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Systematic water and climate observations through Global Water Data Centres and Networks

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Life on Earth is closely linked to the availability of water and its variability. However, one third of the world, including sixty percent of Africa, does not have access to early warning and climate information services. This is directly related to the fact that there are worldwide still significant data deficient areas. To fill observational gaps the Global Climate Observing System (GCOS) has published an updated Implementation Plan, which was taken up by the Sharm el-Sheikh Climate Change Conference (COP-27). This resulted in a COP cover decision, that emphasizes (a) for the first time “the importance of protecting, conserving and restoring water and water-related ecosystems” and (b) “the need to address existing gaps in the global climate observing system, particularly in developing countries”.

Global data centres often operating under the auspices of UN agencies, collect and harmonise water data worldwide to make these global data sets available to the public. 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 for 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 communication and shared development. GTN-H aims for data and knowledge transfers between data providers, scientists and decision makers as well as between the different institutional bodies on UN-level such as the WMO, UNESCO, FAO, UNEP or GCOS. GTN-H thus directly links to the aims of the COP-27 cover decision as an example of coordination of activities by the systematic observation communities.

Updates of the in-situ branch of global terrestrial water resources monitoring will be demonstrated and a picture of a global water observation architecture will be drawn. The data centres aim to provide useful and actionable water and climate information for mitigation, adaptation and early warning systems. Satellite-based remote sensing of water-related parameters and operational data-assimilation services are becoming increasingly important to assess changes of the global terrestrial water cycle as part of the Essential Climate Variables. Still,

in-situ data provide long-term records of changes in the various components of the hydrological cycle and are an important basis for the validation of remote sensing data. In addition, issues and suggestions to improve sustainable financing of observational networks will be highlighted to address data policies and enhanced exchange of basic hydrological observations. Based on the assessment, gaps in existing observation systems will be discussed and guidelines for future water cycle observation strategies will be formulated.

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