Circulation

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The newsletter of the British Hydrological Society



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Cover photo: River Avon, Bristol (Tim Hess)

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Membership enquiries: Moira Doherty, BHS Secretary, Institution of Civil Engineers, 1-7 Great George Street, London, SW1P 3AA. Tel. 0207 665 2234. Email: moira.doherty@ice.org.uk

Editor: Vicky Shackle: bhs-circulation@outlook.com

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

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Please email your material to bhs-circulation@outlook.com — contributions may be edited for length or clarity (**maximum** 1,000 words, or 750 with figures). Hydrological photos very welcome.

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In between issues of Circulation, you can keep up with the **British Hydrological Society** on social media:

LinkedIn—search for British Hydrological Society

Bluesky @britishhydrosoc.bsky.social

President's perspective

Duncan Faulkner

I'm writing this from Vienna, four days into the European Geosciences Union (EGU) General Assembly. It's my first time attending in-person for 30 years. Back in 1995, things were very different - EGU had not yet been formed, and it was the European Geophysical Society (EGS) General Assembly that I attended to present my first conference paper. I didn't know anyone apart from the handful of colleagues with whom I flew to Hamburg. It seemed overwhelming—a vast gathering of 2,500 scientists.

These days, EGU attracts seven times as many delegates to its gigantic assembly by the Danube, with fields ranging from atmospheric science to vulcanology. There are 115 sessions just on hydrology! It's been a truly inspiring week, meeting BHS members every day, along with colleagues, former colleagues, international collaborators and many just starting their careers, in a similar situation to me back in 1995.

Another change has been in my attitude to travel. I try (not always succeeding) to travel in a gentler, less polluting, more immersive way. While I don't think we'll solve the climate and nature crises solely through consumer choices (we also need systemic change), it does seem vital that our lifestyles are consistent with our scientific stance.

After 30 years of cycling to work daily, I wondered, how about a more ambitious bike ride? A cycling pilgrimage along the rivers from the Yorkshire Dales, down the River Aire and the Ouse to Hull, ferry to Rotterdam, along the Waal, up the Rhine, down the Danube. I attempted to persuade my wife the Rhine would be flat and the Danube downhill all the way. She was wisely unconvinced, but happy to come along.

The story of these major rivers was a silver thread woven through the lives of those we encountered.

We stayed with Dutch friends working on regional water management, hearing about floods, droughts and agricultural pollution. Our ride was diverted round works to raise and strengthen the Waal dikes, to a level equivalent to the 10,000 year return period. One host lost her garden recently to make space for a widened dike. Another grew up literally on the river, the daughter of a Rhine barge captain. Riding on into Germany we overtook his successors, skilfully piloting their barges laden with raw materials or containers along a narrowed channel flanked by wide, sandy banks. A dry winter had left the Rhine at Lobith about 1.5m lower than the long term average for April.

Shortly after passing through Bonn we crossed a small tributary of the Rhine, little more than a trickle, on a shiny new metal bridge, built to replace a traditional covered wooden bridge over the river Ahr that was destroyed - along with so much else - in the flood of July 2021. This extraordinary and tragic flood seems to have led to much questioning of received hydrological wisdom, with a counter-torrent of articles published on megafloods, "impossible" floods, heavy-tailed flood distributions and more.

My presentation examined such events from a different perspective, looking at whether a physics-based model (SHETRAN)



At the confluence of the Danube and Inn at Passau

could represent the intensification and acceleration of runoff processes reported during extreme floods, by explicitly representing changes in the balance of those processes (https://meetingorganizer.copernicus.org/EGU25/EGU25-11977.html).

After a few setbacks (punctures, catching Covid), we reached the Danube headwaters. At this point, if pressed, I might admit to catching a train, but only because we'd already cycled that part of the route on an earlier trip. Donaueschingen is the claimed source of the Danube, but not far downstream the infant river vanishes underground. It reappears 12 km south, at Germany's largest spring,, by now in the Rhine catchment – a good reminder that hydrology is complicated, with even an apparently simple property like catchment area as slippery as a Danube sturgeon. In wetter conditions, the sink is overwhelmed and the remaining flow continues down the Danube.

Our journey followed the footsteps of Patrick Leigh Fermor who, aged 18, walked from Holland to Istanbul in 1933-34. Along the Danube he met a "polymath" who lamented the impending loss of wilderness:

"*They talk of building power dams across the Danube and I tremble whenever I think of it. They'll make the wildest river in Europe as tame as a municipal water works.*" (from P. Leigh Fermor, A Time of Gifts, published in 1977).

The dams arrived in abundance, but the Danube still has vestiges of wildness: mazes of channels meandering around reed beds and signs of beaver-felled trees. I think the polymath was right to be concerned; green hydropower is welcome (it generates more than half of Austria's electricity), but meddling with the water environment doesn't always turn out well.

Reflection on Precipitation Processes conference

Amy Green

In March 2025, I had the privilege of attending the PrePEP conference at the University of Bonn, Germany. This event brought together researchers and experts from around the world to discuss the latest advancements in understanding and monitoring precipitation processes. The conference focused on multi-sensor, emerging, and opportunistic in-situ and remote sensing techniques to improve precipitation forecasts, with key discussions around methodologies for exploiting observational data, including retrievals, nowcasting, data assimilation, and the development of parametrisation for Numerical Weather Prediction (NWP) models. A major aim of PrePEP is to better understand, assess, and predict extreme precipitation events and flooding, which are becoming increasingly relevant in the face of climate change.

I had pleasure of delivering an oral presentation, in a session dedicated to Precipitation and Hydrological Models: Extreme Precipitation Events. My talk focused on the Global Sub-Daily Rainfall dataset, an hourly rainfall dataset that uses rain gauges from around the world to study extreme precipitation. The dataset offers valuable insights into understanding rainfall extremes, and my presentation sparked meaningful discussions. The audience posed insightful questions, particularly about the challenges involved in maintaining and updating such a global dataset, which led to enriching exchanges with fellow researchers. The conference not only provided an academic platform but also encouraged networking, with many informal interactions taking place during the icebreaker session, which was an invaluable opportunity for both knowledge-sharing and forming future collaborations.

As part of the conference program, we were taken on an excursion to the Ahr Valley, a region that experienced catastrophic flooding in 2021. The floods caused extensive damage and loss of life—134 fatalities, more than 700 injuries, and the displacement of thousands. It is believed that rainfall during the event was twice the area's monthly average and as we toured the region, it was disheartening to see the lasting impact and watermarks from the event still clear on buildings (~6m). Many communities have yet to recover fully, and the scale of the destruction was clear but despite the devastation, there was a sense of community resilience throughout the valley. Projects like the "tiny houses" initiative, which brought together resources and expertise to help rebuild, exemplified the strength and solidarity of those affected.

Prior to the conference, I attended an Adaptalab event in Barcelona as part of my current research project, IMPETUS4CHANGE. This Horizon research project brings together climate, city, and social experts to improve the quality and accessibility of climate information for cities and regions.



Conference excursion to see Ahr Valley flood damage.

Photo: Amy Green

As we all know, there is a big move to lower the carbon costs of travel, particularly for climate related research. I chose to travel from Barcelona to the PrePEP conference, and back to the UK via train, which was only possible due to the BHS travel grant. This involved 10 trains (~1,500km), going through six countries, and was a real adventure!

PrePEP was a great opportunity for me to get feedback on research ideas and current progress from the international community as well as networking, particularly in the early stages of my career as a researcher, which has been limited thus far due to restrictions during my PhD from the COVID-19 pandemic. Seeing first hand the damage and impact that extreme precipitation has had on the Ahr Valley in Germany, and the adaption and community spirt in recovery was a real pleasure. Thank you to the British Hydrological Society for supporting my attendance to the conference through the travel grant, and I would encourage other early career hydrologists to make full use of the help that BHS provides.

Call for British Hydrological Society Trustees

BHS is almost entirely run by volunteers, who give their time to serve the hydrological community. It is a registered charity (1208263), so is governed by a set of Statutes and a board of Trustees. Trustees attend Main Committee meetings quarterly, and contribute to one or more sub-committees.

Could you help BHS by volunteering as a Trustee please?

You can find out more about the Trustee roles at https://www.hydrology.org.uk/Trustees_of_the_British_Hydrological_Society.php.

We encourage applications from all backgrounds and experiences, to properly represent the membership.

News: Major US award for a UK hydrologist



Congratulations to BHS member **Professor Paul Bates CBE FRS**, who was recently announced as this year's recipient of the Ven Te Chow award from the American Society of Civil Engineers (see https://www.asce.org/career-growth/awards-and-honors/ven-te-chow-award).

The award recognizes lifetime achievement in the field of hydrologic engineering. Paul is Professor of Hydrology at the University of Bristol and also Chair of Fathom, a flood risk analytics consultancy he co-founded in 2013 that now employs 60 people. The citation states that Paul's award is for "pioneering contributions to surface water hydrology and hydraulics, leading the development of open-source flood modelling software, and providing engineers and scientists worldwide with tools to address risk assessment and mitigation challenges related to climate change and rising sea levels." The award will be made at the 2025 World Environmental and Water Resources Congress in Anchorage, Alaska in May.

Paul is best known for his development of the LISFLOOD-FP hydrodynamic model along with satellite data sets and methods that allow for the code's application at global scales.

Congratulations Paul, from all at the British Hydrological Society!

The Environment Agency's commitment to learning, outreach, and fostering community in hydrology

Rachel Coldwell

Over the past two years the Environment Agency's Water Resources Training and Skills team, alongside a group of passionate Water Resources hydrologists from our National and Area teams, have been working hard to develop and implement the water resources hydrology workforce plan. The key priorities of this action plan are:

- to develop our hydrologists
- maintain a resilient hydrology community
- work with others to achieve more and shape the future of hydrology.

As a team, we recognise hydrologists as the backbone of the Environment Agency and promote their value and importance internally and externally. The actions we have taken to develop the hydrology workforce, and the wider discipline, serve as a timely response to BHS President, Duncan Faulkner's, aspirations for greater support for people starting out in their hydrological careers and the promotion of professional development. The following programmes address many of the concerns and highlight where contributions have been made to hydrology.

Learning and Development

The Water Resources Training and Skills team hosted two online sessions to staff showcasing the benefits of BHS membership, and ways to get involved. BHS committee members kindly offered their testimonies for these – thank you to Education & Careers sub-committee Chair and President Elect Joe Pearce, and sub-committee member Emma Cross for their help. We received great feedback, especially on the engaging speakers and ideas presented.

Not only do these sessions highlight the role that BHS can play in the professional development of budding hydrologists, but they also raise the profile of BHS, attracting more potential members.

Additionally, we hosted sessions on other professional bodies of interest to hydrologists including the Institute of Water and CIWEM.

Hydrology was a priority for dedicated sessions during our 'Learning month' programme for the upskilling and development of staff. Sessions included AI in Hydrology – exploring the use of AI in forecasting river discharges and Water Resources Modelling. These sessions served as a great learning opportunity for both early career and experienced hydrologists.

We hosted a Continuous Professional Development session for hydrologists in the Environment Agency to develop a structured CPD plan. We also offered a follow-up session to close any gaps that were identified as part of this process.



Supporting new hydrologists and fostering community

To enable us to tailor our support for early career hydrologists, the Training and Skills team designed a 'New Starters Hydrologist' survey. This included questions about what led them to a career in hydrology and what training would support them with their progression.

The results of the survey highlighted the need to develop a stronger hydrology community at the EA – one which supported new hydrologists as they begin their careers. Regular coffee breaks have been organised, creating an informal environment for hydrologists around the country to meet and chat. A buddy network has also been set up, matching up hydrologists from different areas to meet regularly and get to know each other.

Both provide opportunities for hydrologists to network, build relationships and get a better understanding of what's going on in other EA areas.

Recruiting new talent

In response to the challenging landscape for water resources hydrology recruitment, partly due to the lack of visibility of hydrology as a career option, our team designed a pilot mentoring programme to address these concerns. This matched 11 water resources hydrology mentors with 11 student mentees from the University of Exeter under their successful career mentoring scheme. The scheme demonstrated to the students the links between hydrology and the real world. A mentee from the scheme shared that they benefitted from the "invaluable insight into the EA and to the hydrology sector".

Insights from this scheme were presented at the most recent BHS Symposium. The scheme has doubled the number of mentor pairings in the second year, and is embarking on an additional university partnership in the third round.

Furthermore, we have welcomed in talented graduates to our new Water Resources Graduate Training scheme. In this, graduates rotate within hydrology teams to gain specialist skills. We are excited to see enthusiastic new hydrologists thrive in their roles.

Outreach

Promoting the importance of the discipline was a priority of our work. With external filmmakers, our team created a suite of marketing materials including a hydrologist job profile, a hydrology career journey in the Water Resources careers brochure, and a day in the life of a hydrologist video. The materials received fantastic feedback from the hydrology community and highlight how rewarding a hydrology career can be.

This is just a glimpse into the work we have been conducting to further increase the talent pipeline into water resources hydrology, raising awareness of the career, and supporting our new hydrologists to ensure they are confident as they progress in their roles. Our work with the water resources hydrology community and the discipline at large has been a rewarding experience, and we look forward to working with these groups in the future.

With thanks to contributors Emma Cross, Sally Smith, John Waddingham, Katherine Naylor, Matthew Clark, Chris Skinner, Joe Pearce, Ann Kretschmar, Pam Reynolds, Kathryn Wild, Anne Webster, Ruth Pengelly, Julia Docherty and the wider hydrology community at the EA.

International Partnerships for Urban Flood Resilience: Lessons from Nairobi's 2024 El Niño Event

Prof. Mark Trigg, Dr Samuel Mureithi Kioni and Prof. John Gathenya

Unprecedented floods and a global call to action

When torrential rains lashed Nairobi in April and May 2024, the damage was swift and devastating. Roads were torn apart, homes destroyed, and thousands of citizens displaced. This flood was part of a highly unusual El Niño event, compounded by overlapping climate phenomena such as a strongly positive Indian Ocean Dipole (IOD). In demonstrating the consequences of extreme weather in a rapidly urbanizing setting, it provided a stark reminder that the climate emergency transcends borders and that coordinated, international responses are essential.

To confront these challenges, the Hydrological Society of Kenya (HSK), UNESCO, and the University of Leeds formed a partnership to conduct a rapid assessment of the flood. Supported by the Intergovernmental Hydrological Programme (IHP-IX), the project demonstrates what can be achieved when local expertise and international research capacities unite—a theme that resonates with members of the British Hydrological Society (BHS) seeking to strengthen knowledge exchange and resilience worldwide.

A shared vision for water security

HSK mirrors the ethos of BHS in uniting professionals committed to advancing hydrological science and practice. Recognizing that urban flooding is now a recurring challenge in Nairobi, HSK works to promote research, host workshops, and collaborate with government authorities, while

maintaining high professional and ethical standards. This society's engagement reflects its core belief that data-driven expertise and post analysis of extreme hydrological events can generate useful information for disaster management and can help shape safer cities and improved livelihoods.

UNESCO's IHP provided vital funding and a global framework; Nairobi's floods offered a tangible demonstration of why such collaboration is needed. Inadequate drainage systems, encroachment on floodplains, and accelerated runoff from built-up surfaces converge with large-scale climate patterns to threaten public health, infrastructure, and economic stability.

The University of Leeds, provided cutting edge flood modelling techniques and an established research background on the use of global datasets for flood risk assessment. Expertise from water@leeds members (including some BHS members) helped to refine methodologies suitable for data-scarce regions. By sharing these approaches, the University of Leeds contributed to a stronger foundation for regional flood-risk analysis and management in Nairobi and beyond.

The importance of international partnership

International cooperation in hydrology fosters diverse expertise, capacity building, and meaningful links to policy. In assessing the Nairobi floods, the alliance between HSK, UNESCO, and Leeds was especially fruitful. The parties combined local knowledge about Nairobi's landscape and watercourses with technical tools, such as Rain-on-Grid HEC-RAS flood modelling, which integrated satellite and ground-based precipitation data, land cover maps and digital elevation models tailored to local conditions. This synergy allowed a rapid mapping of flood extents, which gave municipal authorities and the Ministry of Water, Sanitation

and Irrigation (MWSI) the information needed to understand the scale and implications of the flood event more effectively.

The collaboration also cultivated skills transfer. Through practical workshops and iterative modelling exercises planned in 2025, Kenyan scientists and practitioners will gain hands-on experience with modern hydrodynamic techniques. Such training, reinforced by local field observations, often proves more effective than purely theoretical instruction. At the same time, Leeds researchers benefit hugely from grounded perspectives on the region's unique social and geographical challenges, including complex drainage patterns in informal settlements and the difficulty of maintaining conventional gauges in rapidly changing urban environments.

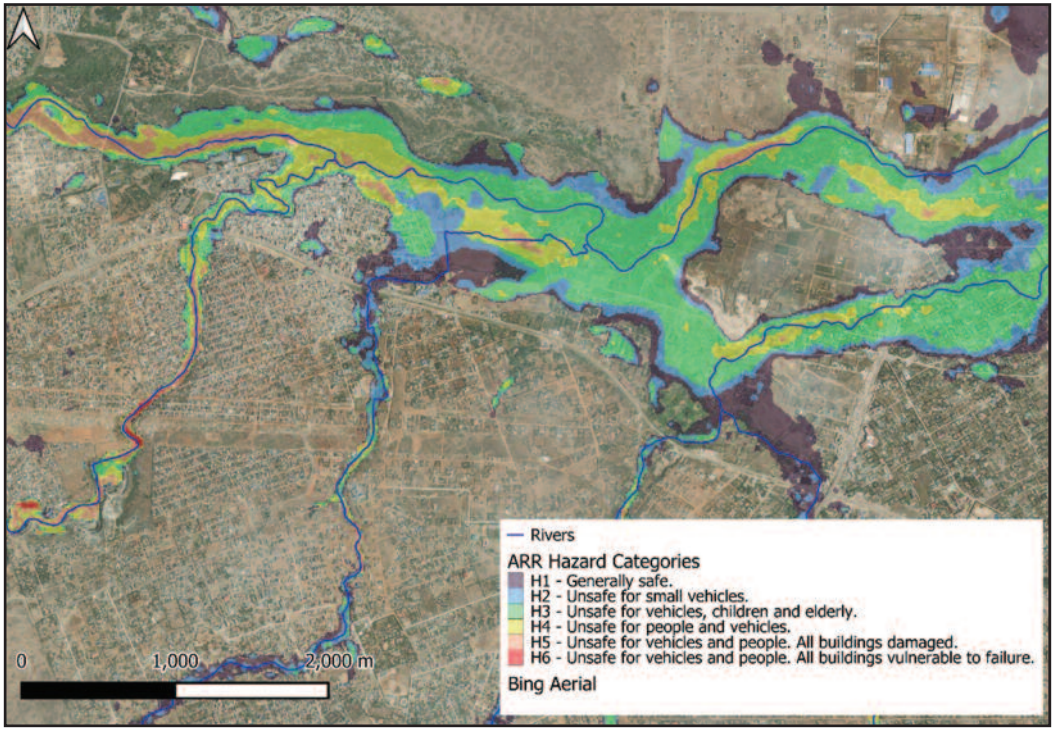
Crucially, the project ensured that technical findings were communicated to city and national authorities. Flood hazard maps and in-depth analyses of rainfall patterns were disseminated to key stakeholders who oversee infrastructure design and disaster preparedness. This two-way dialogue between technical experts and policymakers demonstrated that results from advanced flood modelling can inform planning and mitigation measures and guide long-term urban planning strategies.

Lessons for the British Hydrological Society

For the BHS, this collaboration underscores the value of channelling world-class research into practical applications. It shows that science-based approaches, jointly developed by local and international partners, can yield timely and effective flood management solutions under extreme climate conditions. The Nairobi experience reminds us of the importance of open data, adaptable modelling methods, and inclusive training in ensuring that hydrological innovation reaches the people who need it most.

These lessons are particularly relevant for BHS members involved in building scientific capacity in lower- and middle-income countries. They reinforce the view that large-scale challenges, such as climate-driven urban flooding, require continuous global knowledge exchange. Partnerships that span continents and disciplines can transform isolated data gaps or resource limitations into platforms for robust learning and meaningful adaptation.

Map: Flood model outputs from Hec-Ras Rain-on-Grid flood modelling for peak of 28 April 2024 at 1:00 am. Hazard categories based on a combination of velocity and depth defined according to the AAR Guidelines (https://arr.ga.gov.au/arr-guideline). Location centred on Nairobi and Ngong River confluence.



Looking ahead

The April–May 2024 floods in Nairobi will likely not be the last such disaster to threaten East Africa. Projections indicate intense rainfall events may grow in frequency and severity, underscoring the urgency of proactive preparedness. Ongoing collaboration among HSK, UNESCO, and the University of Leeds offers an encouraging model for mobilizing technical expertise, strengthening local institutions, and driving science-based policy changes. Their work highlights how professional societies, such as HSK and BHS, can form bridges across borders to deliver critical knowledge and bolster resilience in areas most vulnerable to climate extremes.

In addition to providing rapid flood modelling and hazard mapping to government agencies and other stakeholders, further training workshops are scheduled for 2025 to enhance local expertise in flood management. Methodologies developed during this project will be documented in an open-access research paper, ensuring broader dissemination.

Ultimately, this approach recognises that urban flood disasters can't be managed through isolated efforts. Effective action must combine scientific and technical innovations with well-coordinated policymaking, community engagement, and sustained international support.

As we have demonstrated, a unified and scientifically informed response to large-scale hydrological events is both feasible and vitally important for safeguarding lives and livelihoods in the face of a changing climate.

Prof. Mark Trigg – University of Leeds (water@leeds), BHS member

Dr Samuel Mureithi Kioni: National Chairman, HSK and Director SMK Consultant Ltd.

Prof. John Gathenya, Chair, Professional Committee, HSK and Jomo Kenyatta University of Agriculture and Technology, Kenya

BHS on the SAGA committee

Duncan Faulkner

BHS is represented on the SAGA Committee. Nothing to do with coach holidays for old folks: the **Surface And Groundwater Archives Committee** was formed in 1982 when the national hydrometric data archives were transferred from the Department of Environment to the Institute of Hydrology (now the UK Centre for Ecology and Hydrology) and British Geological Survey. These archives are the National River Flow Archive (NRFA) and the National Groundwater Level Archive (NGLA). The aims of the committee are to:

- promote the ongoing stewardship and use of the national hydrometric data archives;
- provide a forum for liaison between the different stakeholders involved in UK hydrometric data collection, archival and dissemination;
- help match the capability of monitoring networks and data archives to user needs;
- provide mutual support to Measuring Authorities and the Archives in maintaining and developing monitoring networks and data archives that ensure appropriate and representative data for the UK are protected for national public good;
- review the stewardship activities of the NRFA and the NGLA and recent operational developments in the Measuring Authorities.

As well as the NRFA, NGLA and measuring authorities, the committee also includes user organisations like BHS and CIWEM and funding bodies like NERC, Defra and devolved governments. You can find out more here: https://nrfa.ceh.ac.uk/about/nrfa-partnerships.

Committee members are tasked with communicating the work of the committee amongst their organisations - hence this report.

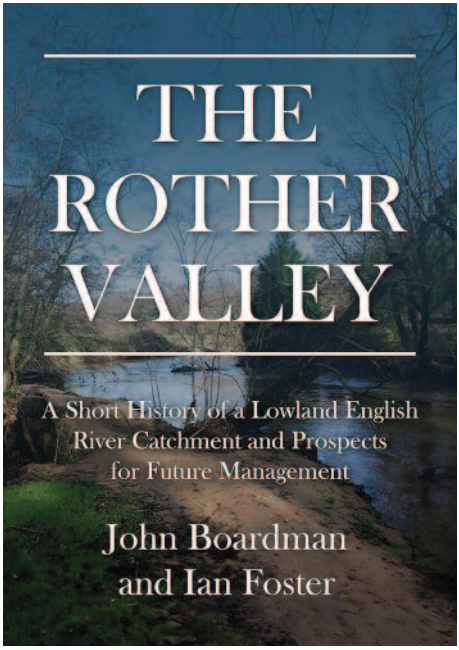
The SAGA committee meeting on 5 March heard reports of all the hard work that goes on to measure, quality control, archive and share information on the water environment . It was an opportunity to feed back the gratitude of BHS members for the excellent provision of hydrometric data that we enjoy in the UK, including recent work to add more capability to the NRFA website and to increase the availability of open data.

We also heard of cost pressures, staff shortages and "network optimisation". Given that just about any gathering of hydrologists ends up agreeing that we need additional, better quality, more spatially extensive, open, reliable hydrometric data, this news is concerning. The one part of the UK that is bucking the trend of cutbacks in hydrometry is Northern Ireland, where the Rivers Directorate in the Department of Infrastructure has been able to recruit more staff and now has a record staffing level in its hydrometry team.

I've selected a few points from the presentations made at the meeting, which may be of interest to BHS members:

- One downside of open data is the potential for increased workload and misunderstandings created by the availability of multiple versions of datasets in the public domain. For instance, there are three versions of some of SEPA's rainfall data, pre-quality control, post-SEPA quality control and post-Met Office quality control.
- It is hoped that the FDRI project will include work on making information on hydrometric metadata and uncertainty more widely available.

- The Met Office has digitised monthly and daily rainfall data at 65 Scottish raingauges, for the period 1922-1945. AI techniques are being investigated to aid with digitisation of a very large number of scanned handwritten daily rainfall records from across the UK;
- There is an aspiration to amalgamate rainfall data from the UK and Ireland into an extended Had-UK gridded product;
- UKCEH have seen promising results from integrating COSMOS soil moisture measurements with remotely sensed and gridded meteorological data. They would like to make a gridded soil moisture datasets available as an operational product.



A new(ish) book brings together recent work on the geomorphology, ecology and archaeology of the Rother Valley in West Sussex. The valley has a special character based on its Cretaceous geology of sandstones and clays, and contains unique chalk-aquifer fed streams with rare and protected species.

The book considers the future of the unique landscape of the Rother Valley, including plans for floodplain restoration. Contributors include planners, researchers and managers of the large estates that are an integral part of the landscape.

Windgather Press, 2024

Machine Learning and AI for Hydrology and Water: Current and Future Opportunities

Mike Simpson

On 30th April Arup hosted an evening event in our Birmingham office, co-sponsored with BHS. Four speakers gave updates on their recent work, as well as their perspectives of how AI and Machine Learning tools can be used to address hydrology and water challenges.

Cat Wallace and **Brogan McCawley** from Arup spoke about their development of AI tools to address flood resilience and groundwater/water resource challenges respectively. Cat highlighted the opportunities presented by AI for forecasting in catchments with rapid responses to rainfall, and Brogan showed how his work on AI could be used to extract more information from multiple existing data sources.

After a break for refreshments and discussion, **Soroosh Sharifi** and **Xilin Xia** from the University of Birmingham spoke about their work on the topic. Soroosh discussed the range of water applications for AI including fluid dynamics and water quality studies, emphasising that there are many uses for AI outside of forecasting, such as design and optimisation applications. Xilin gave an example of using generative AI to develop hydrological models using basic prompts which showed just how rapidly the technology has developed, as well as showing how AI and ML tools could be applied to climate impacts on buried infrastructure.

It was really fantastic to see hydrologists and others from academia and industry meeting in person. There was much discussion of future events, potentially as a new series of BHS Midlands Group talks. If you would be interested in getting involved or have some ideas for topics for future meetings please do email me (mike.simpson@arup.com).

The Flood Studies Report at 50

Vicky Shackle

Published in 1975, the Flood Studies Report is 50 years old this year. It was the result of four years' research, at four different centres, and set out two indirect methods of flood estimation which are still the foundations for estimation across the UK and Ireland today—statistical, and rainfall-runoff.

FSR formed a landmark in terms of using a national dataset, bringing research methods into practice, and proposing standardized methods. Prior to FSR, estimation relied on formulae for time of concentration in a catchment, and subjective judgement about data types and distributions.

Some of the most pioneering aspects of FSR were:

- Flood frequency analysis of peak discharge
- Data extension using nearby catchments as donors
- Rainfall losses and unit hydrograph
- Producing a T-year flood peak from rainfall-runoff
- Estimation for ungauged catchments
- Application to reservoir safety and spillway design.

While many parts have been superseded or built upon, some are still used. The Probable Maximum Precipitation/Flood (PMP/PMF) concepts remain a crucial part of reservoir hydrology, despite their age, although the limitations of the method for reservoir safety work must be acknowledged. In the Republic of Ireland the FSR Rainfall Runoff method is still used. For further reading on FSR you could try "Progress in Modern Hydrology" by John Rodda et al, 2015.

With acknowledgement to Max Beran's 2015 BHS paper, and colleagues at JBA.

New members

Kiera Ellis
Anna Murgatroyd
Matthew Cook
Mitch Summers
Yinxue Liu
Hanifa Tahsin
Christine McKenna
Jon Lloyd
Saeld Najjarghabel
Marcus Buechel
Miai Barry
Troy Aston-Wright
Michael Green
Daniel Cliffe
Laura Davey
Isobel Evans
Ayman Awadallah
Dingyu Xuan

Below: River Danube, captured by Duncan Faulkner on his trans-European cycle ride to EGU



UK Hydrological Bulletin, February – April 2025

Compiled from UKCEH summaries

February was drier than recent months, with mostly settled dry conditions. However a slow-moving cold front brought heavy rain on the 4th which caused surface water flooding and travel disruption around Glasgow. All regions except southern England received below average rainfall for the month, and river flows were correspondingly normal to exceptionally low. The dry weather raised the wildfire risk and fires broke out in Wales on the 18/19th. Despite low total rainfall (60-70% of average, apart from Thames and Wessex), there were still periods of heavy downpour combined with strong winds.

After high flows at the end of January, in most catchments, recessions continued right through to the last week of February. New daily flow minima were established on the Bervie and Inver between the 13th and 20th. In contrast, catchments in south-west Scotland and Northern Ireland (21st), south Wales and south-west England (23rd), and southern England (24th) recorded new daily flow maxima. Many catchments ended February with flows at or below average.

Soils at COSMOS-UK measurement sites were still wetter than average in February in most regions. Groundwater levels varied, generally remaining in the normal range to above normal. Some regions saw steady groundwater levels (south and south-west) while others saw rises (south-east) or decreases (Yorkshire). At Weir Farm (Shropshire_, levels remained exceptionally high, reaching a new February maximum level. Reservoir stocks for England & Wales were 94% of capacity. Stocks at the majority of reservoirs rose relative to average - most only marginally.

High pressure persisted from February into early March, resulting in settled, warmer than average conditions for most of March. The UK as a whole recorded less than half the average rainfall for March. Correspondingly, river flows remained below normal or lower across much of the country. Many northern and western rivers registered exceptionally low flows, some the lowest average March flows on record.

Groundwater levels generally declined, with record March lows in Northern Ireland, Scotland and Wales. At month-end, reservoir stocks for England & Wales were at 90% of capacity, just below average, but almost all impoundments recorded reductions relative to average. Soils were drier than average everywhere apart from the Western Isles & Shetland. The prolonged dry spell and above average temperatures led to a higher-than-usual frequency of wildfires for the time of year, and concerns for agriculture at the start of the growing season.

Figure 1 shows total daily UK flow for the preceding 12 months.

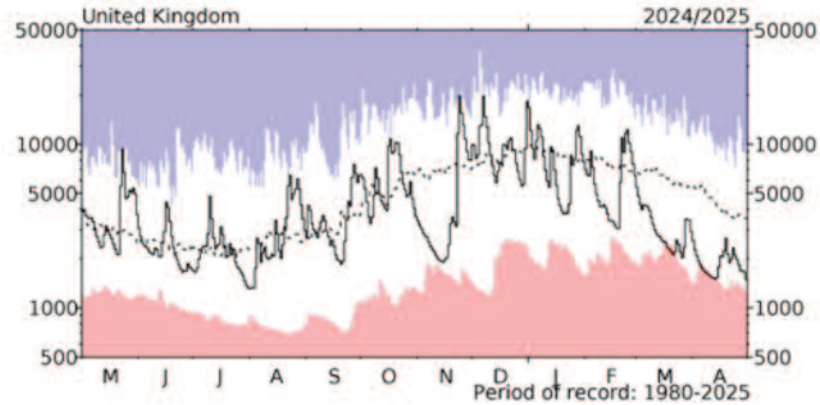


Figure 1: Total daily mean flow (m^3/s) for the whole UK, together with previous maximum (blue) and minimum (pink)

April was generally dry and warm, although with rain in some western parts. It was the third warmest April for the UK in a series from 1884, with particularly high temperatures in England and Wales towards the end of the month (e.g. 26.9°C on the 30th recorded at Treknow, Cornwall). Continuing the generally dry conditions of February and March, rainfall was just over half of the April average for the UK, with some places receiving less than a fifth of average.

Many rivers registered notably or exceptionally low monthly mean flows, several with minima for April. In most regions of the UK, soils at the end of April were drier than at the end of March, and many COSMOS-UK sites registered drier than normal to exceptionally dry soils. There were wildfires in south-west Scotland, Northern Ireland and Wales, and increased concerns about the impacts on agriculture, with an early start to the irrigation season. Groundwater levels in the Chalk generally decreased throughout April. At Weir Farm (Shropshire) groundwater once again remained very high.

Reservoir stocks for England and Wales were below average at 85% of capacity. Away from Northern Ireland and south-west England, some impoundments were considerably below average at month-end (e.g. Northern Command Zone, Celyn & Brenig and Daer).

Without appreciable late spring rainfall, summer is likely to commence with widely depressed river flows, with potential for environmental impacts and pressure on water resources (some water companies are already starting to ask customers to use water wisely). The start of May has been extremely dry across the UK, and the current hydrological outlook suggests that below normal or lower flows will persist into the summer in many areas. Figure 2 shows recent UK flows as a percentage of the long term average.

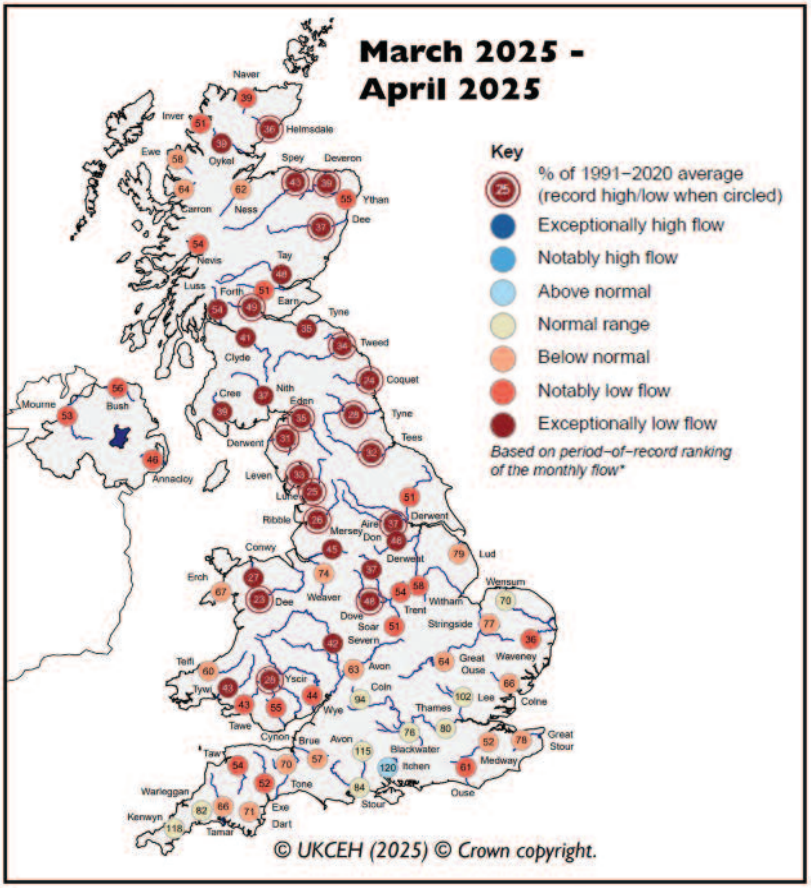


Figure 2: UK river flow in March and April 2025 as a percentage of the 1991-2020 average

The Hydrological Bulletins draw primarily on data and information from the UK Met Office and the CEH/BGS National Hydrological Monitoring Programme—the latter comprising data supplied by the Environment Agency, SEPA, NRW and Northern Ireland Environment Agency, as well as the UK water companies.

Forthcoming events

Summer School—Runoff Prediction in Ungauged Basins. Learn methods of estimating runoff characteristics in the absence of local observations. **30th June—4th July 2025**, Wien, Austria. https://iahs.info/uploads/Meetings/2025/Flyer_Summer_School_PUB_2025_Electronic.pdf

The Royal Meteorological Society's **Weather and Climate Conference, 2025,** will take place at Manchester Metropolitan University 2-4th July 2025. This event will bring together the UK weather and climate community to showcase cutting-edge science and facilitate new ideas and collaborations. To register: https://www.rmets.org/conference/2025

Peter Wolf Symposium, 2025

This will take place at the University of Liverpool, 28-29th July. The theme is Hydrology in the Community, and details of how to book will be available shortly.

Land and Water in a Changing Climate – what's next for Science and Policy?

A two-day Hydro-JULES event at The Royal Society in London, **24-25th September 2025**, bringing together the hydrological and land-surface modelling community, industry and policy makers across the UK to discuss how research can influence policy decisions. Booking details to follow shortly.

The Royal Meteorological Society and BHS will co-host **From Forecast to Action: Advancing Flash Flood Resilience on 8th October 2025** at The Geological Society, London. Three sessions: forecasting, warnings and decision-making; climate change and changing risks; policy, governance and interventions. https://www.rmets.org/event/forecast-action-advancing-flash-flood-resilience

International hydrology meeting

A one-day meeting at the Institute of Civil Engineers, London, **1st December 2025.** Organised jointly by BHS and the UK Committee for International Hydrology, in the building where UNESCO was created 80 years ago; this conference will celebrate the 50th anniversary of UNESCO's International Hydrological Programme and the contributions made by UK hydrologists to meeting the UN Sustainable Development Goals. Booking details will be confirmed later.

Watch this space: plans are in progress for a BHS National Symposium, at the University of Leeds in autumn 2026.

Exeter fund

Early career participants who are giving a presentation at the biennial IAHS Scientific Assemblies can apply for a grant to help with travel costs. Full details can be found at: https://www.hydrology.org.uk/assets/ExeterFundBHSNewPolicy090119.pdf



British Hydrological Society