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A European vision for hydrological observations and experimentation

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The Global Terrestrial Network - Hydrology (GTN-H): network of networks for integrated observations of the global water cycle

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The exchange of data and information on freshwater-related observations has been a key issue for scientists and hydrologists for decades. Although significant improvements have been made in the observation of the global hydrological cycle, the Global Climate Observation System (GCOS), in its latest Implementation Plan 2022, still identifies the need for further improvements in the exchange of hydrological data. This message has been echoed by the COP27 Sharm-el-Sheik 2022 Cover Decision. The main barriers are long known and related to a) lack of capacity to apply international standards for data and metadata exchange and b) restrictive data policies that hinder data exchange.

The Global Terrestrial Network - Hydrology has been established in 2001 to support a range of climate and water resource objectives, building on existing networks and data centres and creating integrated products on the global water cycle. Today, GTN-H comprises 12 data centres and networks, such as GRDC, the International Soil Moisture Network (ISMN), the Global Environment Monitoring System for Freshwater (GEMS/Water), IGRAC's Global Groundwater Monitoring Network (GGMN) or FAO AQUASTAT. The data and information provided by the GTN-H Global Data Centres are an essential source of information for the UN, regional and national programmes and projects in support of development and science. GTN-H is a joint effort of the Global Climate Observing System (GCOS) and the World Meteorological Organisation (WMO).

In this presentation, we will summarise past and recent efforts to improve data sharing in Europe and globally. Additionally, we will present recent developments in agendas and technical implementation efforts at the UN level to improve data sharing. These include:

- Some historic background: In the 1980s, the UNESCO FRIEND-Water (Flow Regimes of International Experimental and Network Data) global water community has been established to collect and share hydrological observations for scientific assessment of flow regimes. These activities led to projects such as EURO-FRIEND's European Water Archive and SA-FRIEND's Southern Africa Flow Database. Both datasets have been integrated into GRDC's Global Runoff Database.

- An introduction to the global acting data centers federated within the GTN-H, focussing on hydrological, climate and environmental observations worldwide.
- The World Meteorological Organisation emphasises the importance of open data policies and interoperability. We will provide an insight into the recent efforts of the GEMS/Water Data Centre to improve the interoperability of water quality data and show the success of the GRDC in implementing a new data portal. We will also present a concept for tiered networks and how to assess their maturity.
- The IX. Phase of UNESCO's Intergovernmental Hydrological Programme, which aims to fill the data knowledge gaps in hydrology, particularly by engaging the scientific community.
- Finally, we will report on the UN 2023 Water Conference, with outcomes that will focus on sharing of water observation data and information to achieve the goals of SDG6.

keywords: global data centres; operational hydrology; data analysis; open data; data sharing