

Circulation

No.144
February 2020

The Newsletter of the British Hydrological Society

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Apologies:

We usually list recent PhDs in the February issues of Circulation but there is simply not enough room this time so will hold the item over until May.

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President's Perspective

In 2019 many advocacy groups, local councils and some professional bodies such as CIWEM, declared that we face a 'climate and ecological emergency', demanding new thinking and action (stories.ciwem.org/climateemergency). As hydrologists, we have a part to play in delivering the new science and engineering solutions.

We know that '...the impacts [of climate changes] on people will be felt mainly through water, driven by shifts in regional weather patterns, particularly rainfall and extreme events...', to quote Lord Nicholas Stern's seminal text on the Economics of Climate Change.

We are equally aware that the dramatic decline in wildlife over the last 30 years, particularly in the humid tropics, relates in part to habitat loss from deforestation and urbanisation, and from agricultural intensification with its unintended impacts on soil and water quality. Scientific investigation, engineering practice and hydrological education all have a fundamental role in reducing the risks to people and the natural world from the knock-on effects of these changes for flooding, water insecurity, and health. The need for hydrologists to come together to work on these grand challenges for a positive impact on society has never been greater.

Our NationalSymposium

With your support, the three-days of the 14th BHS National Symposium (BHS2020) from 8-10 September will focus on the ways that we can contribute new science and engineering practice to address these challenges. The programme revolves around five cross-cutting themes, which came out of the 17 session proposals contributed by the BHS community. The themes are: Future hydrology, Floods & droughts, Natural flood management & partnership working, Ecohydrology & water quality and International hydrology. Submission of individual contributions to the proposed sessions within these themes are now invited: see

https://www.lancaster.ac.uk/bhs2020

We welcome creative presentations (e.g., digital or physical demonstrations) as well as oral and poster presentations. Do come to 'showcase' your recent activities and network with the broad BHS community of practitioners and academics. The programme includes a range of networking opportunities, including field visits in the Lake District.

Attendance costs have been kept to a minimum to encourage wide participation in this key networking event of the UK water calendar. Online registration is now open.





The venue : The George Fox building and B&B accommodation.

While the symposium is the place to share your latest work, the BHS community and wider UK society have been making significant progress with these grand challenges over recent months:

Future hydrology
In December, new visions and techniques for hydrology arising from the 13th BHS National Symposium appeared in our journal Hydrology Research (iwaponline.com/hr/issue/50/6) and a BHS Working Group led by Prof Keith Beven FRS published an invited commentary on future observational needs in *Hydrological Processes* (doi.org/10.1002/hyp.13622).

Floods & droughts
The Natural Environment Research Council (part of UKRI) funded a 5-year research programme on 'Flooding from Intense Rainfall' from 2012–2019. Some of the advances in our understanding and forecasting of convective events was presented at the Royal Society on 3 February (royalsociety.org/science-events-and-lectures/2020/02/rainfall-extremes), and will be published in *Philosophical Transactions of the Royal Society A*.

There has been significant progress by the practitioner community. In November, Water UK announced that from April 2020, new rules will make it easier for water companies to take on responsibility for maintaining new Sustainable Urban Drainage systems (SuDs: hwww.water.org.uk/blog-post/new-rules-on-sustainable-drainage-will-help-prevent-pollution-and-tackle-climate-change). Water practitioners are keenly awaiting publication of the Government's National Infrastructure Strategy that will include measures to achieve net zero emissions by 2050. In December, the water companies, working with Ricardo and Mott MacDonald, took a lead by announcing a commitment to achieve carbon neutrality by 2030 across their industry. Their action plan is to be published in March 2020, followed by a detailed report in the summer.

Natural flood management (NFM) & partnership working
One of the cornerstones of CIWEM's climate declaration is for technical experts to work more closely with wider society to build greater trust and delivery, especially with those in flood-affected communities. This leads on from their policy work last April on 'Climate Resilience and Extreme Risks' (stories.ciwem.org/climateresilience). Our regional BHS meetings also demonstrate the importance of partnerships between industry and academia: iwe have just had the meeting on NFM by BHS SE Region (6 Feb) and Uncertainty in Flood Peak Estimation by BHS Pennines Region follows on 27 Feb)

Ecohydrology & water quality
Both the Agriculture Bill and the Environment Bill returned to Parliament in January. The Agriculture Bill, in the words of the minister, aims to deliver 'a future where farmers are properly supported to farm more innovatively and protect the environment'. The mechanism for this is the anticipated Environmental Land Management scheme (ELMs). This may include support for on-farm interventions that reduce flood hazard and cut the loss of agrochemicals and

bio-contaminants to watercourses, while maintaining food production systems.

The design of these interventions and assessment of their efficacy requires considerable technical input from the BHS community. Indeed, in January CIWEM highlighted that if extensive tree planting to help meet our carbon targets is to deliver its full potential, it needs to consider a wider range of potential benefits including habitat creation and flood mitigation (www.ciwem.org/news/woodland-creation-the-right-way). The Environment Bill promises to provide a way to assess the 'environmental gain' of the supported interventions.

International hydrology

Developing countries, facing serious water-related problems, are benefiting from the technical expertise of UK consultancies and cutting-edge UK research. Substantial support for this research continues via the UK's Global Challenges Research Fund (GCRF), so BHS researchers are encouraged to contribute (www.ukri.org/research/global-challenges-research-fund). The Centre for Ecology & Hydrology (now UKCEH) demonstrate great leadership in such international initiatives and I am sure will continue to do so following their move from the UKRI family to a non-for-profit company on 2 December. Many of you will be waiting to hear of the outcome of your abstract submissions to EGU2020: I wish you all success and hope that there will be a strong UK presence.

Returning to UK-focused matters, I would like to highlight that entry for this year's Institution of Civil Engineers' Chris Binnie Award for Sustainable Water Management opened on 1 February – find more details of how to enter at www.ice.org.uk/news-and-insight/latest-ice-news/ice-entries-for-chris-binnie-award-open.

Lastly, I should like personally to thank Dr Ian Littlewood for his dedicated work for the Society as Honorary Treasurer from Sept 2017 to Oct 2019, overlapping with my role as President Elect. Ian sought ways to grow our income and make it go further, including the potential cost savings gained from moving to a digital-only version of Circulation. The BHS Main Committee, having discussed this idea, have concluded that a paper-copy of Circulation is of considerable benefit to many of our members and so should be continued. All elements of our income and expenditure do however remain under regular review to ensure that resources are used most effectively for your benefit.

Nick Chappell
President
February 2020

2020 – An important milestone for our journal *Hydrology Research*

Celebrating 2019

2019 has been a great year for our journal – together with our publishers (IWA Publishing) and partner societies – we have refreshed our aims and scope (see below), updated our Editorial Board (including welcoming CEH's Jamie Hannaford to the Board) and reviewed and streamlined our editorial systems. Thanks to the hard work of our editorial team, publishers, reviewers and authors, this year our impact factor rose by 37.4% to 2.47.

We will only consider articles that comply with our Instructions for Authors, and they must offer a distinct, novel contribution to the research literature. This might be a methodological innovation, a contribution to theory, improved understanding of processes or principles, or insightful analysis which reveals gaps in our understanding, policies or practice of hydrology and water resource management. Research papers should clearly outline an existing knowledge gap and articulate how the findings address this deficit, including the practical implications for water resources management and the science of hydrology."

Our refreshed scope is:

"*Hydrology Research* is an international, peer-reviewed journal publishing articles providing a distinct, novel contribution to the science of hydrology and water management, including:

- surface and groundwater hydrology, including physical, chemical, biological, and ecological aspects
- hydrological processes, hydrological extremes and the impact of anthropogenic change on hydrological systems
- methodological innovation regarding hydrological observations, data analysis, modelling and management
- hydrological analysis for the design, operation and management of engineered and natural water systems, and associated structures
- insightful analysis and new approaches to linking hydrology with social, economic and legal aspects of water resource management
- innovative, integrated and holistic aspects of the water-energy-food nexus

All papers from the BHS 2018 Symposium are now available online, including two keynote papers:

Keith Beven – How to make advances in hydrological modelling https://doi.org/10.2166/nh.2019.134

Rob Wilby – A global hydrology research agenda fit for the 2030s https://doi.org/10.2166/nh.2019.100

If you missed their very thought-provoking keynotes at BHS 2018 – or just want an insightful read, have a look at them on the journal's home page (https://iwaponline.com/hr) or link to them from the BHS website. IWAP kindly waived fees for these articles, so both are open access.

Celebrating 2020

Next year marks the 50th anniversary of our journal. From 1970 to 2008 the journal was called *Nordic Hydrology* and managed by the Nordic Association for Hydrology (NHF). From 2008 onwards BHS entered into a partnership with the NHF and the journal was renamed Hydrology Research to better reflect a broader scope. Subsequently our journal was also adopted by the Italian and German Hydrological Societies.

From 1 January 2020, our journal will become a fully Open Access journal. This is fantastic news for BHS members because it means that members will have access to the journal at no cost. All papers will be published under Creative Commons OA licenses allowing for greater reuse, transparency and promotion of published research – and of course – will reach a global audience, rather than just subscribers. In addition, to celebrate this milestone IWAP has agreed to waive Open Access fees for BHS members, members of the International Water Association, and the other hydrological societies for 2020. As with all Open Access at IWA Publishing, fee waivers for authors from less-economically developed countries are also granted through IWAP's collaboration with the Research4Life programme.



Appeal to BHS Members

- Please help by considering Hydrology Research as an option when you are thinking about your next paper – or thinking about Special Issue options following a meeting or conference.
- Are you perhaps interested in becoming more involved in the journal? We are always looking for reviewers and would welcome new additions to our panel.
- Would you like to be an Associate Editor? We are currently looking for a BHS nominated Associate Editor who would handle papers in their nominated specialist area, but who could also potentially move into the BHS Editor-in-Chief role at some point in the future.
- Finally, the journal has also launched the 'Young Water Professionals Editorial Board' initiative – see https://www.iwapublishing.com/news/hydrology-research-young-water-professionals-editorial-board. We are seeking up to four young water professionals from anywhere in the world to join Hydrology Research's International Editorial Board for an initial period of two years.

If you are interested in any of these possibilities, please just email (nevil.quinn@uwe.ac.uk) for more detail.

Nevil Wyndham Quinn
Emma Gulseven
Editor-in-Chief (BHS)
IWAP Head of Editorial and Production

About Drought Download

The About Drought Download took place at The Royal Society on 7th November to mark the culmination of the UK Research Council funded Drought & Water Scarcity programme.

The UK Droughts & Water Scarcity research programme is a five year interdisciplinary, £12 million+ NERC programme in collaboration with ESRC, EPSRC, BBSRC and AHRC. It is supporting improved decision-making in relation to droughts and water scarcity by providing research that identifies, predicts and responds to the inter-relationships between their multiple drivers and impacts. The Download event helped to illustrate the diverse, interdisciplinary and cross-sectoral content of About Drought and gave a valuable insight into drought and water scarcity.

The day opened with welcoming remarks from Sir Mark Walport, Chief Executive of UKRI, the programme PI Jamie Hannaford (CEH), and from the user perspective, a talk from Meyrick Gough of WRSE.

Throughout the day there were data clinics, exhibitions and stands, quick-fire talks, a cinema, panel events on 'Abstraction & Environmental Flows' and 'Reframing the discourse around drought', a 'Drought Walk in St. James' Park', a drought-forecasting game and singing and songwriting from folk singer Sharron Kraus. Rob Lawson of Artesia Consulting & CIWEM summed up the day with closing remarks.

We should like to thank all our speakers and exhibitors who shared their expertise and all the delegates for your questions, comments and opinions which will feed into the future of drought research in the UK.

The About Drought Handbook was launched at the event, a readable, magazine-style summary of the UK Drought & Water Scarcity Research Programme. Filled with interesting interviews with key stakeholders, project leaders and decision-makers who are already using the outputs, the handbook also contains links to all the datasets and tools as well as published research papers, briefing documents and primers, links to the videos and podcasts and even a selection of the brilliant DRY Project cartoons created by John Elson. As well as having a limited run of printed copies, the handbook is available to read online and to download at:bitly comAboutDroughtHandbook

The new-look 'About Drought' website has been transitioned from a project website to a user-friendly, one-stop shop for all the outputs from the About Drought / ENDOWS programme. Briefing papers, guides, primers, report cards, user interviews, videos, podcasts, insights into the data tools, published papers and, of course, all the dataset and tools themselves too are featured with more being uploaded as they become available.

Visit www.AboutDrought.info







New members

Gang Zhao.....University of Bristol
Rebecca Ing.....JBA Consulting, Birmingham
Richard Body.....HR Wallingford, Abingdon
Lorena Ramirez-Romero.....Landell Mills Ltd, Trowbridge
Elaine Hallliday..... Reading
Ken Mirunga.....Nairobi
Nikki Beale.....Environment Agency
Eoin Cullinane.....Nicholas O'Dwyer Ltd., Dublin
Alexnder Osbourne.....University of Durham
Ioannis Michalopoulos.....Newcastle upon Tyne
Ruth Goodall .....Aecom, Buxton
Jamie Hizzett.....Environment Agency, Southampton
A Collins.....Rothamsted Research, Okehampton
Camilla Negri.....James Hutton Institute, Aberdeen
Thomas Singleton.....JBA Consulting,

New portal tracks UK hydrological situation in real-time

CEH has launched a new web portal that allows users to assess information about the latest hydrological situation and drought conditions across the country in near-real-time.

The UK Water Resources Portal is a prototype web-based system for tracking the hydrological situation in near-real-time. It offers dynamic, interactive situation monitoring, mapping and plotting and a wide range of variables including rainfall, river flow and soil moisture measurements (from COSMOS-UK). Near real-time river flows across England are fed in from the new Environment Agency hydrological data service.

The portal is a 'demonstrator' as it is still a work in progress that is being developed and is undergoing user-testing until spring 2020 when it will be fully operational.

The web address is **https://eip.ceh.ac.uk/hydrology/water-resources/**

The new portal is aimed at anyone with an interest in current water resources situation or drought conditions. The primary focus is for water resources and drought applications, but it can also be useful for tracking river flows and soil moisture in real time in order to provide an indication about high flows, as well as low flows.

The portal provides access to the following datasets;

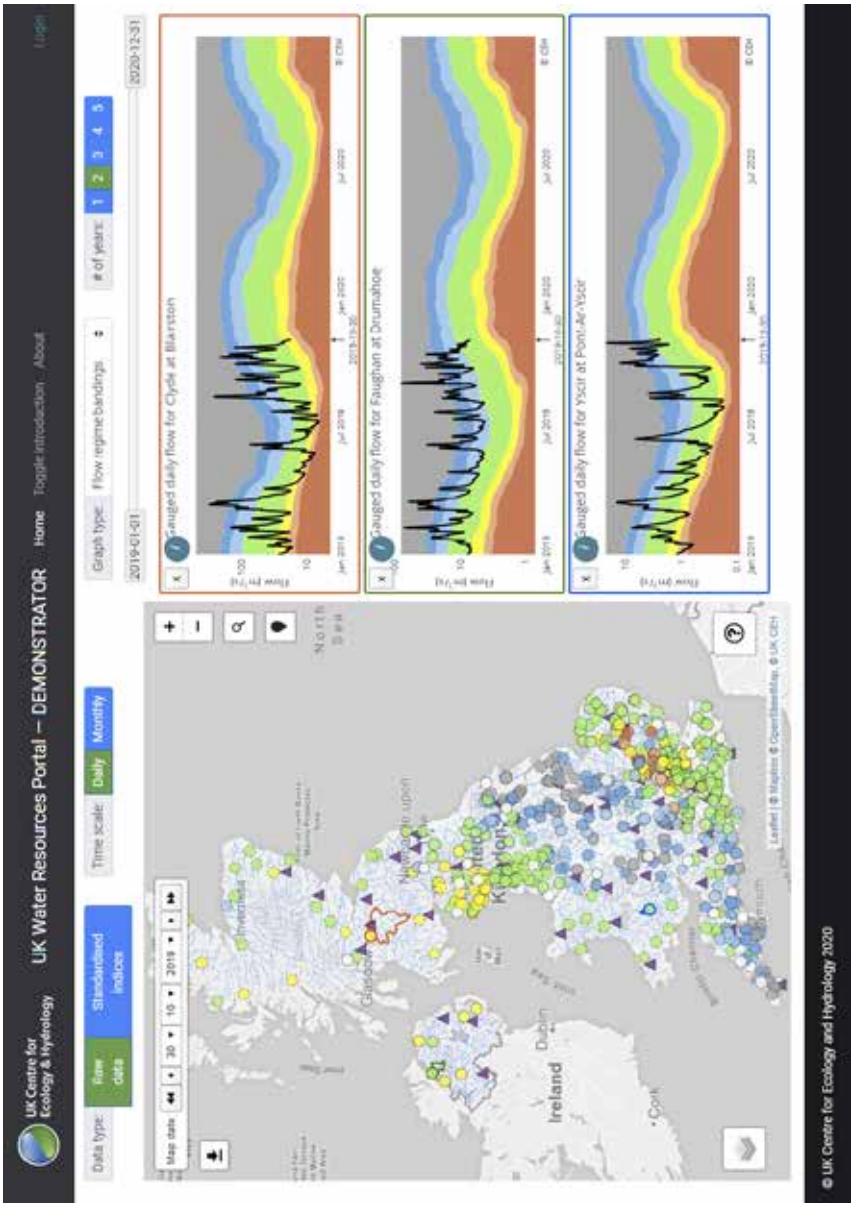
- Rainfall from the Met Office (gridded, and over gauged catchments and hydrometric areas)
- River flows from the National River Flow Archive (for historical data) and Environment Agency (for real-time data)
- Soil moisture (from CEH's COSMOS-UK network)
- Base maps including UKCEH Land Cover Map 2015 and BGS Hydrogeology 625K
- ....and Coming Soon! BGS Groundwater Levels.

As well as visualizing observed and measured data, it can also be presented as 'standardised indicators' which show the anomalies from the long-term average.





Left: NRFA Gauging Station the 23004 South Tyne at Haydon Bridge © National River Flow Archive
Right: COSMOS-UK station Balruddery, Scotland © COSMOS UK



The portal is a prototype designed to showcase what is possible with the new real-time data streams becoming available, and to seek feedback from users. Please visit the About page of the portal and email comments to nhmp@ceh.ac.uk.

Stephen Turner

BHS National Meeting

Hydrological Interfaces —

interdisciplinary advances and perspectives in a changing environment

Thursday 2nd April 2020
Loughborough University

Call for abstracts for Oral Presentations and Poster

Climate change, political instability and growing populations put pressure on hydrological resources and the ecosystem services they provide. Our ability to manage water resources successfully relies on appropriate understanding of the underpinning science (hydrology, ecology, geomorphology) and engineering, but also how people and societies interact with water (social science, international studies, economics, humanities). This one-day meeting will bring together actors and practitioners from across these fields to explore the ways in which interdisciplinary and cross-disciplinary approaches can improve our understanding of complex problems and benefit our hydrological future.

Keynote Speakers

Prof. Julian Olden, School of Aquatic and Fishery Sciences, University of Washington

Professor Ellen Wohl, Department of Geosciences, Colorado State University

Registration and Attendance

Please register via the direct link on the BHS website -
£90 (non-members), £60 (members) and £45 (students and retired).

Abstract Submission

Those wishing to deliver an oral presentation or poster at the meeting should submit a title, list of authors and a 250-word abstract by **Friday 20th February 2020** to Paul Wood (p.j.wood@lboro.ac.uk). In particular we would welcome submissions centered on interdisciplinary perspectives on flooding, drought, river / habitat restoration, the management and conservation of aquatic waterbodies/ ecosystems, ecosystem services, ecohydrology, hydrogeomorphology / hydromorphology, water resource management and economics, biomonitoring of aquatic system and the importance of communication hydrological information to interdisciplinary audiences and publics.

Meeting organiser: **Prof Paul Wood** p.j.wood@lboro.ac.uk

Promoting equality and diversity

BHS is committed to promoting equality and diversity in all its activities. As part of a new strategy to increase diversity, inclusion and equality within hydrology, profiles of hydrologists from a diverse background of employer, entry into the field of hydrology, gender and ethnicity, will be published in an ongoing series in Circulation. We hope that these profiles will demonstrate the diversity of those currently in the field of hydrology, and the different career pathways available. They will be also be available as a resource on the BHS website. If you would like to be featured, or would like to nominate someone, please contact Liz Lewis (elizabeth.lewis2@newcastle.ac.uk).

We are very grateful to **Hannah Cloke** for agreeing to 'go first'



How did you become interested in hydrology?

I love rivers. I really do. I have done ever since I was tiny. My Dad was a Geography teacher and school holidays were filled with Dartmoor walks with Dad enthusiastically pointing out how the landscape around us worked as we hopped across bogs and paddled in the clear streams. I still get excited as I run along the Thames path when I see the eddies spinning off, and the Swans swimming against the current. I was also lucky at university to have a super enthusiastic lecturer, Paul Bates (who later became my PhD supervisor), to demystify the delights of the Navier Stokes equations for me.

What is your current job?

I am Professor of Hydrology at the University of Reading. I co-direct the Water@ Reading research group, an interdisciplinary research centre, where we undertake research into global flood & drought forecasting, early warning of natural hazards, natural flood management, catchment processes, earth system modelling and risk communication. I am also Guest Professor in the Department of Earth Science in Uppsala University, Sweden where I visit several times a year. Although hydrological research forms a large part of my job, I also teach university modules such as 'Preparing for Floods' and I sit on many science advisory groups including those of the Environment Agency & the Copernicus Emergency Management Service.

What is your dream job?

In so many ways I am doing my dream job right now. I always wanted to be a University Professor like my Uncle. It is a very varied and fulfilling job and I continue to hope that our work on improving early warnings of floods and other natural hazards makes a real difference to people's lives. I would like to have a slightly less hectic life, to do more science communication, work more with the media, and also to spend more time on the river instead of behind a computer screen. I'm working on this plan!

What, or who, has helped you get to this point in your career?

It is impossible for me to list here all my funders, collaborators or the very many supportive and inspiring people who have helped me get to this point in my career so I will not try – but instead take this sneaky opportunity to say a massive thankyou to everyone who I work with. Certainly I would not be where I am now without my husband Florian Pappenberger, who is not only the best ever life partner but also the

best ever research collaborator, and has always utterly bought into total equality in terms of mutual career support and raising a family together. My Mum and Dad have been the most fabulous parents in the world, providing unfailing support in so very many ways. I also owe a huge debt of gratitude to my long time mentor Jutta Thielen, who is not only an inspiring scientist, but also taught me to be braver than I ever knew I could be and never give up.

Do you have any advice for your younger self?

Be braver. Just do it. It will be awesome.

Do you have a favourite river? Why is it your favourite?

I spent ages thinking about this question and am going to have to cheat and pick 3. The River Amazon because it is completely extraordinary and it was one of the best moments of my life cruising up this river. The River Dart in Devon where I learnt the beauty of rivers as a little girl. The River Thames which keeps my love of rivers nourished on a daily basis.

Do you have a hydro-hero?

Joseph Conrad who wrote the Heart of Darkness which I spent many hours reading and re-reading as a young teenager, conjuring up the Congo River in my imagination.

What keeps you busy apart from hydrology?

My very lively family keep me very very very very busy. But in recent years I have learnt the hard way that even though everything is so very busy it is essential to carve out personal time. So for the last couple of years I have made an effort to do more music and I now sing in the University of Reading Chamber Choir and take part in Music@ Reading festivals such as our upcoming performance of Joseph and the Amazing Technicolour Dreamcoat.

Which BHS meeting did you enjoy most?

The really focussed ones are always my favourites, where you can generate some deep science discussions, such as at the 2018 Seasonal Forecasting meeting in Loughborough

What do you like about being a member of BHS?

The opportunities to come together as a community and discuss hydrology with such a wide range of people.

Describe BHS in three words:

Support, Network, Water-friends

Many thanks also to **Shaun Harrigan** for his responses.



How did you become interested in hydrology?

I was always fascinated with the natural world and how it worked. Growing up in Donegal along the Atlantic coast in northwest of Ireland, it was hard not to be. I didn't realise it at the time, but the spark for my career in hydrology probably started during my final year Geography project at secondary school. We spent two days of fieldwork across Lough Foyle in Northern Ireland studying the River Roe. We mapped the topography and graphed and analysed my data – a hydro-geek was born.

What is your current job?

I work as a Scientist in hydrological forecasting at the European Centre for Medium-Range Weather Forecasts (ECMWF) in Reading, UK. I work within the team that produces the European and Global Flood Awareness Systems (EFAS and GloFAS).

What is your dream job?

Working at ECMWF is pretty cool! There needs to be more to our job than just writing and publishing our work in journals. It's important, but it's not everything. It is very fulfilling to be working in a job where I can see my hydrological research contributes to improving an operational service that provides early warning of floods and droughts, making society more resilient and saving lives.

What, or who, has helped you get to this point in your career?

I spent 10 years at Maynooth University in Ireland, completing my undergrad, MSc, a research assistantship, and finally my PhD in 2015. Conor Murphy lectured, supervised, and helped me develop every step of the way. I had several research visits to Loughborough University with Rob Wilby during my PhD, he gave me invaluable mentorship and guidance. I then joined CEH and soaked up everything Jamie Hannaford knew about trends and the UK Benchmark Network of river flow stations to help update it. Christel Prudhomme introduced me to hydrological forecasting – I was hooked!

Do you have any advice for your younger self?

Don't let your PhD research consume your life so much. Make more time for hobbies and seeing friends and family.

Do you have a favourite river? Why is it your favourite?

The River Boyne in the east of Ireland. It drains into the Irish Sea with a catchment area of 2,460 km2. I wrote my first paper on this river, trying to attribute the causes of changes in river flow patterns to human influences and climate changes. I got to visit the gauging station in the grounds of Slane Castle: pity U2 or the Rolling Stones weren't playing at the time!

Do you have a hydro-hero?

Evaporation – the hydro-hero underdog: https://younghs.com/2016/07/09/the-mystery-of-evaporation/

What keeps you busy apart from hydrology?

Playing guitar, golf, gym, and swimming.

Which BHS meeting did you enjoy most?

The Peter Wolf Early Career Hydrologists' Workshops are fantastic and are a must for any fledging hydrologist. My first was the 2011 event at Loughborough University. I particularly enjoyed it because I won the presentation prize (shameless brag) – a Loughborough T-shirt, so when I go to the gym people must think I had one of those top sports scholarships.

What do you like about being a member of BHS?

Keeping up to date with events in the British hydrological calendar. The short meeting summaries in '*Circulation*' come in handy when I haven't been to an event.

Describe BHS in three words:

Science, Practice, Communication.

Events Calendar 2020

Date	Title	Venue	Type
17 March	Early Career Women in Water	Cranfield Univ.	Conference
02 April	Hydrological Interfaces - Interdisciplinary advances and perspectives in a changing environmentonment	ICE London	Conference
17–18 June	Peter Wolf Symposium	Stratheclyde Univ	Symposium
10-13 August	Nordic Hydrology Cnference	Tallin Univ	Conference
09-10 Sept	BHS NATIONAL HYDROLOGY SYMPOSIUM	Lancaster Univ	BHS National Symposium

Changes to the Statutes

The Main Committee is proposing some changes to the Statutes. These are mostly points of clarification but there is one substantive point: when the Statutes were last changed the concessionary subscription rate for members over the age of 62 was removed (following concerns in relation to age discrimination legislation). The committee would like to reinstate this for "members retired from employment". This will be on the basis of self-declaration - we believe that we can trust members not to abuse this (but there are potential courses of action open to the committee if required!).

The proposed changes to the Statutes allow the committee to set concessionary rates. This would be in line with Statute 6 which states that the committee shall be responsible for recommending the structure and level of membership fees. If the change is approved it would be possible for concession categories to be amended in future without the need to change the Statutes. The size of the concession has never been stated in the Statutes; there is no intention to change from the current 50%.

The proposed changes will be put to members via an email sent to members. If any member does not have their email address registered with the Society they may vote by contacting the Secretary, Moira Doherty, and advising whether they wish to vote for or against the proposed changes. The details of the proposed changes may be seen on the BHS website.

The closing date for ballot responses is **March 31st**. The results of the ballot will be published in the next issue of *Circulation*. If the changes are approved any retired member wishing to claim the concessionary rate will be able to do so from the next subscription renewal date.

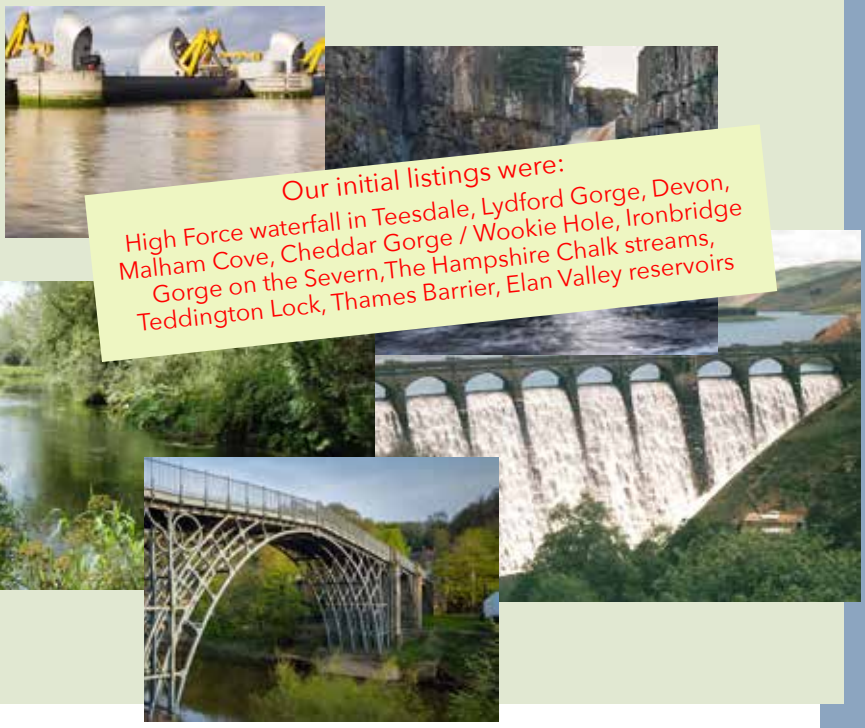
SSHIs

Everyone knows about SSSIs but what about "Sites of Special Hydrological Interest"?

A request from an American hydrologist planning a UK trip this summer for some suggestions of places to visit with 'high impact appeal' led to quick trawl round the Committee for ideas (see below). We should like to expand on this and promote it on our web site for general interest. In the meantime, we hope it provokes a lot more thought among the membership such that some more ideas will come forward (where are the Scottish sites, for example?!)

We will do a map indicating locations and postcodes to give sufficient basic information for Google or Wiki searches but what about adding some pithy descriptions of their hydro/ geological importance? Volunteers very welcome!

nb: there are over 4000 SSIs so we have a way to go yet....



Our initial listings were:
High Force waterfall in Teesdale, Lydford Gorge, Devon, Malham Cove, Cheddar Gorge / Wookie Hole, Ironbridge Gorge on the Severn,The Hampshire Chalk streams, Teddington Lock, Thames Barrier, Elan Valley reservoirs

AGU Fall meeting
San Francisco
9–13 December 2019

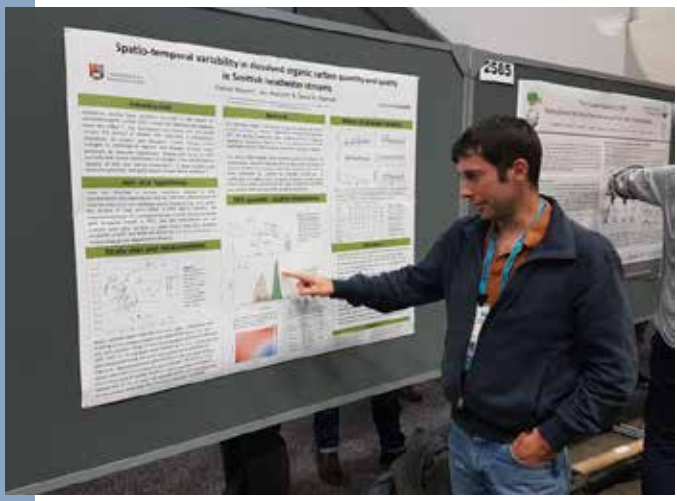
Travel grant reports

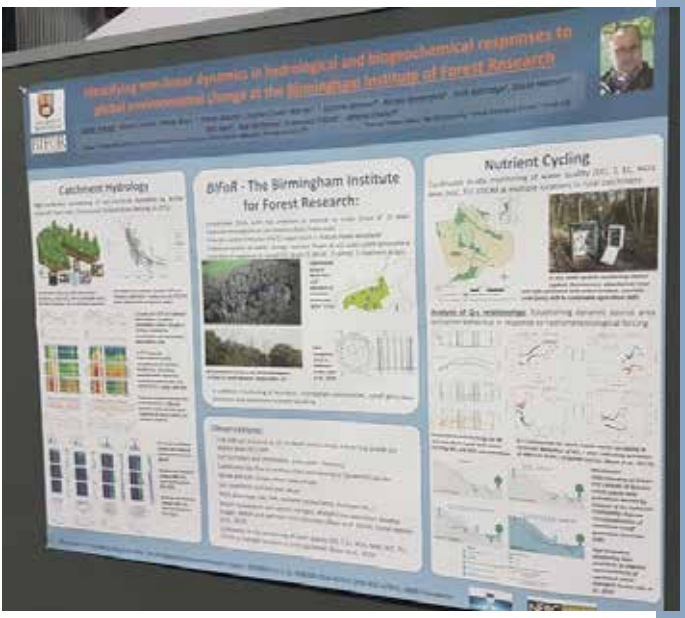
Kieran Khamis, from Birmingham, writes:

From the huge queue of scientists snaking through the cavernous Moscone Centre to collect name badges early on Monday morning, I quickly realised the scale of this conference was far greater than I had anticipated. As a first time attendee I took a while orientating myself and located the numerous rooms that would be hosting the 1000s of oral presentations throughout the week. Then, I set about finding my allocated poster board in the session "Characterizing Dissolved Organic Matter Composition to Assess Its Sources and Role in Natural Waters" which was running that afternoon.

The poster hall was enormous but well organised and I quickly found my spot within the vast array of 2000+ posters. I was presenting a paper "Spatio-temporal variability in dissolved organic carbon quantity and quality in Scottish headwater streams" with collaborators from the University of Birmingham (UOB) and Marine Scotland Science (MSS). Using a long term dataset of DOC (dissolved organic carbon) concentration and absorbance records (254 nm) collected from 45 riverine sites and loch outflows across Scotland we were able to highlight the hydrometeorological and catchment controls on DOC quantity and quality.

The session was well attended and lively discussions were had with scientists from N. America, Europe and Asia. UK-based researchers were well represented with interesting posters from **Fred Worrall**, University of Durham on the long-term concentration, flux, composition and processing of dissolved organic carbon in UK rivers and **Catherine Moody**, University of Leeds, on UK DOM composition and impacts on water treatment. Another UK based researcher, **Ryan Pereir**a from Heriot-Watt University, provided a global perspective of riverine dissolved organic matter flux, composition and fate, highlighting some novel DOM characterisation techniques he has been developing.





I also co-authored a poster in the interesting session "The Catchments Behind the Data and the Process Behind the Catchments" in which researchers were encouraged to put their catchment on the map. Here, lead author Stefan Krause from UOB showcased the experimental catchment at the Birmingham Institute of Forest Research; highlighting how we have combined sensor network innovations with adaptive modelling approaches to identify non-linear dynamics in hydrological and biogeochemical responses to global environmental change. From alpine to coastal, forest to urban, Germany to Antarctica the diversity of catchments presented in this session was inspiring. It is clear that through better data sharing we can improve our understanding of catchment dynamics across spatial and land use gradients.

There were so many great talks, e-lighting presentations and posters it is difficult to do them justice in this short piece. However, some of the highlights were in the session "Advancing River Thermal Research and Modeling" with an overview of river temperature sensitivity to climate from David Hannah (UOB). Posters from Faye Jackson (MSS) on predicting the effects of climate change on thermal habitat suitability for salmonids and Valerie Ouellet (UOB) on the development of a river temperature model to prioritise riparian tree planting were also particularly interesting. In addition the "Goundwater - Surface water Interactions" session conveyed by Nicolai Brekenfeld (UOB) was another highlight with a diverse range of oral contributions, ranging from from microplastic transport in fluvial systems to the use of diatoms as tracers of dissolved organic matter source contribution.

Finally, I would like to thank BHS for providing the support to enable me to attend AGU. This has been a great opportunity to get feedback on my research from leading scientists in the field and broaden my network of potential collaborators.

Kieran Khamis
School of Geography,
University of Birmingham



Doris Wendt, also from Birmingham, writes:

Over 28.000 academics attended this AGU meeting and thanks to the British Hydrological Society, I was one of them. This immense gathering of academics is a great opportunity for science discussions and meetings, even before the official start of AGU. On Sunday, a delegation from the University of Birmingham travelled to Berkeley to participate in the Catchment Symposium. A day full of interesting discussions about ongoing catchment research (**Theresa Blume** and **Renee Brooks**), newly developed concepts (**Jeff McDonell**), and innovative ways to model catchments (**Reed Maxwell**). It was a symposium, true to the ancient Greek word 'symposion', as new science was being discussed during the many pop-up presentations, lunch, dinner, and coffee breaks. A brilliant way to start the AGU week, as I could streamline my AGU schedule to see the work of the academics I had met.

With an overflowing schedule of interesting talks, posters, and meetings, AGU is very much a platform to (re-) connect with academics working in the field of groundwater management, aquifer recharge, drought mitigation, and water resource management. These fields define the landscape of my PhD and since I am close to finishing, AGU was a perfect opportunity to see how my PhD research fits in.

The work I presented told the story of drought mitigation using Managed Aquifer Recharge in the heavily-stressed aquifer in the Central Valley in California. Using a regional approach, I could show how groundwater levels increased over time in this aquifer and how this increase in groundwater storage alleviates groundwater droughts regionally. The potential of managed aquifer recharge in California is enormous and receives more and more attention, given the increasing pressure on water resources in



the changing climate and the implementation of California's new water law (SGMA). After my e-Lightning presentation, I spoke with some local (Californian) and international water managers who showed interest in this regional groundwater research. Thanks to the setup of AGU, I could share the iPoster and contribute the open-science platform.

Now it is time to boost the paper writing after the constructive meetings at the AGU meeting. It seems that there is a chance on furthering this research in other regions that face increasing pressure on their groundwater resources. This potential for new research, new collaborations, and strengthening existing connections shows the value of visiting the AGU meeting. The generous contribution of the British Hydrological Society is therefore greatly appreciated, as it directly contributed to this successful conference visit.

Doris Wendt
School of Geography

UK Hydrological Bulletin: November 2019 – January 2020

A vigorous Jet Stream contributed to predominately mild and wet conditions across much of the UK for the period under review. More notably in terms of the hydrological impacts, regional and local variability in precipitation was very marked. Some areas, e.g. parts of Northern Ireland and north-west England, recorded below average rainfall whilst a clustering of exceptionally wet interludes combined with saturated soils and, in some areas, rapidly increasing groundwater contributions, resulted in sustained spate conditions punctuated by exceptional flood episodes, particularly in Yorkshire, Derbyshire and the Midlands. Many new monthly runoff records were established for both major rivers and minor streams. The associated flooding was persistent and had very severe impacts on local communities, transport, agriculture and ecology. Beneficial consequences of the exceptional rainfall included healthy reservoir stocks in early 2020 and a welcome flow recovery in baseflow-dominated streams and rivers following a substantial contraction in the drainage network through much of 2019.

At the national scale November rainfall was close to the long-term average but regional departures were very marked. Much of north-west Scotland recorded less than half the average monthly rainfall; correspondingly, flows in the river Ewe (Wester Ross) fell below the previous minima for the late-autumn (in a series from 1968). By contrast, many catchments in the Midlands, Yorkshire and north-east Britain were exceptionally wet and new maximum runoff totals for November were established in a substantial number of index catchments from the Tweed to the Kenwyn (Cornwall). A severe flood episode was initiated on the 7/8th (when 24-hr rainfall totals of 84 mm and 114 mm were recorded in Sheffield and Glossop respectively) and exceptional peak flows were common. The Derwent (Derbyshire) exceeded its previous maximum flow and the Don (at Doncaster) recorded a peak of 395 m^3s^{-1} – the highest in a series from 1959 (Fig 1): an extreme event (note, however, that records published in the Flood Studies Report for an

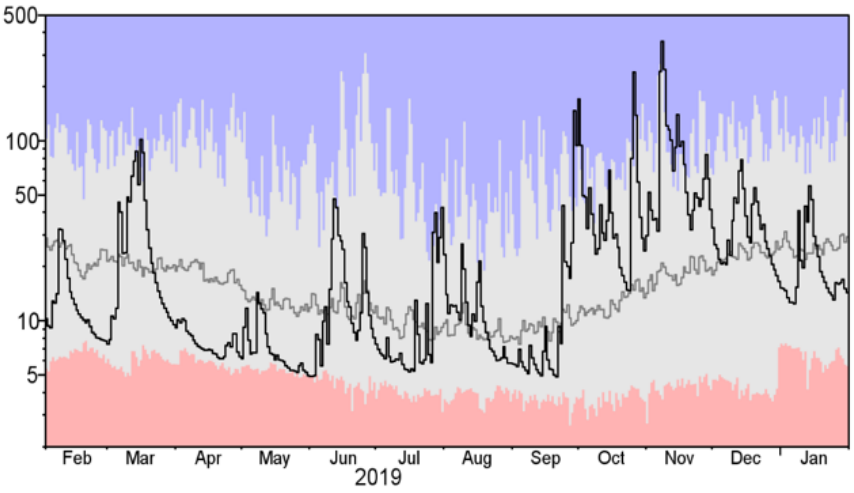


Fig 1 Daily mean flows (m^3s^{-1}) for the Don at Doncaster with pre-2019 daily max. and min. and long term average

earlier gauging station at Doncaster include three flood maxima >340 m^3s^{-1} in the 1930s and 1940s). The associated floodplain inundations were protracted and extensive with a major evacuation required at Fishlake (near Doncaster) and widespread transport disruption.

A week later, flows in the river Teme (West Midlands) exceeded previous maxima in a 50-year series. An estimated 1000 properties were affected by the two flood episodes whilst flood defences were estimated to have protected over 20,000.

With soils saturated throughout the month, recharge to many major aquifer units was very healthy and record average November levels in the Lincolnshire Limestone, (including the New Red Lion well which has a 56-year record – see Fig. 2) signalled a rapidly growing threat of groundwater flooding through the ensuing winter.

Mild, cyclonic conditions were again dominant in December, reflected in a UK rainfall total 20% above average. However, the tracks followed by a sequence of Atlantic low-pressure systems generally favoured western Scotland and southern England, catchments in Essex and Kent particularly. In contrast, coastal areas of Northumbria were notably dry. In Cumbria on the 5th, an severe 24-hr rainfall total of 135 mm was recorded at Seathwaite resulting in a power outage for >5000 properties and exceptional local transport disruption. Outflows from Scotland were notably high in the second week and further widespread frontal rainfall on near-saturated catchments saw a rapid expansion in the regions vulnerable to flooding. On the 20/21st, more than 100 Flood Warnings and 250 Flood Alerts were operational across England & Wales. Surface flooding and transport disruption was widespread – the M23 was closed in both directions and rail transport disrupted, and a few landslides were reported (e.g. near Guildford).

The generally wet conditions since the early autumn ensured that stocks for most index reservoirs were close to, or above, the end-of-year average, and groundwater replenishment continued to be very healthy.

In the southern Chalk, late December levels at West Woodyates Manor (Dorset) had risen 35 metres since the end of September. By contrast, recharge at the deep and slow-responding Therfield well (Hertfordshire) had yet to reach the water-table and levels remained at their lowest for December since 1997. January was a further seasonally mild month with rainfall totals in the normal range across most of England & Wales but the predominance of a westerly airflow made for an exaggerated west-to-east rainfall gradient across Scotland. A timely anticyclonic interlude early in the month generally moderated flood risk but in northern Britain, the second week was very unsettled. On the 11th, Achnagart (Ross & Cromarty) recorded a precipitation total of 97mm in 24 hrs and, following the passage of Storm Brendon on the 13th, many fluvial and tidal flood warnings were in operation. Total outflows for Scotland were notably high but, by contrast, in Northern Ireland the December–January runoff for the River Bush was the lowest since 1996.

From mid-month, the main focus of flood concern was south of the Mersey-Humber line, particularly after heavy overnight rain on the 15th. Moderate but sustained floodplain inundations were common and during the third week around 200 Flood Alerts were in operation across southern and eastern England – reflecting a mixture of tidal, fluvial and groundwater generating mechanisms, the latter prolonging spate conditions in permeable catchments. Skilful management of control weirs and floodplain storage limited the community impact but in the third week the River Wensum recorded its highest level since 1993 causing the Sculthorpe Moor Nature Reserve to be inundated with the boardwalks submerged.

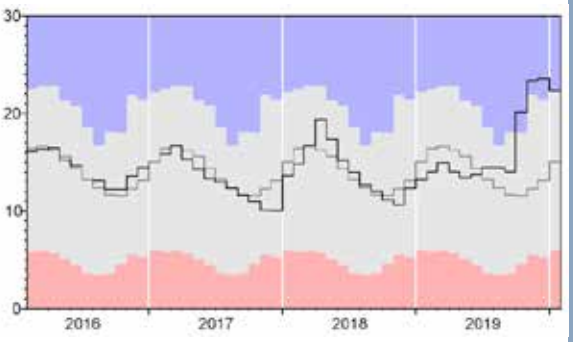


Fig 2 Monthly groundwater levels for the New Red Lion well (black trace) with pre-2019 monthly max., min., and long term average

Terry Marsh
10/2/20

BHS2020

Full registration details at https://www.lancaster.ac.uk/bhs2020



Morgan's Pond, Newport,Wales

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