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A global dataset of near-natural basins for climate change detection

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As hydrological extremes become more severe in the warming world, impacts to livelihoods, infrastructure, and economies worsen. To attribute emerging trends to climate change, we need to remove the signal of anthropogenic activities, such as, the presence of dams, land-cover change, channelisation and the abstraction of water for public water supplies, industry and agriculture. These human disturbances can obscure climate change signals and distort trends in river flows and, in some cases, lead to a complete reversal of true, natural trends.

There have been many studies of long-term changes in river flows around the world however, at a global scale (as represented by Intergovernmental Panel on Climate Change (IPCC) reports), confidence in observed river flow trends remains low. It can also be a challenge to integrate the results of various regional- and national-scale studies due to the different methods used, hampering consistent continental- and global-scale assessments.

Identifying the problem, many countries have 'Reference Hydrometric Networks' (RHNs) which consist of natural or near-natural catchments. Globally, however, these types of catchment can be sparse in both their spatial and temporal nature and in order to provide real value to international assessments of hydrological change on a consistent basis (such as those undertaken by the IPCC), an integrated approach is needed.

The Reference Observatory of Basins for INternational hydrological climate change detection or ROBIN initiative, is a worldwide collaboration to bring together the first global RHN. The network currently consists of partners from almost 30 countries spanning every continent, the first iteration of the ROBIN dataset is now available – a consistently defined network of near-natural catchments consisting of over 3,000 catchments.

Here we will present the criteria for inclusion of river flow data in the ROBIN network, detail the

quality control undertaken to prepare the dataset for analysis, and highlight data availability. Where data sharing allows, the dataset of daily mean river flow data at near-natural sites has been made openly available for the community to use as a resource to interrogate and conduct analyses on and alongside this the ROBIN team are undertaking the first, truly global analysis of trends in river flows using minimally disturbed catchments.

Going forwards, whilst the first iteration of the ROBIN dataset has been published, it is our aim to continue network growth to increase the number of countries involved and add more catchments and even more diverse geographies to the dataset to continue developing this unique resource of river flow data.

With the support of international organisations, including WMO, UNESCO and IPCC, ROBIN will lay the foundations for an enduring network of catchments, to support global assessments of climate-driven trends and variability in the future.

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