THE NEWSLETTER OF THE BRITISH HYDROLOGICAL SOCIETY

Circulation

No. 51 August 1996

Inter-Celtic Colloquium

8-11 July 1996
INSA, Rennes, Brittany

This gathering inspired the imagination. The hospitality was excellent. It was a Conference not to be missed, with more than two hundred delegates participating. The papers were good. The simultaneous translation (French/English) made this multilingual conference much more enjoyable and worthwhile. It was a very good idea as many of the delegates were not fluent enough to appreciate the finer points of the other main language used. However, even the translators had a little difficulty with the Celtic languages.

For me the conference started on a high note when I was met by the Coordinator **Alain Jigorel** himself at 22.00 on Sunday evening and went with him to INSA to register. The student accommodation was excellent and the next morning we went over and enjoyed a Breton breakfast of cheese, ham, rolls, croissants and coffee and "cornflakes". Although I had been to France before it was the first time I had used my "cornflakes bowl" for coffee too.

The conference itself was made up of plenary sessions and then presented papers plus a bonus — poster papers accompanied by a full formal presentation (10 minutes) during the main part of the conference. This was a good idea as simultaneous translation was provided. The first morning saw a very erudite presentation by the Deputy Mayor of Rennes, who highlighted the local problems. One of which is of their own making as they have converted the river flowing through the town centre into a road and parking area. Suitable notices indicating the risk of flooding are displayed. I am sure a full description of the papers will be provided elsewhere *[any offers? – Ed.]*.

Immediately after lunch on the first day **Professor Jim Dooge** gave one of his usual masterly presentations on the theme "Water & Celtic mythology".

On the first evening we were taken to the "Ecomuseum of Bintinais" and enjoyed a Celtic experience which included a visit around the "Museum of Farming", Breton dancing and a buffet. Afterwards the Celtic evening continued with music and audience participation in the dancing, one of which could be described as the Breton equivalent of the "Conga". **John Rodda** and **Hugh Jones** added some Welsh vocalisation to the proceedings and a very pleasant evening was had by all.

The following morning saw the presentation by **M. Lefeuvre** of the problems caused by "Agribusiness" in Brittany. This also served as an introduction to the following day's field trip. Then followed papers in two venues. To round off the day we heard about "Water use" in the Celtic tradition of Brittany, which preceded a reception in the Town Hall. Afterwards we sampled the restaurants of Rennes. We found one, aptly perhaps, in the Rue St. Georges, that cooked over a Breton wood fire "in the traditional manner" — trust the representative from South Africa to find the "braai".

Next day it was up early for the three different field excursions. All were well planned and contained an interesting mix of "sightseeing, local culture and scientific projects". The tour I went on visited the Department of "Cotes d'Armor", hosted by the region, with the "Water Resources Manager" as one of our guides. Between them **Pierre Hubert** and Hugh Jones translated into English for us. We saw something of the size of the "Agribusiness", with a food processing plant producing an effluent equivalent to 30 million people. We saw an ultrasonic and a conventional measuring weir, both fitted with nitrate samplers as well as the more usual gauging equipment. Then we were taken to the reservoir dam: a double arch buttress dam with two thirds below ground and one third above. The reservoir was 11 MCM capacity with an 11 m depth at the dam wall. While there we saw a working eel ladder and lift, which allows the elvers upstream. After that it was into the regionally-owned water treatment works to view the denitrification plant.

Then we were off to the most important part of a Breton's day, "le dejeuner" (for which two hours were allowed in the programme). It was indeed a meal gastronomique. There was local ham, then a main dish of local beef, followed by Camembert, then Breton apple tart. A selection of bottles was provided on each table, including "low nitrate bottled water" — the others were marked "produce of

Bordeaux".

Then it was off to the coast to view the problem of filamentaceous green algae growing in the Baye de La Fresnaye. The only solution applied so far was to clear it away from the tourist areas each morning by low loader. After that we went to Cap Frehel to view the bird life, cormorants and gulls, and to study the local ecology, where microclimates could be established by the different types of *erica, calluna* and orchids growing there. After a drive along the coast to view all the holiday makers gathered on the beaches and dunes, we returned to Rennes.

On the final morning John Rodda presented "Characterising Celtic Hydrology", followed by parallel sessions up to lunch time. In the afternoon there was a very interesting two-hour "round table discussion", including a little audience participation. Again the use of simultaneous translation made the project feasible. Then came the closure and (for some) departure, but several of us stayed over until the Friday and went into Rennes to sample the delights of the City, including "how to buy a rail ticket from a French Automatic Vending Machine" — an education in itself (although there was an English version to help). It was very interesting to discover the delegates' different choices of route: a few came by car and ferry, others took advantage of special offers by Eurostar and TGV (perhaps the cheapest way from Birmingham), while a few of us flew direct from Gatwick to Rennes by "Brit Air" (registered in Brest and nothing to do with BA).

At this colloquium old acquaintances were renewed and new friends made. It was certainly a conference with a difference and lived up to all its promises. For me it highlighted the problems of surface pollution by nitrates and pesticides due to intensive agriculture, as well as possible methods of ameliorating the problem. This is a great help to me as South Africa faces some difficult problems of treating polluted water.

As was illustrated in several of the presentations, the Celts are great wanderers: Canada, New Zealand and South Africa were all represented in the presentations, as well as those from nearer home.

Description by Anthony J Tollow, one of the participants from overseas (Durban, South Africa)

Travel grants

A subcommittee has been set up to administer the interest from the Exeter Fund and other travel grants. Its four members are the President, the Hon. Treasurer, Dr David Collins (IAHS rep. on the BHS committee) and Dr Jim McCulloch.

Applications for grants from the Exeter Fund to attend the IAHS General Assembly in Rabat in May 1997 should be made ***by the end of August*** to the **Hon. Treasurer, Dr Richard Harpin**, Sir William Halcrow & Partners, Burderop Park, Swindon, Wiltshire, SN4 0QD. The committee will then decide how to allocate the money and let applicants know by early October.

Grants of up to £150 are available to help members with the cost of attending meetings (see *Circulation 38* to 47). Please provide details of the meeting, why you want to attend, the costs of attending and other sources of finance. Successful applicants are expected to produce a short report of their experiences in attending the meeting.

Any enquiries should be made to the Hon. Treasurer, Richard Harpin *(tel/fax 01793 812479).*

President's piece

If, like me, you are inclined to open your new magazine or journal and dump the flyers in the waste paper basket, I hope you will retrieve the questionnaire enclosed with this issue of *Circulation*. The questionnaire enables you to comment on — and hopefully support — the role BHS could play in promoting attendance at the 1998 Exeter Symposium by young scientists from overseas. It also seeks your views on how BHS might increase the monies available to enable our own younger members to attend relevant conferences, both in the UK and overseas.

In the year following the Exeter Symposium, BHS members will have a second opportunity to take part in a big international meeting in this country. The General Assembly of the International Union of Geodesy and Geophysics is to be held at Birmingham from *19th to 30th July 1999*. This will be a unique occasion for British hydrologists to contribute to the IUGG, to which hydrologists are affiliated. It will provide a forum for members to present their work and to make a significant input to the IAHS programme within this meeting.

Most members will be aware of the House of Commons Environment Committee's enquiry into water conservation and supply. Although BHS was invited to submit evidence, the members of the main committee were undecided whether there was a purely hydrological aspect of the 1995 supply shortage on which they might usefully comment. As one of the associated societies of the Institution of Civil Engineers, BHS is represented on the ICE Water Board. Through this channel we were invited to comment on the written evidence presented by the Board's chairman, **Brian Rofe**. This was submitted under ten headings:

- Demand is increasing;
- Demand management is not effective;
- Leakage can be controlled, at a cost;
- Metering is not cost-effective;
- Metering should be applied to help domestic customers only;
- Water transfer schemes are expensive in capital and generating costs;
- Water storage in reservoirs and groundwater is essential and good for the environment;
- Public appeals for voluntary restraint are unlikely to be productive;
- OFWAT's main achievement lies in Asset Management Plans and assessments;
- EA (NRA) have achieved significant improvements in water quality.

My own view is that an uninterrupted supply for domestic, industrial and business use is essential, and achievable for 100 per cent of the time. This was not achieved in 1975/76 in part due to the poor infrastructure and inexperience in the newly-established Water Authorities. In 1996 there can be no other reason than bad management. The introduction of hosepipe bans, on the other hand, must surely be an acceptable constraint in times of severe drought, since the absolute security of supplies for garden watering is neither economic nor justified. Much more public involvement is required to set the correct balance between the cost to the consumer and the level of acceptable service for this purpose.

The BHS Annual General Meeting is to be held on *10th September 1996* at Imperial College, London. This will be followed by a mini-symposium with a lead paper by **Dr John Rodda**, President of IAHS, who was awarded Honorary Membership of BHS at last year's AGM. I hope a large number of members and their guests will be able to attend.

M J Hamlin

HydroGIS '96: a summary

This conference was held in Vienna from 16 – 19 April 1996, and was organised jointly by the Universität für Bodenkultur (Vienna), IAHS and UNESCO. It followed the first HydroGIS conference, held in Vienna in 1993, which met with immense success, being the first international IAHS conference solely devoted to hydrology and GIS. The structure of HydroGIS '96 was essentially the same as that adopted in the first conference, consisting of a combination of plenary, parallel and poster sessions, as well as computer workshops in which participants could demonstrate their software.

The conference opened with a plenary session on GIS Functions and Hydrological Modelling. Possibly one of the best sessions of the conference, it included the presentation of various papers looking at the integration of linking multiple models to GIS, at the development of hydrological toolboxes within GIS and on the integrated use of raster and vector data structures for automated parameter estimation. This last was considered in an interesting paper by Priestnall and Downs, which considered the application to river channel morphology evolution.

The second plenary session, Methodological Aspects, presented interesting considerations on the integration of physically-based hydrological models and GIS. In particular, the results presented by the UK MEDRUSH group pointed out how the need for hydrological models to work over a large range of scales poses important problems for the generalisation and representation of hydrological processes at those scales. Though GIS is used essentially as a DBMS and visualisation tool, there is scope for it to contribute to solving the above problems. The same session also included various presentations illustrating how the time component can be incorporated into the GIS, both for representing data but also, and more importantly, for dynamic simulations directly within the GIS.

The initial plenary sessions were followed by five parallel sessions dealing with:

- Coupling GIS with Hydrological Models;
- Digital Terrain Models in GIS;
- Application of GIS in Water and Environmental Management;
- Application of GIS in Surface Water Systems;
- Application of GIS in Ground Water Systems.

Within the parallel sessions, papers illustrating a wide variety of applications prevailed, but there were also some noteworthy presentations of research at the leading edge of the field. Interesting, though questionable, was the paper by Kopp, which presented a view of the future based on improved data and comunication standards, as well as on component-based software and flexible model development environments. The papers presented by Watson *et al.*, and Garbrecht and Martz instead focused on representation of the distributed nature of hydrological processes and attempting to resolve the problem of model parameterisation. To these aspects, Gumbricht contributed bypointing out the need to identify synoptic indicators for distributed model parameterisation, and the — still — potential role of GIS.

Interesting also were the papers by Lee and Chu, and Miller and Morrice, which analysed the influence of error and uncertainty in DTMs on the extraction of hydrological features. In particular, the paper by Miller and Morrice looked at how uncertainty affects catchment boundary extraction by analysing the results obtained from different source DEMs. Finally, the issues of sensitivity analysis, model calibration and validation were considered in the paper presented by De Roo *et al.* The role of error propagation and uncertainty is one of the topics that had been touched upon in the first conference, and which seemed to hold much promise as a field of innovative research. But having recognised the inherent fuzziness and uncertainty of much hydrological and environmental data, hydrologists still need to develop better analytical frameworks capable of incorporating such variability.

The conference was closed by two plenary sessions, the first on Remote Sensing and GIS, and the second on GIS in Relation to Decision Support and Expert Systems. The first session sparked off an interesting debate amongst participants, questioning whether remote sensing is effectively able to provide input data necessary for model parameterisation and, just as important, for model validation. With regard to the first point, some of the papers, looked at the possibility of using remote sensing to derive soil moisture and saturated hydraulic conductivity. In the second session Fedra and Jamieson presented an object-oriented approach to model integration. They underlined the advantages of object-oriented design for linking diverse data objects with multiple models, within complex environmental decision support systems. But the question that arises is whether these systems, initially developed to comunicate results better, can effectively help towards a better understanding of the processes occuring.

To conclude, although everyone appreciated the excellent organisation of the conference, many delegates had expected to hear more about groundbreaking research in the integration of hydrology and GIS. Instead there seemed to be a general opinion that the novelty of the first conference was lacking from HydroGIS '96 and (as one participant put it) that many papers reflected current research as a "game where hydrological knowledge is not increased". As hydrologists we must always take care in interpreting GIS results, and not simply accept GIS maps and images as physical reality.

Given the calibre of researchers present, these risks were acknowledged and the criticisms subdued by the open and honest approach with which many participants discussed their own research and exchanged ideas on how common problems could be overcome. But in order to truly make a contribution to hydrology, conferences such as this need to focus more on hydrological /water resourse research issues, and less on issues relating to data handling/visualisation within GIS. We can only hope that, if there will be another HydroGIS, these aspects will be better represented.

On the social side, it must be said that the hospitality of the organizers was sincerely warm and friendly. The highlights consisted of a Welcome Reception held at the Ministry of Agriculture and Forestry, and a Conference Dinner held in the cellars of the City Council Chambers, which was concluded by a round of national recitals and, inevitably, by Viennese waltzes. Needless to say, these events were also accompanied by others, much less official, that occurred in Vienna's many beautiful cafes and beer cellars.

Finally, my thanks go again to the BHS for providing me with a £100 travel grant towards attending the conference.

Mauro Ciaccio
Dept. of Geography
University of Edinburgh

Conference Publication: Kovar, K. and Nachtnebel, H.P. (eds.), "Application of Geographic Information Systems in Hydrology and Water Resources Management", *IAHS Publication No. 235*, IAHS Press, 1996, ISBN 0144-7815.

Books for review

I would like to revive the Book Reviews section in *Circulation*. In an effort to get this going, I am listing here some of the titles I have received for review: please volunteer if you are willing to write a review of one of them for *Circulation*, or suggest names of potential reviewers to me. I shall also be contacting people directly and posting this list on the BHS electronic mailbase.

WMO Operational Hydrology Report No. 35, Snow cover measurements and areal assessment of precipitation & soil moisture

WMO Operational Hydrology Report No. 36, Remote sensing for hydrology

WMO Operational Hydrology Report No. 37, Hydrological aspects of accidental pollution of water bodies

WMO Operational Hydrology Report No. 38, Simulated real-time intercomparison of hydrological models

WMO Operational Hydrology Report No. 40, Land surface processes in large-scale hydrology

WMO Operational Hydrology Report No. 41, Overview of techniques for analysing surface-water data networks

WMO Operational Hydrology Report No. 28, Hydrological information referral — Infohydro manual (1995 edition)

Scale issues in hydrological modelling (Kalma & Sivapalan)

Scaling up in hydrology using remote sensing (Eds. Stewart *et al.*)

Solute modelling in catchment systems (Trudgill)

Riparian landscapes (Malanson — Cambridge Studies in Ecology)

Stream hydrology: an introduction for ecologists (Gordon, McMahon & Finlayson)

Dynamics of gravel-bed rivers (Billi, Hey, Thorne & Tacconi)

WMO guide to hydrological practices (1994 edition)

Statistical modelling in hydrology (Clarke)

Introduction to water quality modelling (James, 2nd edition)

Stormwater management (Wanielista & Yousef, including programs on disk)

Wildland watershed management (Satterlund & Adams, 2nd edition)

Channel network hydrology (Eds. Beven & Kirkby)

Groundwater microbiology & geochemistry (Chapelle)

Terrain analysis & distributed modelling in hydrology (Eds. Beven & Moore)

John Griffin

NERC research grants in hydrology

I feel it is worth reviewing the grant round outcomes to see how hydrology has fared. *NERC News* for Summer 1996 has just been issued, with a leaflet inside giving the awards. This is my personal selection of those of value and interest to some branch of hydrology. The descriptions are as published. Congratulations to BHS members who have gained awards.

Earth observation standard grants

Dr D Wingham (Space and Climate Physics, UCL) and **Prof J Dowdeswell** (Earth Sciences, Aberystwyth): "Synthetic aperture radar interferograms to investigate ice dynamics in Svalbard" £168,916

Prof C Jones (Computer Studies, Glamorgan): "Automated environmental change detection using spatially referenced digital datasets" £54,750

Earth sciences standard grants

Dr B Huntley (Biological Sciences, Durham): "High temporal resolution study of palæoenvironment and palæovegetation during the last 130,000 years at Lago Grande di Monticchio, southern Italy" £129,495

Earth sciences small grants

Dr M de Freitas (Geology, Imperial College) and **Dr R Zimmerman** (Earth Resources Engineering, Imperial): "The hydraulic properties of rock fractures under normal and shear loading" £16,996

Dr R Kemp (Geography, Hull): "Changing dominance of winter and summer monsoon patterns in eastern Asia over the last 130Ka: testing phase relationships using a high resolution loess-palæosol" £22,918

Freshwater standard grants

Prof K Beven (IEBS, Lancaster): "Fuzzy modelling of flood inundation" £119,817

Prof W Davison and **Dr J Hamilton-Taylor** (IEBS,Lancaster): "Particle to pore-water fluxes and mobilities of metals in undisturbed freshwater sediments using DGT" £148,288

Prof R Batterbee and **Dr R Flower** (Environmental Change Research Centre, UCL): "The deposition and accumulation of endemic planktonic diatoms in the sediments of Lake Baikal and an evaluation of their potential role in climate reconstruction during the Holocene" £121,404

Marine & atmospheric sciences standard grants

Dr K Shine (Meteorology, Reading): "The relationship between radiative forcing and climate response" £132,842

Terrestrial sciences small grants

Prof R Smith (Biological Sciences, Leicester): "Analysis of non-linear dynamics in short ecological time series" £25,464

Frank M Law
Institute of Hydrology

New chair of BHS Southern Section

In May this year **Howard Wheater**, Professor of Hydrology at Imperial College, stood down as chairman of the Southern Section Committee, a position he had held since the formation of BHS. In recognition of his services to British hydrology in helping to establish and strengthen BHS, and as a leading professor of hydrology, Howard has been nominated for this year's President's Prize.

His successor as chairman of the BHS Southern Section is **Dr Adrian Butler**, also of the Department of Civil Engineering at Imperial. After graduating in 1981, Adrian worked for three years in what was then the hydrometeorological branch of the UK Meteorological Office.

His time at Bracknell gave him an interest in hydrology, which resulted in his return to Imperial College to take a Masters degree in Engineering Hydrology. He decided to continue at Imperial in order to carry out research into the dynamics of salt water intrusion processes through a NERC CASE studentship with IH. Adrian was then appointed as a research assistant on a project, funded by NIREX, to investigate radionuclide transfer from contaminated groundwater to vegetation.

In 1993 he was appointed as a lecturer in sub-surface hydrology in the Civil Engineering Department at Imperial and now lectures on groundwater to the same MSc course he attended some eleven years earlier.

Adrian hopes that the dynamic programme of talks and seminars which the Southern Section promoted under Howard's chairmanship will continue to flourish through the work of the new committee, and will continue to inform the hydrological community of the key developments taking place during this most important juncture for the science of Hydrology.

BHS Southern Section

Chairman: Dr Adrian P. Butler, Imperial College, London SW7 2BU *(Tel: 0171 594 6122, Fax: 0171 225 2716, Email: a.butler@ic.ac.uk)*

Environmental remote sensing at the University of Salford

The human environment is the sum of external influences affecting the way in which we live. To understand, and ultimately improve, this environment it is necessary to collect and analyse data relevant to a wide range of natural conditions, including the weather, air quality and water resources. In order to do this, new research needs to be carried out into observational techniques, using the full range of the electromagnetic spectrum.

Within the Telford Institute of Environmental Systems at Salford a group has been established, led by **Professor Chris Collier**, to develop and use new ground-based and space-based remote sensing techniques. The technology that will be used includes advanced weather radars, acoustic profilers, lidars, satellite synthetic aperture radars and a wide range of satellite imagery. Before he joined the University last year, Chris Collier has spent most of his career working in the Meteorological Office, where he was in charge of satellite applications, nowcasting (forecasting up to a few hours ahead) and operational instrumentation.

Currently a number of projects are being undertaken by the group. For example, the British National Space Centre are funding work with GEC-Marconi Research Centre, Matra Marconi (Space), National Remote Sensing Centre and the Environment Agency targeted at developing a method of assessing regional flood potential. In many developing countries rural areas producing food, and urban areas, are vulnerable to the occurrence of significant rainfall over the headwaters of river catchments in which they lie. Often few observations exist upon which to base flood forecasts, and in many areas the use of satellite data offers the only practical way of assessing the likelihood that a river may flood.

The European ERS-1 polar orbiting satellite was launched in 1991, and during 1995 a second system began operations. These satellites carry a Synthetic Aperture Radar (SAR). The aim of this project is to use data from this instrument, and from the NOAA series of polar orbiting satellites, with simple numerical models to assess the likelihood of flooding, should significant rainfall occur. Mean catchment slope may be derived from an interferogram generated using two SAR images, soil moisture from the SAR and the net radiation and rainfall from the Advanced Very High Resolution Radiometer (AVHRR).

Group team member **Neil Fox** has installed an automatic weather station at a United Utilities site on the West Pennine Moors near Darwen (Figure 1). This includes a soil moisture capacitance probe and a weighting lysimeter designed and built by the Institute of Terrestrial Ecology at Grange-over-Sands. Together with Penman-Monteith estimates of soil moisture, these surface based measurements will be compared with soil moisture estimates from the ERS-1 SAR data.

Throughout Europe there is considerable research activity in developing further the use of single polarisation, Doppler and polarisation diversity radars. The European Union COST-75 Projects seek to foster cooperation between countries engaged in this activity, and provide a focus for the exchange of research results. Professor Collier acts as Project Coordinator, and his Salford group are exploring ways of using data from advanced weather radars to improve forecasts of river



Figure 1 Automatic weather station site on the West Pennine moors near Darwen

flow. This work is being undertaken in partnership with the University of Essex, the UK Meteorological Office and scientists in Germany, Italy and Spain; it is funded under the European Union Framework IV Programme.

The common theme that runs through all this work, and future plans, is to seek improved understanding of the impact of the natural environment on human activity and the impact of human activity on the natural environment. The synergy provided by the Research Institute structure within the University should ensure that environmental remote sensing quickly becomes established. The aim is to develop a centre of excellence in this field at Salford.

Chris Collier

New Members

We welcome the following members to the Society:

Ashton, D.A. ..... Scott Wilson Kirkpatrick & Co, Glasgow
Good, M.W. ..... Warlingham, Surrey
Halliday, R.A. ..... National Hydrology Research Centre, Canada
Long, S.E. ..... Elsevier Geo Abstracts, Norwich
Riley, M. ..... Dept of Civil Engineering, University of Newcastle
Shedden, R.M. ..... Broken Scar Water Treatment Works, Darlington
Skellern, A.R. ..... Leeds
Turnbull, D.A. ..... Department of Environmental Management, University of Central Lancashire, Preston
Wade, S. ..... Geography Division, Coventry University
Wragg, S.K. ..... Westlakes Research Institute, Cumbria

Analysis of BHS members by employment

Thanks to **Dr Laura Baird** for her work in analysing the BHS membership by employment category, with the aim of identifying areas of strength and areas to target for recruiting.

The table shows the analysis by category based on the 1994 membership (682 members) and 106 members joining since then ("recent" in the table). When broken down further, there are several clusters: notably the Institute of Hydrology, Civil Engineering Departments at Newcastle and Imperial College, Halcrow and Mott MacDonald, the Environment Agency (especially Thames and North West Regions). It is particularly noticeable that there are no members from the water companies among those joining since 1994.

Category	UK	Over seas	%	Recent	% of recent
Unspecified	174	21	28.6	3	3.2
Higher education	125	16	20.7	41	43.5
Regulatory	102	2	15.2	17	18.0
Consultants	94	3	14.2	23	24.4
Research institutes	63	2	9.5	14	14.8
Water companies	25	0	3.7	0	0
Other	14	7	3.1	8	8.5
Independent	31	3	5.2	0	0
Totall specified	454	33	71.4	106	100

Groundwater discharge in the coastal zone

This International Symposium was sponsored jointly by the Russian Academy of Sciences and the Land-Ocean Interactions in the Coastal Zone (LOICZ) Core Project of the IGBP.

The meeting, held in Moscow from 6 to 10 July 1996, brought together more than 50 participants from 16 countries, representing a wide range of research interests in marine and terrestrial geosciences, hydrology and engineering. The major motivation for the Symposium was the LOICZ requirement to determine C, N, and P dynamics in the coastal oceans for input into biogeochemical models. As well as presenting overview papers and results of investigations, there was a thorough review of the state of scientific research on fluxes of water and materials between land and the coastal marine environment, the probable significance of such fluxes, and the need for further investigation.

Many participants began to appreciate that groundwater discharge from coastlines and shallow marine sediments is an important environmental and biogeochemical factor, delivering some dissolved constituents to the ocean at rates comparable to regional river inflow. This delivery and its effects on coastal productivity and biogeochemistry are believed to be changing significantly as a result of human intervention in local hydrological cycles and global climate.

During the symposium, terrestrial researchers became acquainted with the power of oceanographic tracer studies and modelling, while oceanographers gained an appreciation of hydrogeological and geophysical techniques applied to the problem from the landward side. All recognised the opportunities and challenges of working in this disciplinary and environmental interface.

These were their conclusions:

- Groundwater flux to the coastal marine environment is an important biogeochemical and environmental factor in many coastal regions;

- The physical and chemical processes involved in groundwater flux to the coastal marine environment are complex and highly variable in space and time, and
- In view of the general scientific significance of the subject and to ensure that groundwater fluxes are properly accounted for in the LOICZ Project, we must expand understanding of coastal groundwater flux, and improve assessment methods.

They also identified goals:

- elaboration and improvement of methods, approaches and field/analytical equipment;
- study and assessment of the significance and mechanisms of submarine groundwater flux;
- investigation of contributions of groundwater to biogeochemical regimes in the coastal zone, and
- assessment of potential changes in groundwater flow to the coastal zone due to global change and human activities.

Participants recommended the promotion of information exchange, distribution and coordination, including a directory of researchers and agencies, a bibliography of relevant publications and a catalogue of data sources.

For further information, please contact Prof. Igor S. Zektser *(E-mail: Zektser@iwapr.msk.su)* or the LOICZ CPO, Netherlands Institute for Sea Research *(Tel: (31) 222 369404, fax: (31) 222 369430, email: loicz@nioz.nl)* or scan the LOICZ internet pages at www: http://www.nioz.nl/loicz/.

FORTHCOMING EVENTS

Meetings

International Conference on WATER POLICY
Cranfield, Bedfordshire
23-24 September 1996

This conference will provide a forum for the exchange of experience in the practical implementation of water policy. It is to be opened by the ODA Minister, Baroness Chalker, and there will be a two-day programme of papers on water resource management strategy, environmental protection policies, case studies of large- and small-scale water supply and sanitation projects, political and trans-boundary issues, distribution and demand management, water use efficiency and sustainable development.

Registration by **31st August** costs £260 (£80 for students); after that the fees increase by 15%. For further details contact Mrs Carolyn King, Water Management Department, Silsoe College, Silsoe, Bedford, MK45 4DT. *Tel 01525 863291, Fax 01525 863300, E-mail C.S.King@cranfield.ac.uk*

Hazards Forum/BHS joint meeting
SOME MAJOR FLOODS: ACCEPTABLE RISK OR DISASTER?
London
15 October 1996

This half-day meeting (2.00 – 5.00 p.m.) will take place on a Tuesday afternoon at the Brunel Room, Institution of Civil Engineers, Westminster.

The purpose is to demonstrate the impact of floods on communities and discuss the response to it, given that the risk can never be eliminated. Too little action can be disastrous; too much can cause great environmental damage.

The chairman is **Prof John Gardiner** (Flood Hazards Unit, University of Middlesex) and the speakers will include **R G Purnell** (Chief Engineer of the MAFF Flood and Coastal Defence Division) and **E P Evans** and **P von Lany** (Sir William Halcrow & Partners). Registration costs £15. For further details contact Prof D M McDowell at Brighton *(Tel 01273 822091)*.

Call for papers & registration
HEADWATER '98
HYDROLOGY, WATER RESOURCES & ECOLOGY IN HEADWATERS
Meran/Merano, South Tyrol, Italy
20-23 April 1998

This is an early call for papers and provisional registration for the fourth meeting of the Headwater Control Group, sponsored by IAHS.

Headwaters, where rivers are born, are often critical to water resources development, as well as being valued for the purity of their landscape and water quality. However, this purity and the fragile headwater ecosystems are threatened by acid deposition, erosion, and pollution from intensified land use, including tourism.

This interdisciplinary conference will aim to evaluate alternative land management, environmental protection and land reclamation policies. There are four themes (monitoring, processes, modelling and management) and four aspects (hydrology, ecology, socio-economics and the interdisciplinary approach). These are closely related to UNESCO's IHP-V programme.

If you intend to submit a paper or poster, a one-page abstract is required by **28 February 1997**.

For further information please contact the HeadWater '98 conference secretariat, c/o European Academy, Weggensteinstrasse 12/A, I-39100 Bozen/Bolzano, Südtirol/Alto Adige, Italy *(Fax +39 471 30 60 99, E-mail HeadWater98@ms.sinfo.interbusiness.it)*.

American Geophysical Union
1997 HYDROLOGY DAYS
Fort Collins, Colorado, USA
14-17 April 1997

This is an early announcement of the American Geophysical Union's hydrological meeting in Colorado. The deadline for submission of abstracts for oral or poster presentations at the 1997 AGU Hydrology Days is **24 January 1997**. Registration fees are expected to be in the range $190-220.

For further information on this, and on the technical programme, please contact H J Morel-Seytoux, 57 Selby Lane, Atherton, CA 94027, USA. *(Fax +1 415 365 4080, E-mail morelsey@leland.stanford.edu)*

Diary

30th August – 2nd September, 1996
Conference on Buffer Zones
Venue: Heythrop Park, Woodstock
Contact: Dr Nick Haycock, Quest Environmental, P.O. Box 45, Harpenden, Herts. AL5 5JL. *(Tel/Fax 01582 764727, E-mail: NEHaycock@eworld.com)*

3rd – 5th September 1996
UNESCO IHP-V Conference
"Conflicts in reservoir development and management" (see *Circulation 46*)
Venue: City University, London
Contact: Mrs Pat Walker *(Tel 0171 477 8141, Fax 0171 477 8570, E-mail PWalker@city.ac.uk)*

10th September 1996
• BHS National Meeting and AGM •
"Capturing the hydrological cycle" — Dr John Rodda (Honorary Member) + two other speakers *(see flyer)*
Venue: Dept of Civil Engineering, Imperial College, London
Contact: Dr P L Younger, Dept of Civil Engineering, University of Newcastle *(Tel 0191 222 7942, Fax 0191 222 6669, E-mail: p.l.younger@newcastle.ac.uk)*

10th September 1996
Welsh Hydrological Group AGM
"Flow measurement in the River Wye" — Stuart Child (Hydrologic Ltd)
Venue: Trevithick Building, University of Wales, Cardiff
Time: 5.00 p.m. AGM; 5.45 Presentation
Contact: Dr Rob Drayton, 208 Fidlas Road, Llanishen, Cardiff CF4 5NA *(Tel 01222 754879, Fax 01222 754879)*

8th – 10th September 1996
"Nitrogen deposition & acidification of natural ecosystems"
Venue: MLURI, Aberdeen
Contact: Dr Sue Bird, MLURI, Craigiebuckler, Aberdeen AB9 2QJ *(Tel 01224 318611, Fax 01224 311556, Email mi307@mluri.sari.ac.uk)*

8th – 12th September 1996
Geological Society meeting
"Contaminated land and groundwater — future directions"
Venue: University of Portsmouth
Contact: Dr R Paul Ashley, Parsons Engineering Science, Cambridge *(Tel 01223 421170, Fax 01223 421173, email: ashley@cityscape.co.uk, Internet: http://www.cityscape.co.uk/users/dy67/eg-conf.html)*

11th – 13th September 1996
"Multiple land use & catchment management"
Venue: MLURI, Aberdeen
Contact: Dr Sue Bird *(address above)*

17th – 19th September 1996
1st International Conference on "Geocomputation"
Contact: Tracey Harris, School of Geography, University of Leeds, LS2 9JT *(tel 0113 233 3324, fax 0113 233 3308, Email: geocomputation@geog.leeds.ac.uk Internet: http://www.geog.leeds.ac.uk/geocomputation.html)*

18th September 1996
CIWEM One-day Conference
"Water resources – planning for peak demand"
Contact: Hannah Sime, CIWEM Conferences *(Tel 0171 831 3110, Fax 0171 405 4967)*

23rd – 24th September 1996
International Conference
"Water policy" *(see Meetings)*

24th – 26th September 1996
Sixth ERB General Assembly
"Ecohydrological processes in small basins"
Venue: Strasbourg, France
Contact: Dr Mark Robinson, Institute of Hydrology *(Tel 01491 838800, Fax 01491 692424)*

15th October 1996
Scottish Hydrological Group
"Using constructed wetlands to treat coal mine drainage: a Scottish case-study" — Dr Kate Heal (Stirling Univ.)
Time: 6.30 p.m.; tea from 6.00 p.m.
Venue: Wellcome Room, Royal Society of Edinburgh, Edinburgh
Contact: Dr Andrew Black, Geography Dept, Dundee University, DD1 4HN *(E-mail A.Z.Black@dundee.ac.uk, Fax 01382 344434, Tel 01382 344433).*

15th October 1996
Hazards Forum/BHS joint meeting
"Some major floods: acceptable risks or disaster?" *(see Meetings)*
Venue: Brunel Room, Instn of Civil Engineers, 1 Great George St, London
Time: 2.00 – 5.00 p.m.
Contact: Prof D M McDowell, Brighton *(Tel 01273 822091)*

16th October 1996
BHS Pennines Section meeting
"Water resource modelling"
Venue: York Museum
Contact: Dr Liz Kaar, Environment Agency, North West Region, Warrington WA4 1HG *(Tel 01925 653999)*

30th October 1996
BHS Southern Section meeting
"Climate change – what do the data say?"
Contact: Dr A P Butler, Dept of Civil Engineering, Imperial College, London SW7 2BU *(Tel: 0171 594 6122)*

6th November 1996
BHS / NERC all-day meeting
"HYREX" *(see flyer)*
Venue: Institution of Civil Engineers, 1 Great George Street, London
Contact: Prof Howard Wheater *(address above)*

13th November 1996
BHS South West Section Meeting
"Flood forecasting and modelling"
Venue: Civil Engineering Dept, University of Exeter
Contact: Graeme Boyce, Environment Agency, South West Region, Manley House, Kestrel Way, Exeter, EX2 7LQ *(Tel 01392 444000, Fax 01392 444238)*

21st November 1996
Scottish Hydrological Group meeting with Scottish Hydraulics Study Group
"Wild Rivers" — Elizabeth Leighton (WWF Scotland) and Dr Gary Pender (University of Glasgow)
Time: 6.30 p.m.; tea from 6.00 p.m.
Venue: Theatre G10, Rankine Building, University of Glasgow
Contact: Dr Andrew Black *(address above)*

27th November 1996
BHS Southern Section / CIWEM
"Floods"
Contact: Dr A P Butler *(address above)*

4th December 1996
BHS Midlands Section Meeting
"Arid zone hydrology"
Time: 2 p.m.
Venue: Department of Geography, Loughborough University
Contact: Prof Ian Reid, Geography Dept, Loughborough University, LE11 3TU. *(Tel 01509 222791, Fax: 01509 262192)*

18th December 1996
BHS Southern Section meeting
"Gardening under global warming"
Contact: Dr A P Butler *(address above)*

9th January 1997
Welsh Hydrological Group meeting
"Flood alleviation and highway construction"
Venue: Swansea
Contact: Simon Griffiths *(Tel 01222 388777)*

14th January 1997
Scottish Hydrological Group meeting
"Flood risk assessment" — Dr James Curran (Scottish Environment Protection Agency) *(preceded by Scottish Hydrological Group AGM)*
Venue: Room K314, John Anderson Building, University of Strathclyde
Time: 6.30 p.m.; tea from 6.00 p.m.
Contact: Dr Andrew Black *(address above)*

Copy deadline for *Circulation* No. 52 16th October 1996

Circulation is the quarterly newsletter of the British Hydrological Society. It is issued free to members, but is also available on an annual subscription of £20. All enquiries concerning membership should be made to Richard Howard, Institution of Civil Engineers, 1-7 Great George Street, London SW1P 3AA. Telephone 0171 839 9836. Please address all other correspondence to the Editor, John Griffin, Institute of Hydrology, Wallingford, OX10 8BB. Telephone: 01491 692395. Fax: 01491 692424. Email b.h.s@ua.nwl.ac.uk.
Circulation is produced by the Institute of Hydrology and indexed in *Geosystems' Hydrotitles* & *GeoArchive.*