

**UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND
NATIONAL REPORT ON IHP RELATED ACTIVITIES**

23rd SESSION OF THE IHP INTERGOVERNMENTAL COUNCIL
PARIS, JUNE 2018

1. ACTIVITIES UNDERTAKEN IN THE PERIOD JUNE 2016 – MAY 2018

1.1 Meetings of the IHP National Committee

1.1.1 Decisions regarding the composition of the IHP National Committee

Two meetings of the United Kingdom National Committee for the IHP were held during the reporting period; on 7 March 2017 and 17 May 2018. Since its formation in 2007 (through the merger of the UK National Committee for the IHP and the UK Inter-Departmental Committee on Hydrology) the *UK Committee for National and International Hydrology* (UKCNIH) has acted as the UK National Committee for the IHP. The committee comprises representatives from UK bodies with a major stake in hydrology and water resources research; the current organisations represented are detailed in Table 1.

Table 1 Representation on the *UK Committee for National and International Hydrology* (as of June 2018).

Centre for Ecology & Hydrology (CEH)
Natural Environment Research Council (NERC)
Department for Environment, Food and Rural Affairs (DEFRA)
Department for International Development (DfID)
Welsh Government
Scottish Government
Department for Infrastructure, Northern Ireland
Scottish Environment Protection Agency (SEPA)
Environment Agency (EA)
Northern Ireland Environment Agency (NIEA)
Met Office
Department for Transport (DfT)
British Geological Survey (BGS)
Centre of Expertise for Waters (CREW)
UK Water Industry Research (UKWIR)
British Water
British Hydrological Society (BHS)
UK Committee of the International Association of Hydrological Sciences (IAHS)
International Association of Hydrogeologists (IAH)
UK National Commission for UNESCO
UNESCO Category II Centre of Water Law, Policy & Science, Dundee
UNESCO Chair in Water Science, University of Birmingham
UK interests in IHP Flow Regimes from International Experimental and Network Data (FRIEND)
UK interests in IHP International Sedimentation Initiative (ISI)

The Centre for Ecology & Hydrology (CEH) continues to provide the UK IHP secretariat with Professor Alan Jenkins remaining as Chair of the UKCNIH and Dr Harry Dixon as its Secretary.

1.1.2 Status of IHP-VIII activities

The UK is able to contribute towards the IHP through a number of current scientific research programmes at a national and international scale. Contributions cover a range of IHP-VIII Themes and Focal Areas. UK researchers continue to play a role in some of the cross-cutting and associated programmes of the IHP. A sample of the UK contributions over the reporting period are detailed below.

ISI Programme

Professor Des Walling (University of Exeter) continued to serve as a member of the ISI Advisory Group during the reporting period and has been actively involved in its activities. Work on developing information briefs and policy documents has continued with Professor Walling co-authoring one aimed at identifying hotspots around the world characterized by high rates of erosion, soil loss and sediment yield, as well as highlighting problems associated with reservoir siltation and shrinking deltas.

FRIEND Programme

The UK has maintained its involvement in the FRIEND Programme providing support and research contributions through the activity of hydrologists from across the country. Given the low levels of activity in many regional FRIEND groups, UK scientists have primarily been involved in a number of research initiatives linked to the EURO-FRIEND Low Flow and Drought Group that have delivered outputs over the reporting period. These include contributions by CEH and the University of Birmingham to research papers, hosting of visiting scientists to the UK and involvement in a EU COST Action on the subject of *Science and Management of Intermittent Rivers and Ephemeral Streams*.

UNESCO Chair in Water Sciences at the University of Birmingham

In late 2016, a UNESCO Chair in Water Sciences was established at the University of Birmingham, coordinated by Professor David Hannah. The Chair's activities are aligned with IHP-VIII and include efforts to improve the use of new, more cost-efficient sensing technologies, and harnessing the knowledge of local people as 'citizen scientists' and stakeholders. An international task force will be established to develop a concept for a global sensor network of hydrological variables, which can be implemented at the local level. The Chair also aims to bring together researchers from a range of disciplines, policy makers and the public to raise awareness of water scarcity and global water-related issues with an inaugural *International Connected Water Societies Conference* planned to be held in Birmingham in 2019. An event to mark World Water Day was convened in Birmingham in March 2018.

1.2 Activities at national level in the framework of the IHP

1.2.1 National/local scientific and technical meetings

The UK hydrological community continues to convene a comprehensive range of national and local scientific/technical meetings. The British Hydrological Society (BHS) is a UK national society for the advancement of hydrology. The Society's membership is drawn from both the academic (universities and research institutes) and operational sectors. The Society holds regular national and regional scientific and technical meetings related to Hydrology. Over the reporting period numerous meetings have been held on topics such as *Seasonal Forecasting of Water Resources* and the 4th BHS International Conference was held at Cranfield University in 2016.

1.2.2 Participation in IHP Steering Committees/Working Groups

UK researchers continue to be involved in wide range of IHP Steering Committees and Working Groups. In relation to the cross-cutting and associated programmes of IHP, UK scientists serve on, amongst others, the committees of ISI and FRIEND (see Section 1.1.2). The UK National Committee for the IHP is represented on the Governing Board of the Category II Centre for Water Law, Policy and Science by Dr Harry Dixon (see Section 1.4).

The UK continues to actively engage with other National Committees in IHP Region 1, providing contributions to consultations and other initiatives. The UK National Committee was represented at the IHP Region 1 meetings in Perugia, Italy (June 2017) and Delft, Netherlands (May 2018).

The UK maintains links with the IHP Secretariat in the UNESCO Division of Water Sciences. Over the reporting period the National Committee for the IHP provided a UK response to the special consultation on the IHE and CIRAT proposals for Category 2 Centres and further input to the consultation on the IHP statutes and the rules of procedure. Members of the National Committee were involved in roundtable discussions with UNESCO's Assistant Director General for Natural Sciences, Dr Flavia Schlegel when she visited the UK in February 2018.

Nationally, Professor Alan Jenkins and Dr Harry Dixon (as Chair and Secretary of the UKCNIH) represent UK involvement in the IHP in UK National Commission for UNESCO initiatives. Over the reporting period, contributions reflecting the IHP were made to the Commission's publication on *UNESCO in England* (October 2017) as well as the Commission's regular e-newsletter.

1.2.3 Research/applied projects supported or sponsored

A very wide range of research and applied projects on UK and international hydrology continue to be undertaken with funding from a range of sources. The UK's portfolio of international hydrology research projects has grown over the reporting period due to new UK Government funding opportunities under initiatives including: the Global Challenge Research Fund; Newton Fund and NERC Research Programmes and National

Capability funding. Examples of new and continuing projects are given below.

CEH has commenced a new Overseas Development Assistance programme on *Sustainable Use of Natural Resources to Improve Human Health and Support Economic Development* (SUNRISE) which includes a focus on the development of hydro-climatic services in China, India and East Africa. Collaborative research in these regions covers topics such as the development of new soil moisture sensor networks, advancement of seasonal hydrological forecasting and science to support the restoration and remediation of freshwater ecosystems.

Scotland's Centre of Expertise for Waters (CREW) continues to deliver research, knowledge and opinion to support Scottish Government and its delivery partners in the development and implementation of water policy. Over the reporting period this has included projects on *Innovative solutions for sustainable drinking water treatment* and a design and build guide on *Rural Sustainable Drainage Systems*.

With funding from NERC, the *India-UK Water Centre* was launched in September 2016. This virtual research centre aims to stimulate research collaboration between India and the UK to address water availability and sustainable water management challenges.

Under the Scottish Government's *Hydro Nation* initiative, a number of projects have been supported over the reporting period, particularly in India where UK scientists are working to support the Ganga River Health Project (work led by the UNESCO Category 2 Centre for Water Law, Policy and Science at the University of Dundee) and the James Hutton Institute are supporting a Modular Rural Waste Water Treatment Project.

The Met Office continues to support a wide range of National Meteorological and Hydrological Service (NMHS) providers in developing countries to develop capacity and capability in hydrometeorology. Over the reporting period this has included projects to deliver a multi-hazard early warning system in Tanzania; work to improve drought and flood forecasting in Uganda and; collaborations to better understand the hydrometeorological drivers of landslide in South Asia.

1.2.4 Collaboration with other national and international organizations and/or programmes

Close links are maintained between the UK National Committee for the IHP (see Section 1.1) and other international organisations/programmes. Professor Alan Jenkins (Chair of the UKCNH) is the UK Hydrological Adviser to the UK's WMO Permanent Representative, representing UK involvements in the WMO Commission for Hydrology (WMO-CHy). UK scientists are actively involved in a wide range of WMO initiatives, including the *Global Hydrometry Support Facility* and CEH's leaderships of a new major WMO initiative aiming to develop a *Global Hydrological Status and Outlook System*.

Linkages with the International Association of Hydrological Science (IAHS) are maintained through Dr Kate Heal (University of Edinburgh), Chair of the UK National Committee for IAHS. UK scientists continue to contribute to a wide range of IAHS Commissions and activities. Over the reporting period this has included contributions to the 2017 IAHS Scientific Assembly in Port Elizabeth, South Africa, participation in the leadership of the ongoing Panta Rhei decade and active involvement in the Association's initiative to define *23 Unsolved Problems in Hydrology*. A wide range of other hydrological science projects and initiatives with links to the Association continue to be delivered with UK involvement including the development of a new, European Space Agency-funded open-source snow microwave scattering model (with involvement by CORES Science and Engineering Limited). The 2018 Dooge medal of the 2018 International Hydrology Prize was awarded to Professor Howard Wheater who was based in the UK for much of his career.

UK hydrogeologists continue to be actively involved in a number of Commissions and Working Groups of the International Association of Hydrogeologists (IAH) and close links are maintained between the IHP National Committee and the Association. IAH's Commission on Climate Change and Groundwater, the Urban Groundwater Network and the Burdon Groundwater Network for International Development are led from the UK. IAH celebrated its 60th anniversary in 2016 with a number of activities and events including a conference at the University of Birmingham co-convened by IAH and the Geological Society under the theme *Groundwater – Managing our Hidden Asset*. Highlighting UK contributions to the work of IAH, a series of six strategic overview papers were completed in 2016 led from the UK. These focus on the linkages between groundwater and other sectors such as health, energy and food.

1.2.5 Other initiatives

See other sections of report.

1.3 Educational and training courses

1.3.1 Contribution to IHP courses

See other sections of report.

1.3.2 Organization of specific courses

The UK continues to provide and contribute to a wide range of hydrological training and education both nationally and overseas, including an extensive range of postgraduate degrees in hydrology and related subjects. See other areas of report for examples, including current educational initiatives by the Dundee Category II Centre.

The British Hydrological Society offers a studentship scheme to help support members who wish to study hydrology at postgraduate masters level.

An Annual Catchment Science Summer School has been run in the UK for a number of years for students from the UK and other countries. The next event will run at the University of Birmingham in August 2018 co-hosted

by the University of Birmingham, University of Aberdeen, University of Zurich, TU Berlin and the Global Institute for Water Security.

1.3.3 Participation in IHP courses

See other sections of report.

1.4 Cooperation with international/regional water centres under the auspices of UNESCO

UNESCO Category II Centre for Water Law, Policy and Science (University of Dundee)

The Centre for Water Law, Science and Policy was launched as a Category II Centre under the auspices of UNESCO in November 2006. Over the reporting period the Centre has continued to contribute to a number of IHP related activities including co-authoring chapters for the World Water Development Reports, running events for World Water Day and continued work in the Tweed river basin (linked to the HELP programme). The Centre continues to offer taught modules in water resources law, water services regulation and freshwater ecosystems as well as deliver research projects on topics such as *Deltas, vulnerability and Climate Change - Migration as an Adaptation*. Centre staff published a *Handbook on Water Law and Policy* in 2017 as well as a number of other IHP relevant publications over the reporting period.

1.5 Publications

No list is maintained of UK publications related to the IHP. See other sections of report for examples of related publications.

1.6 Participation in international scientific meetings

1.6.1 Meetings hosted by the country

UK scientists have led and contributed to numerous international scientific meetings in relation to the IHP over the reporting period, both in the UK and abroad. See other sections of the report for examples of these meetings.

1.6.2 Participation in meetings abroad

See other sections of report.

1.7 Other activities at regional level

1.7.1 Institutional relations/cooperation

See other sections of report.

1.7.2 Completed and ongoing scientific projects

See other sections of report.

2. FUTURE ACTIVITIES

2.1 Activities planned until December 2018

See other sections of report.

2.2 Activities foreseen for 2019-2020

See other sections of report.

2.3 Activities envisaged in the long term

UK scientists intend to continue their participation in the IHP, contributing to a wide range of initiatives and programmes as funding permits.

Report compiled by Dr Harry Dixon and Professor Alan Jenkins (Centre for Ecology & Hydrology) on behalf of the UK Committee for National and International Hydrology. June 2018.

For further information regarding the activities outlined in this report please contact Dr Harry Dixon (harr@ceh.ac.uk).