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Global Terrestrial Network of Water Resources Observation Infrastructures

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Life on earth is closely linked to the availability of water and its variability. However, global change means that the demands placed on water resources are constantly increasing. According to the conclusions of the IPCC's 5th Assessment Report, it is likely that human activities have influenced the global water cycle since 1960. Satellite-based remote sensing of water-related parameters and operational data-assimilation services are becoming increasingly important to assess changes of the global water cycle as part of the essential climate variables (gcos.wmo.int). However, particularly over land or in the deep ocean where space-borne monitoring is not possible, in-situ data provide long-term records of changes in the various components of the hydrological cycle.

Global data centres, often operating under the auspices of UN agencies, collect and harmonise water data worldwide and make the global data sets available to the public again. Most of these relevant Global Data Centres are members of the Global Terrestrial Network of Hydrology (GTN-H) that operates under auspices of WMO and the Terrestrial observation Panel of Climate (TOPC) of the Global Climate Observing System GCOS. GTN-H links existing networks and systems for integrated observations of the global water cycle. The network was established in 2001 as a „network of networks“ to support a range of climate and water resource objectives, building on existing networks and data centres, and producing value-added products through enhanced communications and shared development. Since 2017 the GTN-H coordination is held by the International Centre for Water Resources and Global change (ICWRGC, operating under auspices of the UNESCO) aiming for a data and knowledge transfer between data providers, scientists and decision makers as well as between the different institutional bodies on UN-level inter alia the WMO, UNESCO, FAO, UNEP or GCOS.

We will demonstrate the state-of-the art of the global in-situ terrestrial water resources monitoring and draw a picture of a global water observation architecture.

As a major outcome we will share the most recent evaluation of global water storage and water cycle fluxes. Here, we assess the relevant land, atmosphere, and ocean water storage and the fluxes between them, including anthropogenic water use. Based on the assessment, we discuss gaps in existing observation systems and formulate guidelines for future water cycle observation strategies.