Circulation

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STUDENT AWARD 2010

First Prize £400
Two Runner-Up Prizes of £200 each

BHS launched its annual Student Award 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 BHS Main Committee. Each academic department may submit one dissertation. Entries must reach the BHS on or before 9th July 2010. For further information visit our website www.hydrology.org.uk or contact Claire Walsh claire.walsh@ncl.ac.uk.

Papers in international peer-reviewed journals: to "we" or not to "we"?

There is an increasing use of "we" (and other first person terms) in some international peer-reviewed journals. **Ian Littlewood**, Editor (BHS) *Hydrology Research*, gives reasons why it is poor style and argues for the third person narrative. The views and opinions expressed do not necessarily reflect Hydrology Research policy.

In hydrological and water resources research, some publishers and editors allow the use of "we" when co-authors describe their measurements, decisions, actions and analyses. Some journals may even encourage the first person narrative style, as do some modern guides on technical writing. Consequently, a growing number of published co-authored journal papers use "we". Instinctively and rightly, however, most authors would not use "I" in a sole-authored manuscript submitted to a peer-reviewed journal.

If a sole-authored paper included text such as "I chose to [do this] … I then selected [something] after I [did that] … ", and so on, it would be rather like a child's essay on "What I did during my summer holidays" or suchlike. (The square bracketed terms indicate the writer's actions, decisions, etc). The use of "I" in this way would be acceptable in an essay by a child but not in a journal paper. Journals that allow "we" in co-authored papers should, logically, allow use of "I" in sole-authored papers. Inconsistently, however, journals that allow "we" do not allow "I". The following example illustrates the current extent of the excessive and poor use of "we".

A co-authored manuscript submitted to an international research journal (details have been omitted for confidentiality) made frequent use of "we" throughout the text. Indeed, each of three sentences comprising one short paragraph began with "We". If that co-authored manuscript had been sole-authored, would it have been acceptable if "I" had been used throughout the text? More tellingly, would it have been acceptable if the first word in each of the three consecutive sentences had been "I"? Papers are even published in which a sole author uses "we" in describing a decision, action, etc, that he or she has taken. How can there be a "we" when there is just one author who is not the monarch ? What was really meant was "I" but the author knew that to have used "I" would have been poor style.

It is worth discussing the "we" issue more generally because there are types of writing where it is entirely acceptable. Works of fiction can, of course, use the first person (anything goes in fiction). Populist non-fiction books and articles in newspapers, newsletters, magazines, etc, that provide information about research, and opinions on the outcomes of research, for the non-expert but interested reader, may use the first-person narrative style very effectively. Such pieces may cite journal papers but usually do not describe things in the same level of detail, and they tend not to be rigorously and independently peer-reviewed to assess the quality of their scientific and technical content. Such articles might be reviewed internally within an organisation but usually more for political correctness and corporate flag-flying than anything else. In that genre of writing, first person terms used skilfully and infrequently can engage the non-expert and thereby promote the public understanding of science.

A paper published in an international, peer-reviewed journal marks a high level of professional achievement. The corresponding manuscript had to pass independent peer review for its soundness and novelty, i.e. its suitability as a fresh contribution to the continually developing body of knowledge in the widely available international literature. The fact that it passed the peer review test, prior to publication, sends a strong positive message to authors' peers and employers concerning the standard of the research. Published peer-reviewed papers gauge a researcher's professional progress. A count of such papers from an institution is often taken as an output performance indicator for that institution. Papers in refereed journals are, therefore, serious pieces of work and should be presented as such.

They should be written in the traditional disinterested (but never in an uninteresting) way using the third person narrative style, which naturally conveys an objectivity that the first person style lacks. The use of "we" (and other first person terms) implies a self-interestedness on the part of authors, rather than the mature disinterestedness appropriate for a serious piece in an international peer-reviewed journal.

Furthermore, poor and too-frequent use of "we" sets a poor example to aspiring or early-career authors. Writing for peer-reviewed journals is one of the highest forms of communication within a profession. Beyond its basis in taught writing for general communication purposes, it is a skill that emulation helps to develop. Thus, early-career authors, and others whose writing for journals may not be the best (for whatever reason), tend to look to published papers for matters of style. Unfortunately this process allows bad, as well as good, practices to be passed on, which may explain the increasingly frequent use of "we" in journal papers. Therefore, authors who are well established in their profession have a duty of care to aspiring authors and should, if they have started to "we", revert to the third person narrative style in their journal papers.

To avoid degeneration in the quality of writing in peer-reviewed journals, publishers, editors and reviewers should ensure that appropriate standards are met. Given the problems associated with "we" it might be best if journals specified use of the third person narrative style and disallowed the first person style explicitly. In answer to the question in the title – it's best to not "we" in peer-reviewed journals.

Ian makes a very interesting case here, which I know raises strong feelings in some people. If any BHS members want to add their own views on this, please don't hesitate to let us know, either in the next issue of *Circulation* or as an 'open letter' on the BHS Mailbase.

Editor

p.s. you can see where my sympathies lie.....

President's piece

We are now well on our way to this year's major event for the BHS – our third international symposium, to be held in Newcastle in July. There is much to look forward to. Across ten symposium themes, more than 150 papers have been accepted, with authors from 24 countries. Once more, we can look forward to pre-published proceedings, stimulating discussion no doubt, a lively social programme and more besides. It will be a particular pleasure to be able to welcome the recipients of our symposium fellowships – mostly student and early career hydrologists, with the majority coming from overseas. BHS is providing support for these fellowships in conjunction with Newcastle University – we will not only be supporting the early career development of these individuals, in line with our charitable aims, but also adding significantly to the vitality of our meeting. Many members will be presenting papers themselves but, for those who are not, attendance nevertheless offers many attractions – be there or miss out!

Since my last President's Piece, we seem to have come through a remarkable winter, with significant hydrological interest. The Met Office report the winter to have been the coldest since 1978/79 for the UK as a whole while, for northern Scotland, it was the coldest on record. Living within easy striking distance of the Cairngorms, the normal centre of those dark blue areas on the weather forecasters' maps, I was unable to resist a couple of trips on the basis of some hydrological curiosity. Between mid-December and mid-January, the frost was continuous and often severe, and my interest was drawn to the low flows which might be occurring in response to a sustained period without any apparent hydrological input. I have never before seen rivers in which the bed as well as the surface had frozen – evidence enough to confirm the temperature readings from in-stream monitoring equipment. As expected, low flows down to Q99 were observed, but in those extreme frosts, some higher (or should I say

substantially less extreme) flow rates were also observed, prompting questions as to their origins. More on this in another place perhaps… Who else was out there with a current meter during that period??

During the cold spell I made frequent use of the SEPA website showing real-time river levels – and would never wish to take such information availability for granted! Across the Highlands, hydrographs showed tell-tale signs of ice affecting recorded water levels, thereby raising a big data quality flag for the periods affected. There's a data management challenge here on a scale that many hydrometric staff will never have had to deal with in their working lives, and indeed a source of some frustration too. It will be interesting to see what proportion of the hydrometric data for this most interesting winter ends up being shown as suspect or missing.

Climate change scenarios point to a generally diminishing likelihood of such winters occurring in the future, as milder conditions are expected to become more dominant. It's some while since I heard anyone trying to talk up the importance of snowmelt in flood risk assessment, and I get the impression that most snowmelt hydrology research done in UK universities and research institutes is focused on exotic locations where snow tends to be more abundant and dependable. However, there have been reports of snowmelt contributing to flooding this year, acting as a reminder of the continuing importance of this element of flood risk. The water resources significance of the abundance of snow, falling in significant quantities into April, should not be overlooked either – snowmelt looks set to be contributing to river flows for some weeks to come.

At BHS Main Committee in April, some of the discussion focused on the Society's involvement in hydrometry. There was some sense that there was not a strong connection between BHS activities and the hydrometry world, dominated in practice by the UK environmental agencies, as evidenced by relatively low numbers of hydrometrists within our membership. At the same time, there was also a feeling that we have a good track record of offering national and regional meetings on hydrometric topics on a reasonably frequent basis. There's not much of hydrology that does not depend on hydrometry in one way or another, and I'd always be keen to encourage more dialogue between hydrometry and the branches of hydrology that depend on it. So, in that spirit, your Committee would welcome suggestions of meeting topics or other activities that might help meet any demand not presently provided for in the area of hydrometry. Might there be interest in field activities? All observations and ideas welcome.

Andrew Black
President

Travel grants

Travel grants are awarded from the Society's general funds to help BHS members whose travel expenses to attend scientific meetings are not met by an employer. Applicants should have been members of the Society for at least six months. The amount will depend on the nature and location of the meeting and the case put forward.

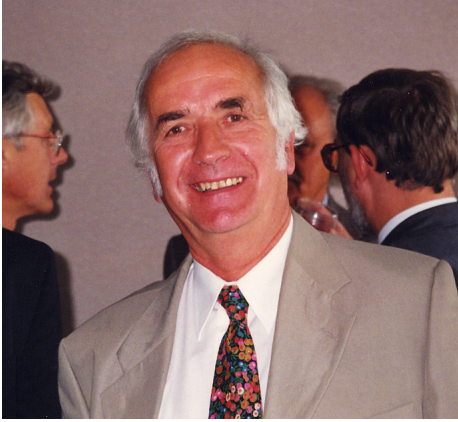
Priority is given to members under 35 or retired from employment, who are presenting papers and who have not previously received support from BHS. Successful applicants will be expected to write a short report for *Circulation*. Travel grant applications should be made to the Hon Treasurer at least two months before the conference or meeting. The Exeter Fund, administered by the society, offers grants to British hydrologists to take part in IAHS/IUGG events.

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

2010 British Hydrological Society newcastle university

This event is on track to be a resounding success. We have double the number of papers presented at Exeter, with authors coming from 24 countries. Further details are on **www.ceg.ncl.ac.uk/bhs2010**. There is still time to register so don't delay and get on line today!

TERRY EVANS



Terry Evans, Head of Hydrology in Sir M MacDonald and Partners and then Mott MacDonald from 1971 to 1993, died recently at the age of 76. Terry had a very broad background with degrees in civil engineering, hydrology and meteorology, and was one of the foremost practicing hydrologists of his generation, playing a significant role in BHS from its inception and was the Society's Hon. Treasurer 1997-2001.

Terry was an enthusiast, one of those 'lucky' people whose interests coincided with his work. He had enormous charisma and he earned wide respect for his technical ability and for the way he embraced innovation. He saw the potential for hydraulic modelling software in the late 1980s and promoted the development of a suite of software tools within MacDonalds. He was mindful of the linkage between engineering and the environment, recruiting Jeremy Purseglove (then famous for a Channel 4 TV programme) in 1989 to foster a new culture of environmental awareness. He was in the vanguard of those concerned about climate change, researching and reviewing data for projects in the Sahel region of Africa. He had a particular reputation for his work on the Nile, and tying together rainfall failures and an obscure sea current called 'El Nino'. We take such interconnections for granted nowadays but in the late 1970s it was all rather novel.

Terry's legacy is clear to see on many projects. He worked on numerous challenging projects throughout the world, and produced many outstanding reports. These contributed to the design of water resources in many countries. One of his early projects had been on the Canje River in Guyana. On recent project work in Guyana, it was found that forty years on, much of Terry's 1963 analysis was still being used and quoted in feasibility and design reports. Even before that when he worked for the Essex Rivers Authority, he authored reports on "Essex Weirs". These are the subject of current investigations and his reports constitute key reference material for that work. More recently, he had involvement in the Caspian Environment Programme, leading projects investigating the impact of climate change on Caspian Sea levels. In this, he collaborated widely with experts in several of the former Soviet states and some of the systems that he put in place at KazHydromet are still in use.

He was a generous supporter of education and training. Many students have benefitted from project work that was arranged by Terry, often with some creativity. He also gave guest lectures at Universities, continuing to inspire students, long after his formal retirement.

For those of us that worked for Terry, we all remember a leader who worked tirelessly for his staff. He represented their interests and was sensitive to the varied challenges of working on overseas projects or to tackling difficult projects. And we were of course entertained along the way, for life with Terry was never dull. On overseas projects, his inquisitiveness was usually well rewarded, though did occasionally lead to some close calls. His conference presentations in the days before Powerpoint were legendary – overhead projector slides flying all over the place, not always appearing in the correct order – but his enthusiasm for his subject, and his deep knowledge, shone through. A possibly apocryphal story that epitomises Terry was in the days when, long before email, proposals for major overseas projects were largely prepared in the UK before being physically taken to the client's office. With customary enthusiasm and commitment, Terry accompanied one such proposal in a taxi to Heathrow, editing it on the journey, before seeing it onto its flight along with a bemused colleague!

He made a lasting impression on those of us who had the pleasure and opportunity to work with him and his legacy continues to influence us today.

This tribute to Terry is based on contributions from Alison Stuck, Peter Ede, Robin Wardlaw and Paul Webster

AGU Fall Meeting 2009

Moscone Convention Center, San Francisco, USA
14–19th December 2009

The annual Fall meeting of the American Geophysical Union is one of the most significant conferences of the academic calendar. The breadth and depth of presentation and exhibition is an opportunity for sustained debate and knowledge transfer with fellow researchers, educators and consultants across a diversity of disciplines.

For those with specific interest in the impacts of climate change, there were few surprises; however, the re-emphasis of the potential weaknesses of popular techniques asked difficult questions of many presenters. Although many projects follow the current trend of using very large ensembles of output from such products as climateprediction.net, ENSEMBLES and UKCP09 to provide an indication of the uncertainty in projected quantities, few contextualise this information intelligently within such quantities as flood inundation volumes and metrics of drought severity.

Modelling the impact of projected climate change on the hydrological cycle, and in particular on the spatiotemporal distribution of key climate variables such as precipitation and potential evapotranspiration, was predictably the focus of the majority of presentations comprising the hydrological sciences section of the meeting. **Alan Hamlet** (University of Washington, Seattle) was one of many speakers to review popular statistical methods of downscaling global climate model (GCM) simulation outputs in the context of questioning the validity and usefulness of such data in wider applications. Alan compared 'delta' methods with more sophisticated bias-correction techniques, proposing a 'hybrid delta' method that re-maps observations onto bias-corrected GCM outputs, explicitly accounting for changes in the moments of probability distributions to produce realistic time-series at high spatial resolutions. In summary, Alan concluded that a 'hybrid delta' approach couples the strengths of the traditional methods with only a few of their weaknesses, and is a sound alternative when dynamic meso-scale climate model outputs are unavailable.

Although the presentation and the discussion that followed explicitly questioned the value added by adopting downscaling sophisticated methods, it was a common notion among many talks featuring GCM data to express great doubt and uncertainty as to their applicability to specific spatial locations. **Ashish Sharma** (University of New South Wales, Sydney) presented a particular perception of this in the form of an investigation of model skill using wavelet decomposition in a comparison of the simulation of low-frequency persistence between dozens of GCM runs for 20th century climate. The data presented implied that internal model structure is a more apparent influence on inter-model variability than are differential resolution and initial conditions.

Contributing to the Bowie Lecture Series, **John C. Schaake** (formerly of NOAA, Annapolis) delivered the prestigious Walter Langbein lecture to a receptive audience on the subject of "Water, weather and climate in our future: what can we know?" (Available from http://www.agu.org/meetings/fm09/lectures/videos.php). Reviewing his numerous experiences, John presented an entertaining and informative overview of the current state-of-the-art in hydrological sciences, borne of half a century of intensive multidisciplinary collaboration between researchers. John's conclusions implied that continued investment in innovative and pragmatic solutions to practical problems would yield satisfactory answers to the 'big questions' of hydrological science, an observation demonstrated effectively by a wide range of projects investigating the impact of projected climate change on water resource.

For example, **David W. Pierce** (Scripps Institute of Oceanography, La Jolla) exhibited a comprehensive analysis of the possible future output of the Colorado River System (CRS), which delivers water to tens of millions of people and sustains a major agricultural industry. Accounting for uncertainties attributable to climate signal verification, downscaling and statistical simulation, David emphasized the

possibility of endemic water shortage in regions supplied by the CRS if the climate proceeds to change as has been suggested by simulation. A complementary pair of presentations from **Upmanu Lall** (Columbia University, New York) concerning water resource management and infrastructure investment under a changing climate suggested that the socio-economic benefit of centralised storage exceeds that realised by decentralised storage systems. However, **Dennis Lettenmaier** (University of Washington, Seattle) and others were keen underline the criticality of hydrological sensitivity to the robustness of future development.

In the field of water resource management, **Joseph J. Barsugli** (University of Colorado, Boulder) delivered an industry-focused discussion of the preferred future direction of climate modelling and impact assessment. The desirable outcomes presented included agreement between models on the change in key parameters, a narrower range of model outputs, and 'reliable' outputs on spatiotemporal scales relevant to current management practices. The resulting debate raised questions concerning the skill of GCM ensembles at simulating inter-decadal behaviours and the resolution of physical processes across a variety of scales, with particular reference to the simulation of the tropical Pacific.

J. Zhao (University of Illinois, Urbana) compared administered and market-based water allocation schemes using an agent-based methodology in a framework of risk management, demonstrating its use for a district of Illinois, while **Robert D. Schmidt** (University of Idaho, Boise) discussed the philosophical difference between price and value in the context of the economic externalities of water.

This was my first attendance of the AGU Fall Meeting, and I was in no way disappointed by the variety of science on display, or the organisation of the event. Although there was relatively limited discussion following talks, as an early-career scientist, I was heartened by the ambition inherent in the exhibitions of my peers and colleagues, and heartened by their reciprocal enthusiasm and vivacity. It was in the poster sessions and informal post-session gatherings that I enjoyed my best moments of the conference, opening dialogues and fresh lines of enquiry in an unpressured environment.

I wish to extend my thanks to BHS, the Environmental and Physical Sciences Research Council (EPSRC) and Newcastle University for sponsoring my attendance at the AGU Fall Meeting 2009. This was an enormously valuable contribution to my postdoctoral training, and I would encourage all early-career scientists to seek out similar opportunities to enhance their further personal and professional development.

Alex Leathard
School of Civil Engineering and Geosciences
Newcastle University

New members

Brian Back.....Environmental Innovations Ltd Bishop's Stortford
Elsa Bottius.....Environment Agency, Reading
Adam Broadhead.....Cranfield University,Gloucester
Jill Crossman.....Birmingham University
Stephanie Dixon.....Durham University
Paul Ecclestone.....JBA Consulting, Wallingford
Amelia Feliciano.....Foster Wheeler Energy Ltd, Reading
Miriam Glendall.....Exeter University
John Harris.....Independent Consultant, Stroud
Peter Harrison.....Hyder Consulting (UK) Ltd, Bristol
Anna Kurowski.....Environment Agency, Exeter
Katrina Lansdown.....Queen Mary and Westfield College, London
David Lee.....University of Leeds
Thomas Levick.....Hereford
Penny Lloyd.....Wallingford Hydrosolutions Ltd
James Longkwang.....Hatfield
Charles Malcolm.....SEPA, Edinburgh
David Milan....University of Gloucestershire, Cheltenham
Julian Moore.....Independent Consultant, London
Ken Moss.....Environment Agency, Bridgewater
Julian O'Neill.....Loughborough University
Faize Saris.....Birmingham University
Elaine Simpson.....SEPA, Perth
Siao Sun.....University of Exeter
Michael Vaughan.....Atkins Ltd, Bristol
Viktoria Von Behr.....London
Joanna Wakefield.....Atkins Ltd, Epsom

Some new perspectives on climate change

Joint RMetS/BHS Meeting
Imperial College
13 February 2010

Frank Farquharson introduced the meeting with reference to the contemporary climate change debate including 'climate gate', the unintended publication by the national press of correspondence between climate change scientists, the Hadley Centre's now familiar 'hockey stick' predicting a steep rise in future temperatures, and recent equivocation by UNCC scientists on the predictions of Himalayan glacial retreat. Global warming and climate change have clearly entered the mainstream, but the issues are complex, and the impacts on climate subject to significant spatial and temporal uncertainty, compounded when coupled with complex hydrological systems. He called for the hydrological and meteorological communities to discuss openly the science and impacts of anthropogenic climate change.

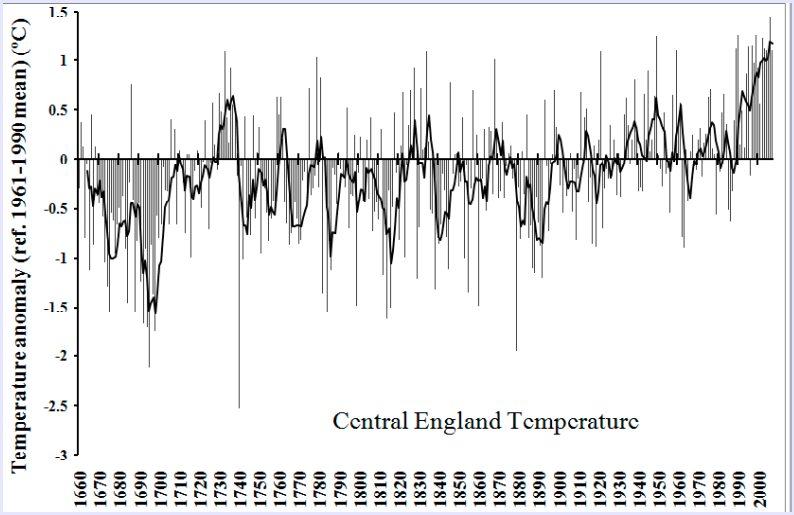
Terry Marsh (CEH Wallingford) acknowledged the upward trend in the Central England Temperature (CET) record, but showed that patterns of rainfall and runoff were not so clear. His extensive examination of UK droughts and floods for the national hydrological monitoring programme revealed a less organised sequence of events. Very significant historic floods occurred in 1947 (the largest on record), 1952, 1953, 1955, and more recently in 2004, 2007 and in 2009 when flood records were exceeded in the north of England and Scotland. In between we have had significant dry periods in 1976–77, 1989–90, 2003 and 2006 characterised by hosepipe bans, agricultural water stress and dwindling water supplies. The UK's longest record of river flows, for the River Thames at Teddington Lock, reveal a long term decline in flows since the 1850s and especially since the 1950s, but this is due mainly to changes in river management, and increased abstraction for drinking water and agriculture.

A regional analysis revealed no geographical trend either. What stress there may be from drier summers, for example in the English lowlands, are offset by increased surface and groundwater storage elsewhere. The records generally indicate increased variability, and less persistence, for example less incidence of long-term drought. One needs to examine of the causes of flooding and how flood statistics are derived. For example, flooding in 2000–2001 was caused by a large volume of rainfall compared with the high intensities which caused the flooding in 1950–51. Snowmelt over frozen ground and ice jams which were a feature of the very wet winter in 1947 may not be a problem in a warmer world.

Ian Strangeways focused on the issue of instrument accuracy and the risk of bias in the records. The global network of climate instruments vary significantly in terms of optimal siting, maintenance and calibration. They may deteriorate in time (e.g. thermometer bulb distortion) or be affected by local environmental effects (e.g. ship temperatures). Changes to the global network as instruments are removed without replacement (e.g. declining ship routes) may affect long term stationarity, necessary for identifying trends. Like Terry, Ian challenged the claim of an unprecedented rise in global temperatures and demonstrated at least two periods (in the early 1700s and 1800s) of steeply rising temperatures in the CET series since 1659 (see above right). He also drew attention to the perils of producing gridded global climate data. Temperature data collected from Ocean buoys suggest sea surface temperatures may in fact be falling, and illustrate significant anomalies in El Nino years.

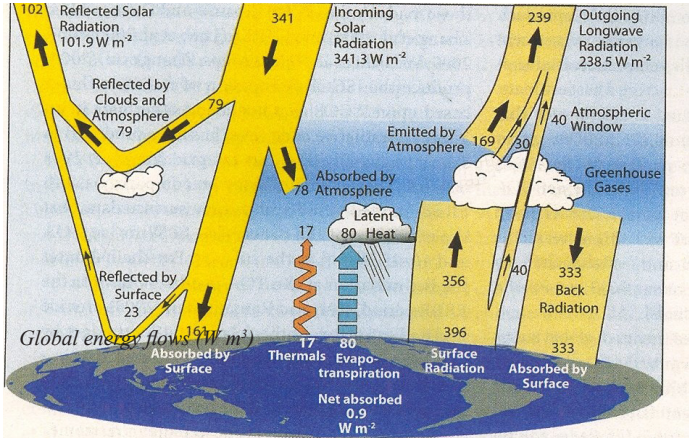
David MacDonald explored how

the engineering community has responded and adapted to the uncertainty generated by predictions of climate change. Extreme values analysis of historic records of flood flows and levels is widely used to generate design levels for flood management schemes. Although limited in length, it is not clear that the records indicate any more than natural climatic variability, or the impact of land use change.



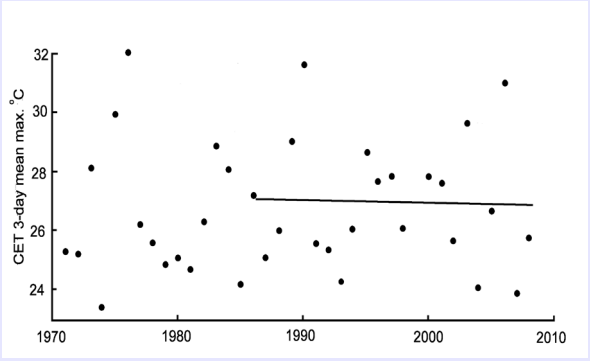
Central England Temperatures from 1659 showing sustained temperature rises in the early 18th and 19th centuries

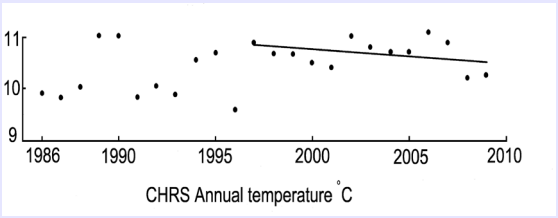
Changes in agricultural practices (e.g. winter harvesting), urbanisation, and the encroachment of building into the floodplain, may be having a more significant effect than the climate change on catchment flow regimes. David cited examples where studies of long records (e. g. the Oxfordshire, Evesham and Derbyshire) did not reveal any long term trends, or where engineering interventions had affected long term stationarity. Engineers aim to comply with Defra guidelines, and considered to be conservative, which expect rainfall to increase by 30%, flood flows to increase by 20%, and sea levels to increase by 6mm per year up to 2080. These blanket increases need to be considered in the flow characteristics at any particular location. In discussion it was noted that factors such as the quality of rating curves used to convert recorded levels to flows, and the inclusion historic extreme events, sometimes missing from the annual maxima series, may significantly affect the extreme value analysis.

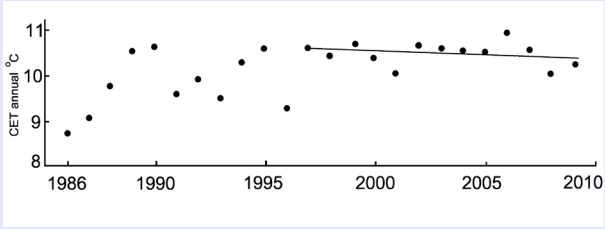


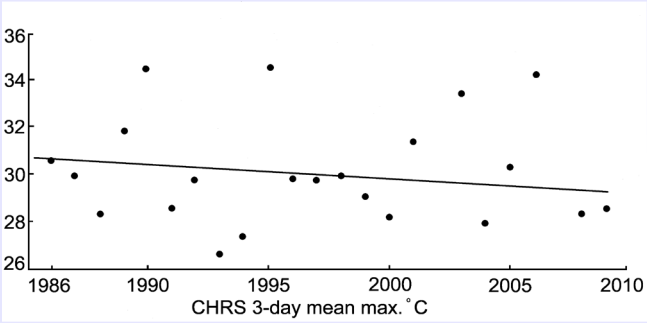
Colin Clark explained the global radiation balance and feedback mechanisms related to outgoing long wave radiation, convection, and evaporation. Surface temperature sensitivity is estimated to be approximately 0.1 ^{o}C W^{-1} m^{-2}, and a doubling of CO2 is estimated to produce about approximately 0.4 ^{o}C warming.

Colin suggested that rather than increasing, global temperatures have flattened out since 2002. He presented the CET series of annual and 3-day mean maxima, and his own temperature data from Somerset, to demonstrate that temperatures may have declined since about 1986, albeit with significant scatter. The CRU's record of









monthly temperatures 1997–2009 support the contention that mean temperatures have not changed significantly in the period. Other temperature records indicate a reduction in the daily temperature range, with an increase in the mean daily minima greater than that in mean daily maxima 1950–1990.

The direct short-term impact of aircraft emissions on temperature was demonstrated in the US, when a significant reduction in air temperatures was observed in the three days following 9/11 when all aircraft were grounded. Colin noted that much of the reported global temperature increase has taken place at night, and speculated that the presence of contrails reduced temperature loss through radiation at night. He concluded that records of extreme UK flood events dating as far back as the 1900s, and the reduced frequency of recorded hail days and violent tornadoes further challenge the climate change orthodoxy.

Geoff Jenkins (Met Office Hadley Centre) reminded the meeting that global average temperatures 1850–2009 show that the 2000s have been the warmest decade on the instrumental record. UKCIP02 predicted generally increasing rainfall in Northern Europe, decreasing in Southern Europe, whilst the UK (in between) is generally less predictable.

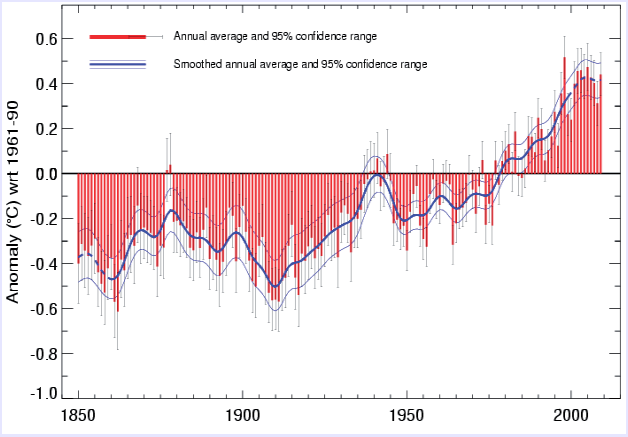
He then introduced the new UKCIP 09 Projections for the UK which include uncertainty in the projections the first time, by presenting them in probabilistic form. Two sources of uncertainty were identified. Firstly *emission uncertainty*, i.e. what will human emissions be in the future. There is a time-lag, due to thermal inertia, between changes in emissions and their impact on the climate. A 1-degree change is already programmed to occur by 2030–2040 independent of changes in human emissions.

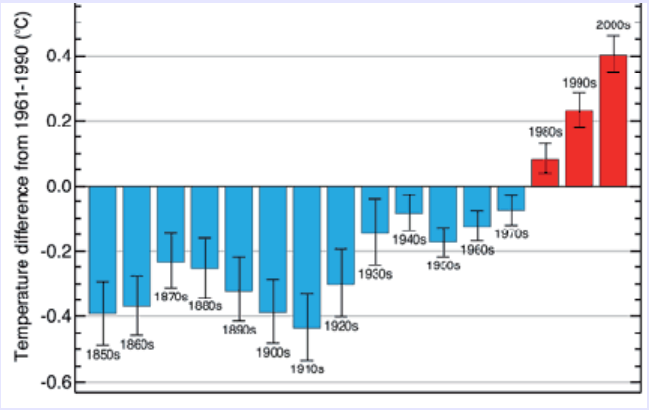
Secondly there is *internal variability*, being chaotic natural variability in the future which may add to, or subtract from, man-made changes.

UKCIP09 probabilistic predictions are produced from ensembles of climate models, some independent, some variants of the Hadley Centre model. Approximately 300 model runs are used for each ensemble, with varying configurations of the physics (clouds, sulphates, aerosols, carbon cycles etc), to generate a spread of different outcomes in terms of temperature, precipitation, relative humidity, cloud and other variables. A probability distribution is then fitted to the data to assess the likelihood of occurrence. It was noted the there has been a large divergence in the various climate models since 2002.

The UKCIP09 predictions are presented in map format on a 25km grid for 16 regions, 23 river-basins and 9 marine regions. Predictions are produced for monthly, seasonal and annual averages over 30-year time periods. A number of examples of UKCIP09 predictions were presented, for example, that there is a 50% chance of the uplift in summer mean maximum temperature exceeding 5-6°C in the 2080s, for a medium emissions scenario.

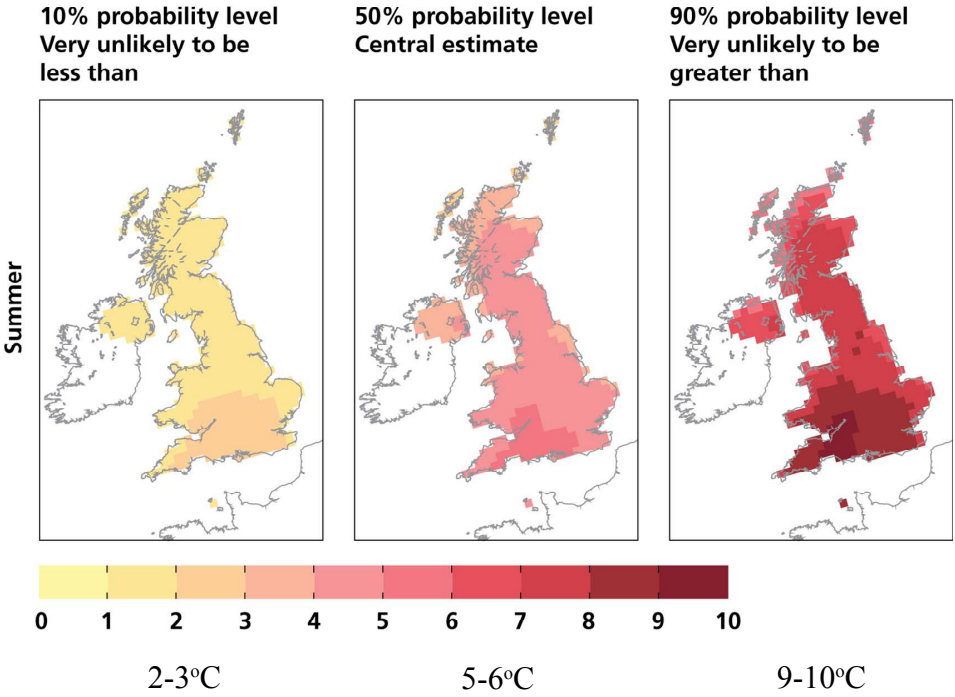
The projections shown in the diagram on the next page will change in future as knowledge and techniques develop, but UKCP09 provides probabilistic projections which are conservative and robust to inform the government's adaptation decisions. They include marine projections, e.g. relative sea levels and storm surge in a future climate, but exclude changes in fog, wind speed, snow or lightning, all of which are being developed. And coupled with the *Weather Generator,* which generates a synthetic daily record, the frequency of extreme rainfall events in a future climate can be assessed.





Global average temperature 1850 – 2009. 2000s warmest decade

Roger Martin of the **Optimum Population Trust** raised the issue of unsustainable levels of global population growth which has been sidelined compared with that of climate change in UN and government policies, for example at the 2009 Copenhagen Climate Conference. With 40,000 born globally every day, population is estimated to grow to 9.2 billion by 2050, increasing the number of carbon emitters (with far bigger footprints in rich countries than in poor), and



Change in summer mean daily maximum temperature, 2080s, Medium emissions

the 'victims' affected by climate change impacts. Unsustainable population growth together with increasing per capita consumption will accelerate the destruction of finite resources and exacerbate climate change impacts. Industrialisation, urbanisation and the availability of cheap and abundant oil and water supplies continue to support unsustainable population growth, further reducing the Earth's carrying capacity, and the developing countries are worst affected. Roger warned of the Malthusian limits to population growth including food and water shortages, environmental degradation and conflict.

Roger recommended that governments, NGOs and development organisations accept and address the population issue. He advocated universal access to family planning information and services worldwide, as agreed at the 1994 Cairo Conference and in Millennium Development Goal 5 for 2012, non-coercive policies to stabilise or reduce populations to sustainable levels, and the education and empowerment of women. Population stabilization it was argued, is a necessary if not sufficient condition for climatic and wider sustainability providing a better quality of life for all.

Andrew Black, BHS Chairman, chaired a lively discussion, and the meeting was closed by Paul Hardaker, Chief Executive of RMetS, with an entertaining video showing interviews with Liverpool people about their understanding of, and responses to, climate change.

Peter Dempsey

This meeting is reported separately by Colin Clark in International Water Power and Dam Construction magazine, March 2010- Volume 62 Number 03, http://www.waterpowermagazine.com/story.asp?storyCode=2055477

A groundwater taster for Scotland

Scottish Hydrological Group meeting
Royal Society of Edinburgh
17th February 2010

Scotland is so liberally provided with surface water that its groundwater resources are often overlooked. However, groundwater is an important resource and accounts for more fresh water than is contained in lochs and rivers. **Alan MacDonald** and his colleagues at BGS Edinburgh have carried out considerable investigations of actual and potential use and he gave a fascinating and entertaining insight into this at a well-attended meeting of the SHG in Edinburgh. His talk provided a rapid tour of Scottish groundwater, with different issues ranging from public water supply to the age of water in the wells, and from nitrate vulnerable zones to groundwater flooding.

He first outlined the many purposes for which groundwater is already important, including somewhere in the region of 30 000 private water supplies which are mostly from groundwater and 7% of the total public water supply, of which the largest unit serves the Dumfries area. Groundwater also supplies a substantial part of the irrigation demand in eastern Scotland, concentrated in a three to four-month season. The bottled water industry contributes £200M annually to the economy. In addition to these direct uses, groundwater provides typically 30–40% of the base flow in watercourses and enables more reliable and predictable use to be made of that resource.

Scottish aquifers include mudstones and sandstones (in Dumfries and Caithness) and a belt of moderately yielding strata running across the central highlands from south-west to north-east. BGS have studied yields extensively, and a productivity map is available showing predicted yield levels and differentiating between intergranular and fissure flow. There are also many superficial glacial deposits which yield water, although these tend to be small and localised and are not readily mapped.

BGS are currently taking part in a joint project with SEPA, over the years 2005 to 2011, to investigate the natural chemistry of groundwater and to establish a baseline against which to measure pollution. This has necessitated sophisticated sampling techniques to eliminate contact with air, which would tend to alter the chemistry. Some data from this are already available on the BGS internet site. A widespread natural contaminant of groundwater is manganese, which may block borehole screens, reduce the efficiency of pumps and is of increasing concern for human health. Its effect is worsened by the reducing chemistry of many Scottish groundwaters, which helps to mobilise the manganese. Around 10% of Scottish groundwater fails the WHO limit for manganese of 0.4 mg/l and 28% the more stringent UK limit of 0.05 mg/l.

BGS are able to estimate the age of groundwater over the last 50 years by analysing for CFC content. Other techniques have established that 'palaeo groundwater' as old as 10 000 years can be encountered.

External threats to the quality of groundwater include pollution by heavy metals in the central lowlands from former oil shale and coal workings, and nitrates from agriculture. BGS are investigating this aspect of groundwater pollution jointly with the Macaulay Institute, and so far have correlated nitrate contamination — in order of seriousness — with arable, dairy and pigs and poultry farming. The object is a definitive groundwater vulnerability map, but this is not yet publicly available.

Alan dealt briefly with groundwater flooding, citing the example of Forres, where flooding originating in the River Findhorn was conveyed to the affected areas through an aquifer.
He also speculated on possible future uses for aquifers, beyond water resources, including carbon capture and as sources for heat pumps.

David Martin
Acting Hon. Sec., SHG

Supplying water in emergencies

BHS SE Section Meeting
19th November 2009

This well attended evening meeting comprised two presentations contrasting the delivery of water in emergency situations at home and in developing countries.

Graeme Clissold is Finance and Operations Director for Water Direct who provide water in situations where mains supply is unavailable, unusable or inadequate, whether planned (e.g. festival camp sites) or unplanned (e.g. droughts or contamination incidents).

In the case of failure of supply, domestic water supply companies are required to provide an alternative supply of not less than 10 litres per person per day. Initially this is usually met by supplying bottled water, as the sight of bowsers and (water) tanks on the streets can cause worry and concern, but as an emergency develops (water) tanks are delivered to streets and filled by bowsers bringing water from outside the affected area.

The flooding of the Mythe Treatment works in Tewkesbury in 2007 put the emergency water provision plans to the test. 350 000 customers lost their water supply for 16 days and in one week, 1% of the annual national production of bottled water was going to Tewkesbury. The main lesson learned was the importance of contingency planning and logistics exercises to ensure that water can be delivered where and when it is needed.

In contrast, **Frank Greaves** (Tearfund) talked about the provision of water and sanitation facilities in the post-emergency phase, particularly in developing countries. Interestingly, the SPHERE Minimum Standards for Water Supply in disaster response, are for 15 litres per person per day (50% more than applied in the UK!). Frank talked about the use of emergency packaged water treatment plants and particularly the value of 'point of use' treatment technologies, such as biosand filters. A key challenge in post-disaster water supply is fostering responsibility for ownership and maintenance in the longer term.

Tim Hess
Cranfield University

First Announcement

HydroEco'2011

3rd International Multidisciplinary Conference on Hydrology and Ecology Ecosystems, Groundwater and Surface Water - Pressures and Options

Vienna, Austria, 2-5 May 2011

The conference is a follow-up to the successful HydroEco'2009 conference and is designed to bring together engineers and researchers from engineering and ecological disciplines. The disciplines include, but are not limited to, hydrology, ecology, environmental engineering, biology, chemistry, geochemistry,environmental biogeochemistry, and subsurface microbiology.

For more information contact: Prof. Hans-Peter Nachtnebel, Universität für Bodenkultur Wien (BOKU), University of Natural Resources and Applied Life Sciences, Vienna, Austria, hans_peter.nachtnebel@boku.ac.at ; or Karel Kovar, Netherlands Environmental Assessment Agency (PBL), karel.kovar@pbl.nl

Abstracts are due by 14 September 2010. Abstract submission will be possible from May 2010. More information is on http://web.natur.cuni.cz/hydroeco2011/

Editorial

We've been thinking hard about our future. Not only do we want to keep up and expand our membership within the hydrological community, we think it's time we stop being so diffident and actively promoted the subject of hydrology. Within the Main Committee we have a small group looking at promotional interests, so expect to see some interesting ideas emerging.

Meanwhile, on the same topic, we have been approached to take part in IWA's Water-Wiki and I have registered BHS on the site. Any members who feel motivated to add to or edit existing entries, please feel free to do so (abiding by the rules of engagement of course),

Its also time for a polite 'nag' to those of you who are a bit tardy with paying your dues: please do think about setting up Direct Debit facilities. We'd also like to encourage as many members as possible to register on our Mailbase as we think we ought to use this particular communication route much more widely. But this will only be sensible if the messages get to a major chunk of our membership.

Finally, this issue is rather slim: I've been charged with trying to make Circulation more 'provocative' (your President's very words), so how about airing some burning issue to get the ball rolling?

Celia Kirby

Hydrology Research

Volume 41 Number 2

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Diary

12 May 2010
'The remote sensing of precipitation with radar: An introduction'.Meeting organised by Univer-sity of Bristol
Time: 14.00
Venue: University of Bristol
Contact: Miguel Rico-Ramirez (Tel: 0117 331 5736)

12 May 2010
'Pharmaceuticals and personal care products in the aquatic environment'
Meeting organised by: water@leeds
Time: 09.30
Location: water@leeds, University of Leeds
Contact: Rebecca Slack (Tel: 0113 343 3373)

19 May 2010
'Water in a Changing Climate'
BHS National Meeting
University of Birmingham.
Contact: David Hannah (Email: d.m.hannah@bham.ac.uk)

14 June 2010
'Advances in the radar measurement of rainfall: An overview'
Meeting organised by University of Bristol
Time: 14.00
Location: University of Bristol, Queen's Building, Civil Engineering Department
Contact: Miguel Rico-Ramirez (Tel: 0117 331 5736)

16 June 2010
'The hydrology of canals'
BHS South East Section Site Visit: 10:00
British Waterways Offices, Paddington. This event comprises presentations, a buffet lunch and a trip on the Regents Canal from Paddington to Camden and back. Cost £25.00.
Contact: Jo Wakefield (Tel: 01372 756693. Email: jo.wakefield@atkinsglobal.com)

23–24 June 2010
Water Quality 2010
Conference organised by: water@leeds
Time: 10.00
Location: University of Leeds
Contact: Rebecca Slack (Tel: 0113 3433373)

6 July 2010
Managing an Uncertain Future: identifying needs and opportunities for sustainable adaptation in catchment management
Conference organised by Catchment Change Network
Time: 09.30
Location: Lancaster Environment Centre
Contact: Ruth Alcock (Tel: 01524 510285)

19th July 2010
'Exmoor Mires and Pinkney Pond'
Joint BHS SW Section & CIWEM field visit

10–20 July 2010
International Summer School: 'Integrated Catchment Management'
Meeting organised by: Catchment Science Centre, Sheffield

Copy deadline for Circulation No. 106 20th July 2010

Location: Beijing - and field visits
Contact: David Lerner (Tel: 0114 222 5743)

19–23 July 2010



Further details see page 4

9th–11th August 2010
XXVI Nordic Hydrological Conference:
Hydrology: from research to water management
Riga, Latvia.
Conference themes:
Climate change impacts and adaptation strategies;
Water management;
Hydrological Infomration systems;
Measurements and Monitoring;
Extremes and uncertainties;
Groundwater/surface water interactions;
Cold climate hydrology
Deatils from:
Www.nordicwater-2010.com

5th–8th Sept 2010
ERB - **Hydrological Responses of Small Basins to a changing environment**
Conference organised by Euromediterranean Network of Experimental and Representative Basins
Location: Seggau Castle, Leibnitz near Graz, Austria
Contact: Ian Littlewood (inanlittlewood505@btinternet.com

October 2010
'Forecasting for rapid response catchments'
SW Section meeting
Further details to be arranged.