydrological events, notably floods and droughts.

Papers and posters are invited on the following principal objectives:

1 To establish current and future frequency-magnitude distributions and variability in hydrologic events and relate these to environmental change at appropriate spatial scales (emphasising physical processes linking extreme events and environmental change).
2 To improve process-based modelling of the effects of changes in land surface properties due to land-use change, urbanisation and agricultural practices on runoff and soil moisture regimes (including specific processes and integrated modelling).
3 To develop techniques for matching the spatial scales of GCM climate change predictions and physically-based rainfall-runoff simulation models, which may involve both downscaling and upscaling.
4 To improve understanding and prediction of the impacts of extreme hydrological events.

For further information contact: Dr Tony Jones, University of Wales, Aberystwyth (email jaj@aber.ac.uk) or Professor Ming-ko Woo, McMaster University, Hamilton, Ontario (email woo@McMaster.ca).

Call for papers / posters
European Geophysical Society
Vening Meinesz Conference on GLOBAL AND REGIONAL SEA-LEVEL CHANGES AND THE HYDROLOGICAL CYCLE
Loiri-Porto San Paolo, Sardinia, Italy
4-7 October 1999

This conference will discuss the present state of knowledge of sea-level variability in relation to the hydrological cycle, at global and regional scales, and aims to identify and investigate the problem areas and key parameters for improving our understanding of the physical phenomena and their interaction.

On 7 October there will be a workshop on monitoring sea level.

Please submit a notification of interest with a tentative title of any paper or poster by **1 March 1999,**

followed by an abstract in accordance to the EGS style and layout by **30 June 1999**.

Registration fees are payable by **15 June 1999**: participant EUR 135; accompanying person EUR 45; student EUR 90.

Accommodation (to be booked by **15 June 1999** will cost (full board) EUR 95 per day.

Further details are available from the EGS office, Max-Planck-Str. 13, D-37191 Katlenburg-Lindau, Germany (tel +49 5556 1440, fax +49 5556 4709, email egs@copernicus.org) or from the conference web site at http://www.copernicus.org/EGS/conference/vmc1/cover.htm

Advance notice of 2-day conference on HYDROLOGY IN SCOTLAND: AGENDA FOR THE 21ST CENTURY 22-23 March 2000 University of Dundee

This major two-day conference is sponsored by the British Hydrological Society, the ICE Scottish Hydrological Group and the Royal Scottish Geographical Society. It will bring together hydrologists from all disciplines and backgrounds to focus on hydrology in Scotland beyond the millennium.

Its remit is to identify the latest important scientific advances, to consider resource management and policy needs for the future, and to establish a consensus regarding the scientific challenges to be prioritised in the new century.

Much has changed since the first *Hydrology in Scotland* symposium, held in 1986 at the Royal Society of Edinburgh. Key issues to be explored include hydrological aspects of:

- Climatic change
- Land use change
- Water resource management
- Regulatory and administrative change
- Hydrological sensitivity of ecosystems
- Policy development and research agendas

All oral papers will be given by respected invited speakers. These papers will be issued to delegates in written form at the symposium, and subsequently published in a journal special issue. Poster papers will be invited in the coming months, via a First Circular to BHS members and others. A web site has now been created, and will carry details of the programme as details are confirmed – see http://www.dundee.ac.uk/geography/hydrolinscot/

Offers of posters, sponsorship enquiries and general enquiries should be addressed to: *Hydrology in Scotland 2000*, Geography Department, University of Dundee, Dundee, DD1 4HN *(Tel 01382 344433)*.

Diary

10th February 1999
Welsh Hydrological Group meeting
"Ten years after water privatisation — better or worse?"
Venue: Old Course Hotel, Chepstow
Time: 5.30 for 6 p.m.
Contact: Steve Taylor *(tel 01222 770088, fax 01222 362 094, E-mail steve.f.taylor@environment-agency.gov.uk)*

17th February 1999
BHS Southern Section meeting
"The EU Habitats Directive: designation and implications"
Venue: Imperial College, London
Time: 17.30 (tea at 17.00)
Contact: Dr Adrian Butler, Dept of Civil Engineering, Imperial College, London *(Tel 0171 594 6122, Fax 0171 594 6124, e-mail a.butler@ic.ac.uk)*

17th February 1999
BHS Pennines Hydrological Group
"Hydrological impacts of climate change"
Venue: Room 10, Canalside West Building, University of Huddersfield
Time: 13.00 Cost: £3.50 (students free)
Contact: Dr Kevin Tilford, Dept of Civil & Environ. Engineering, University of Salford, Manchester M5 4WT *(Tel 0161 295 3458, Fax 0161 295 5060, e-mail k.a.tilford@civils.salford.ac.uk)*

22nd February 1999
BHS National Meeting + Geol. Soc.
"Modelling groundwater - surface water interactions — ecology, low flows and wetlands" — *(all day meeting)*
Venue: ICE, 1 Great George St, London
Contact: Mike Acreman *(Tel 01491 838800, Fax: 01491 692424, e-mail m.acreman@mail.nwl.ac.uk)*

24th February 1999
BHS Midlands Section half-day meeting
"Groundwater modelling, featuring the West Midlands Model"
Venue: School of Earth Sciences, University of Birmingham
Time: 14.00 (coffee from 13.30)
Contact: Richard Boak *(Tel 01743 231793, email: watman_uk@compuserve.com)*

25th February 1999
Scottish Hydrological Group meeting
"Hydrological influences on aquatic habitats in Scotland: modelling approaches" — Dr Chris Soulsby (University of Aberdeen)
Venue: Lecture Theatre A1, Cottrell Building, University of Stirling
Time: 6.30 p.m. (tea 6 p.m.)
Contact: Andrew Folkard *(tel 0141 548 3280, fax 0141 553 2066, email a.m.folkard @strath.ac.uk)*

17th March 1999
Day conference: Strategic and Policy issues arising from the Easter 1998 floods
Venue: ICE, Great George St, London
Time: 10.00 to 17.00
Cost: £170 (students £70) plus VAT
Book by **3 March** with Liane Otten *(fax 0171 233 1743, email OTTEN_L@ice.org.uk)*

17th March 1999
BHS Southern Section meeting
"Innovative techniques for flood investigation: the Galway experience"
Venue: Imperial College, London
Time: 17.30 (tea at 17.00)
Contact: Dr Adrian Butler *(as above)*

29th March 1999
Scottish Hydrol. Group + Geol. Soc.
"Celtic hydrogeology and the era of integrated catchment management"
Venue: University of Strathclyde
Time: 09.30
Contact: Andrew Folkard *(as above)*

29th – 30th March 1999
BHS Postgraduate Symposium
Venue: University of Bristol
Time: from 12.30 on 29th
Contact: Dr Dawei Han *(Tel. 0117 928 7793, Fax 0117 928 7783, e-mail d.han@bristol.ac.uk)*

9th April 1999
Welsh Hydrological Group field visit
"Hydrological aspects of the National Botanical Gardens, Cardiff"
Venue: The National Botanical Gardens
Contact: Steve Taylor *(tel 01222 770088, fax 01222 362 094)*

9th April 1999
BHS National Meeting (full day)
"The 1998 floods in England & Wales"
Venue: University of Birmingham
Contact: John Adams *(tel 0115 945 5722, fax 0115 981 7743)*

21st April 1999
Scottish Hydrol. Group + Geol. Soc.
"Water Framework Directive"
Contact: Andrew Folkard *(as above)*

5th May 1999
BHS Southern Section meeting
"Where's the next drop coming from? water resource planning for south-east England"
Venue: Imperial College, London
Time: 17.30 (tea at 17.00)
Contact: Dr Adrian Butler *(as above)*

19th May 1999
BHS Pennines Hydrological Group AGM
"The Flood Estimation Handbook"
Venue: Yorkshire Museum, York
Time: 13.00
Contact: Dr Kevin Tilford *(details above)*

19th – 30th July 1999
IUGG Assembly + BHS/IAHS meetings
Venue: Birmingham, UK
Contact: Dr Gordon Young *(Fax +1 519 8460968, email 44iahs@mach1.wlu.ca, web http://www.wlu.ca/~wwwiahs/index.html)*

15th September 1999
BHS Annual General Meeting + visit
"The Thames barrier, London"
Contact: Dr Peter Walsh *(details above)*