



A European vision for hydrological observations and experimentation

8th Galileo Conference

NAPLES | ITALY | 12–15 JUNE 2023

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

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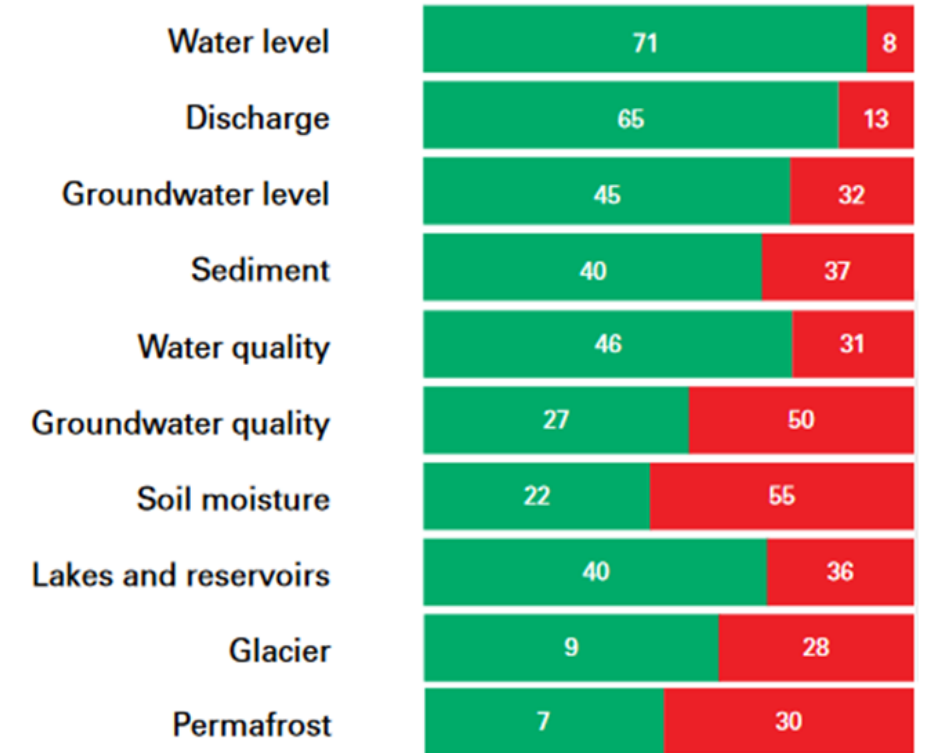
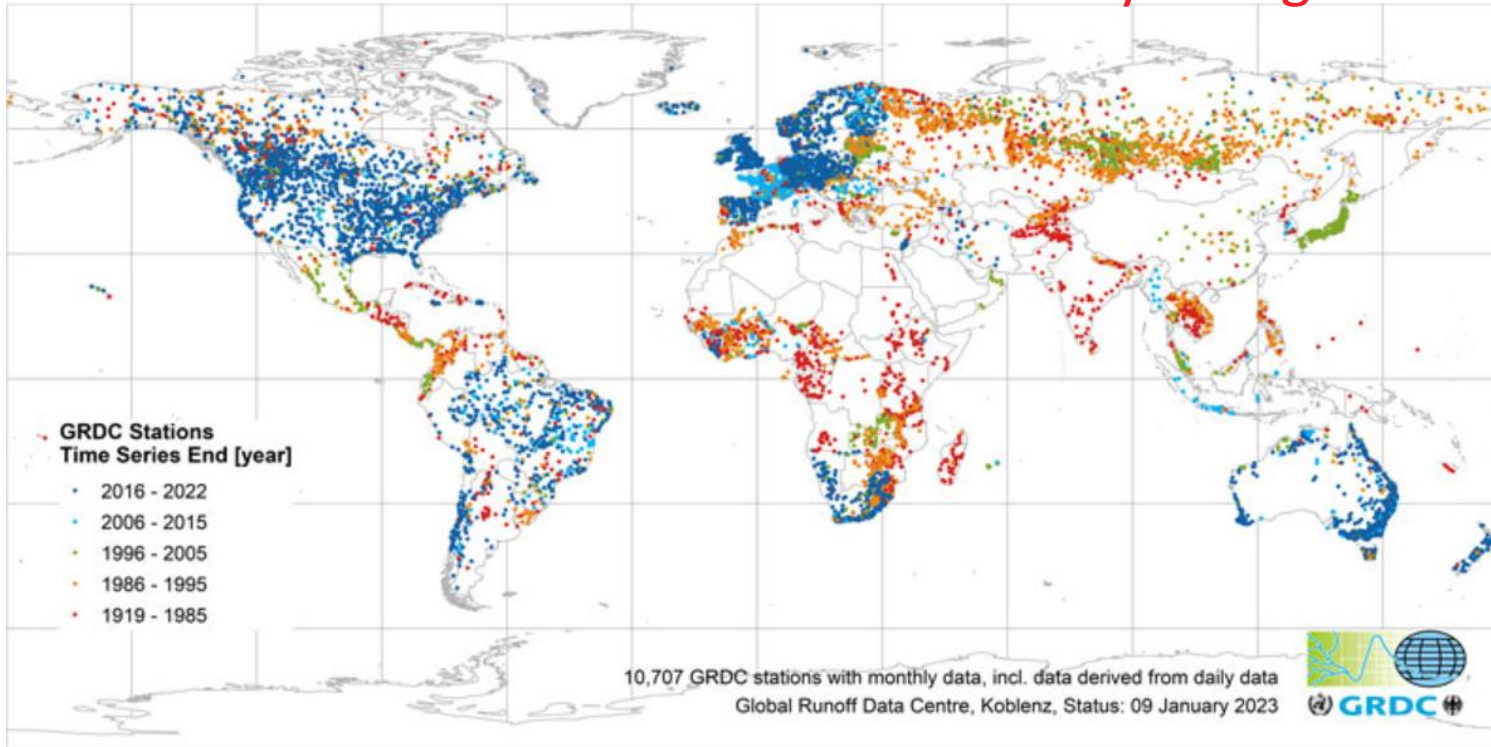
Centre
Under the auspices
of UNESCO



Main finding of report

- The 2021 report highlights the **importance of local analysis and perspective** in addition to the **global overview**
- Challenge: lack of timely **availability and accessibility of verified hydrological data & accelerate observation and sharing of data**

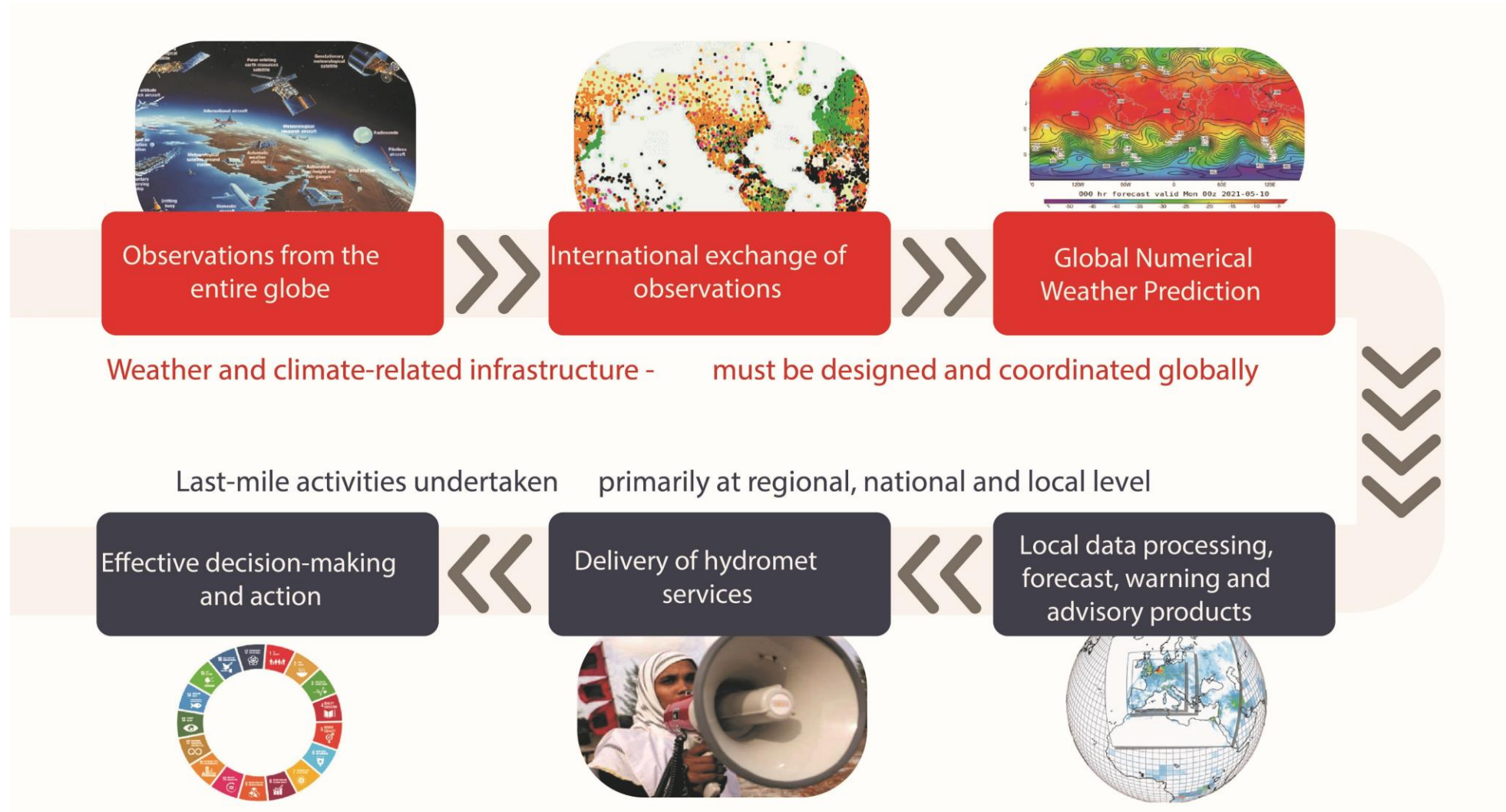
The situation of national hydrological services connected to WMO



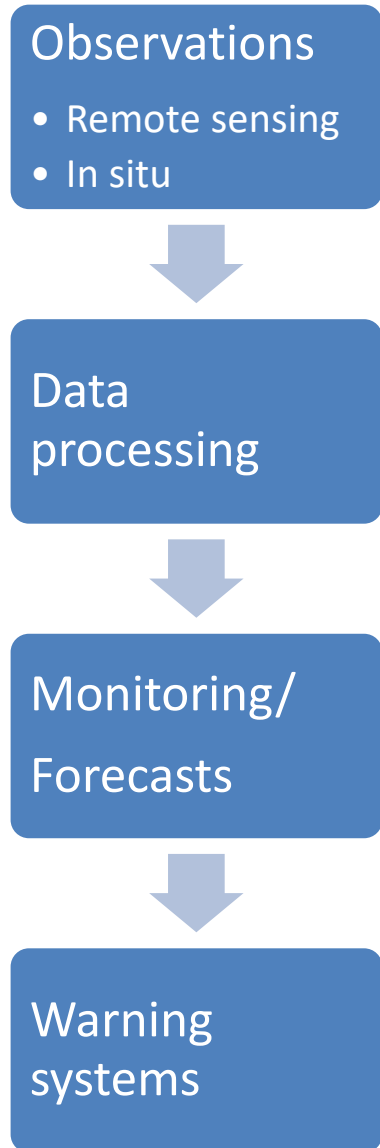
■ Yes ■ No

2/3 national water monitoring networks in decline





Source: <https://public.wmo.int/en/resources/bulletin/wmo-data-policy-21st-century>

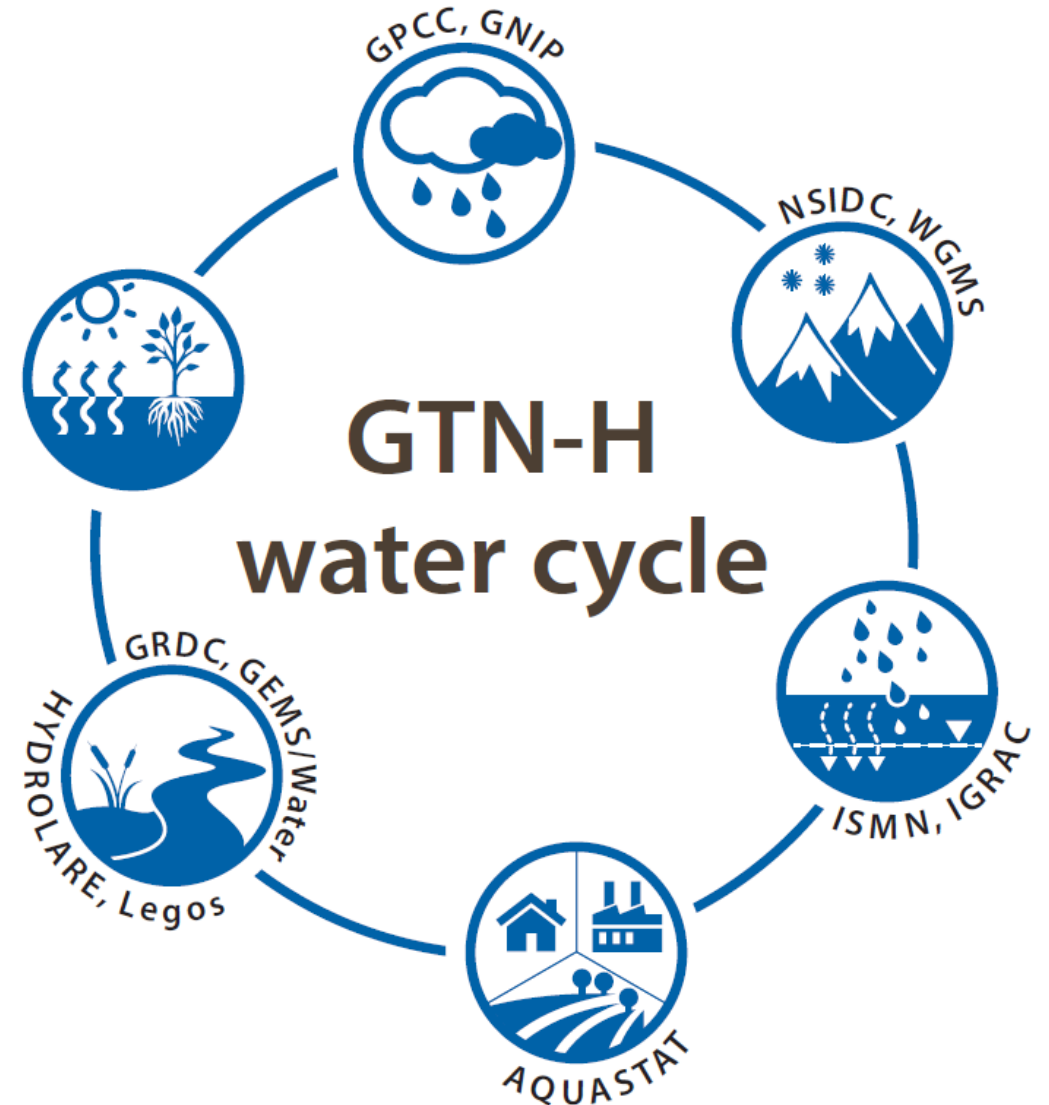


- ❑ currently expressed by the individual communities
- ❑ Decline in observational capacities

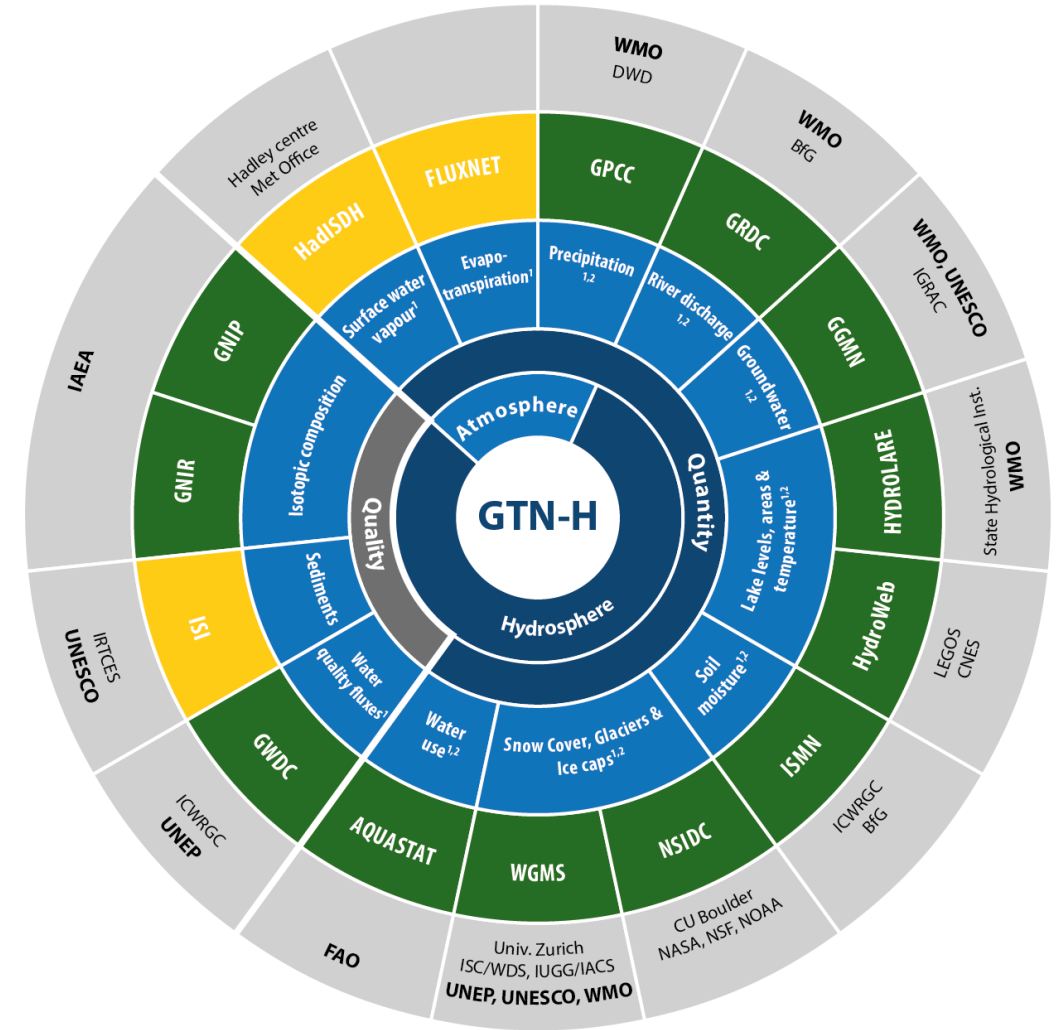


- ✓ should consider a holistic approach
- ✓ Improve interoperability between communities
- ✓ Sustainable funding of systematic observations

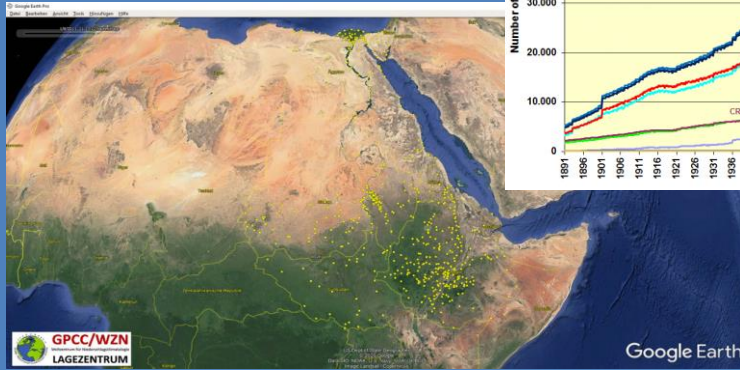
- Joint project of the World Meteorological Organization (**WMO**) and the Global Climate Observing System (**GCOS**)
- Founded in 2001
- Coordinated by ICWRGC since 2017
- Federated network of global water data centres (mostly **under auspices of UN organizations**),
- Linking freshwater-related observations on a global scale.



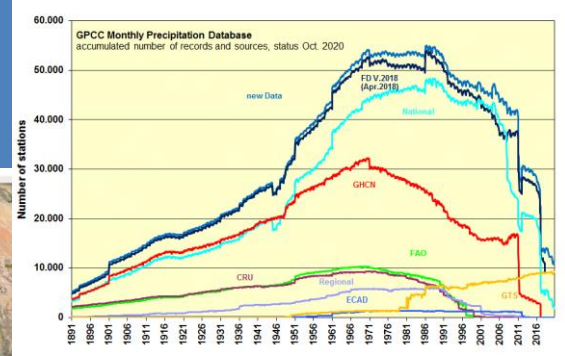
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Precipitation

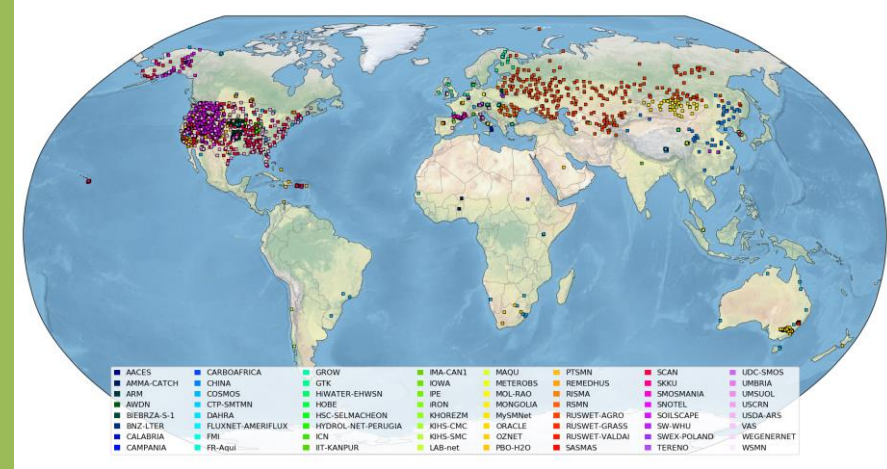


GPCC Precipitation Stations in the Nile catchment



Data allocation over time in the GPCP data base

Soil Moisture

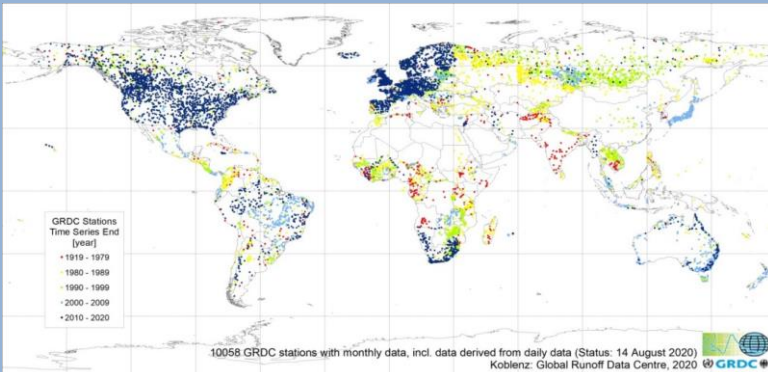


Soil Moisture observation networks contributing to the ISMN

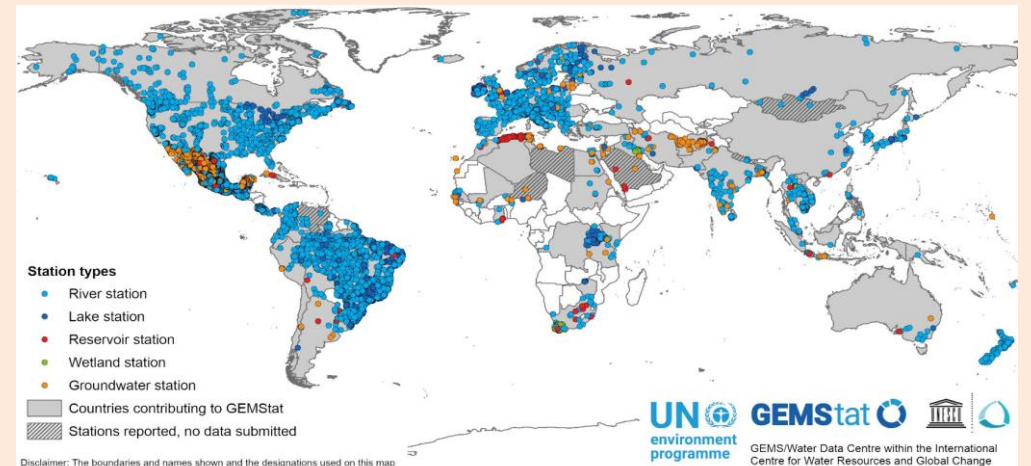
Discharge

Global Runoff Data Centre (GRDC)

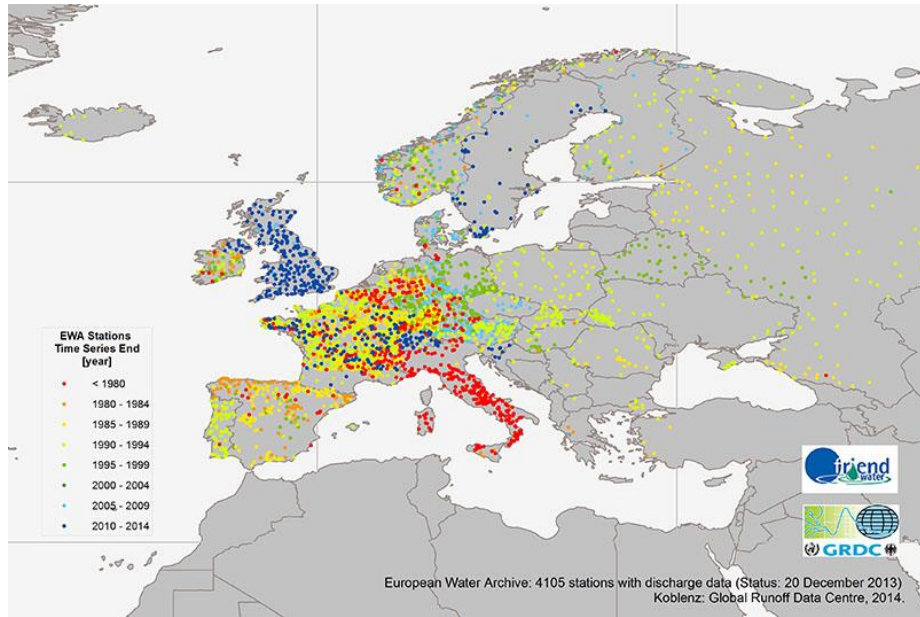
Operational since 1988 under the auspices of the WMO



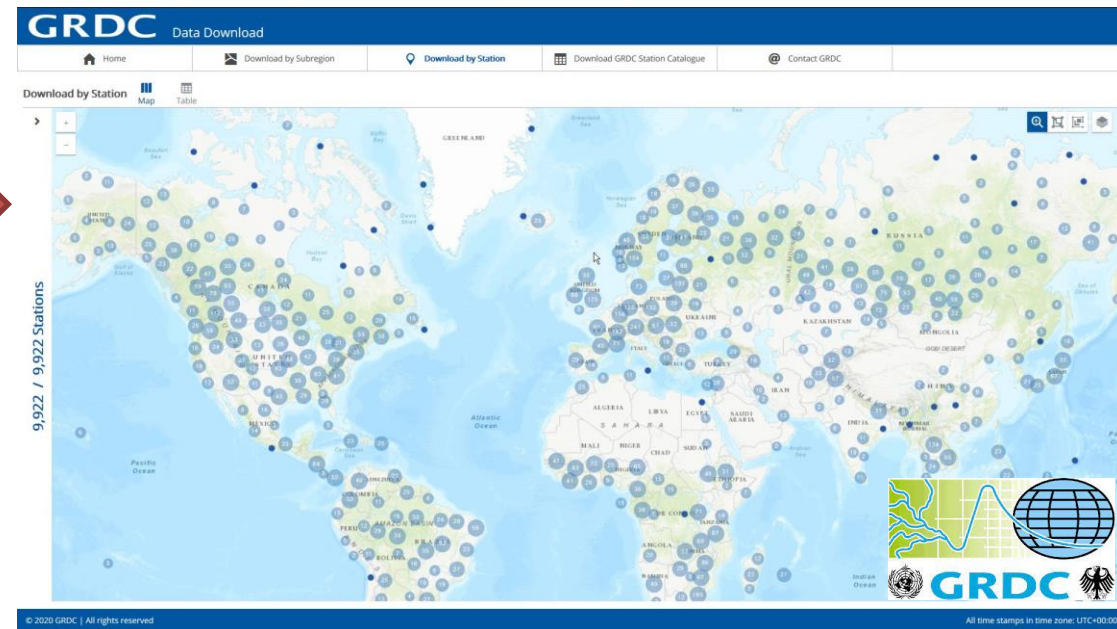
Water Quality



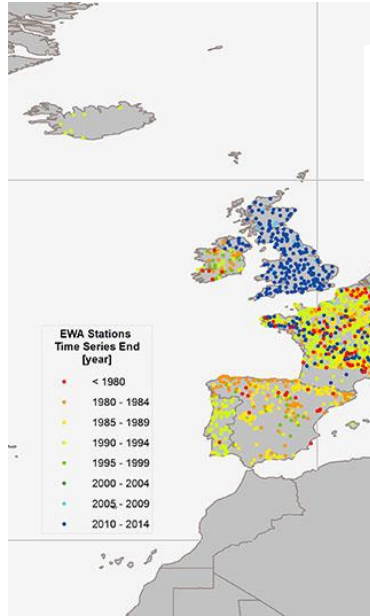
European Water Archive from UNESCO's
EURO-FRIEND Water taken up by GRDC



4105 discharge gauges from 30 countries

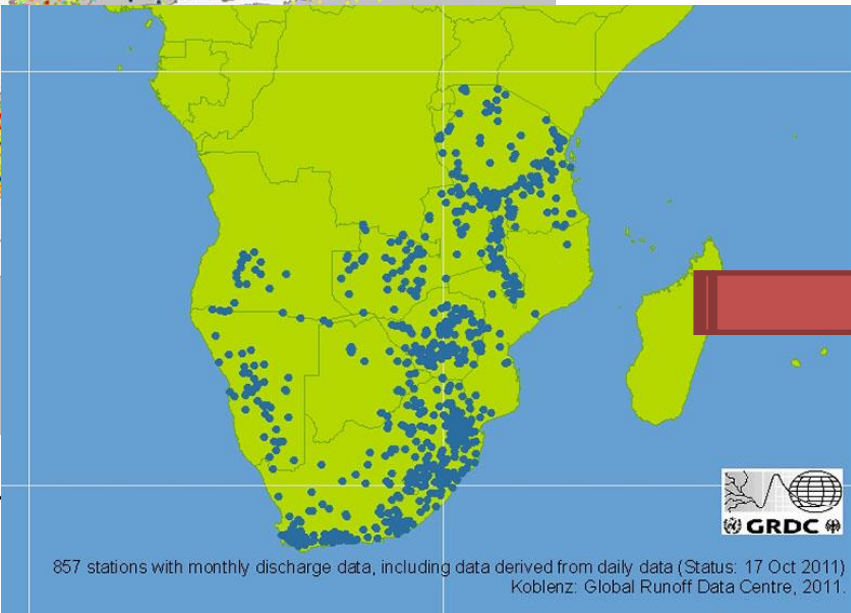


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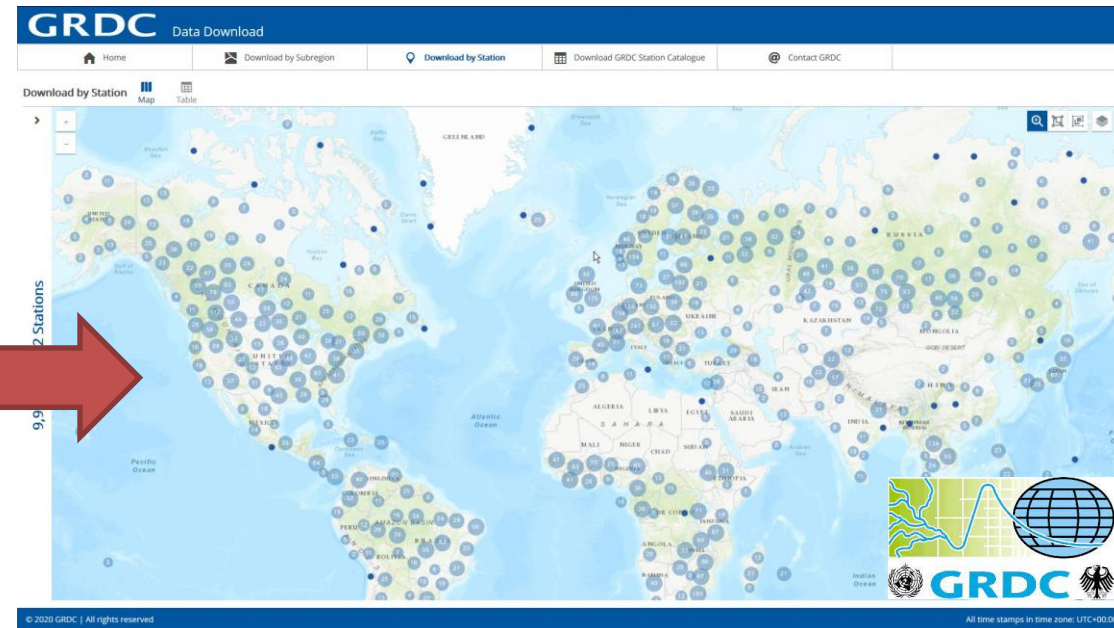


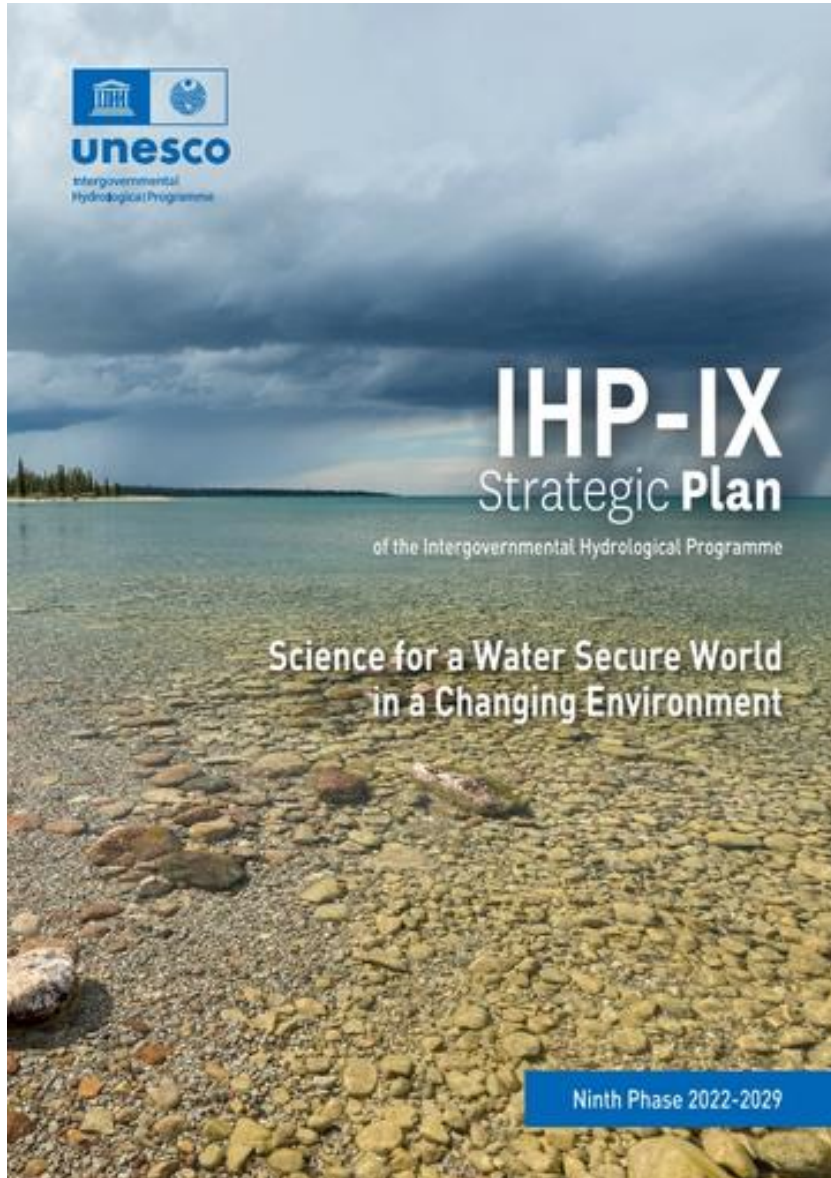
4105 discharge gauges

Southern Africa Flow Database of UNESCO's
EURO-FRIEND Water taken up by GRDC



815 discharge gauges





- 1 Scientific Research and Innovation
- 2 Water Education for the Fourth Industrial Revolution including Sustainability
- 3 Bridging the data and knowledge gaps
- 4 Integrated and Inclusive Water Resources Management under conditions of global change
- 5 Water Governance based on science for mitigation, adaptation and resilience

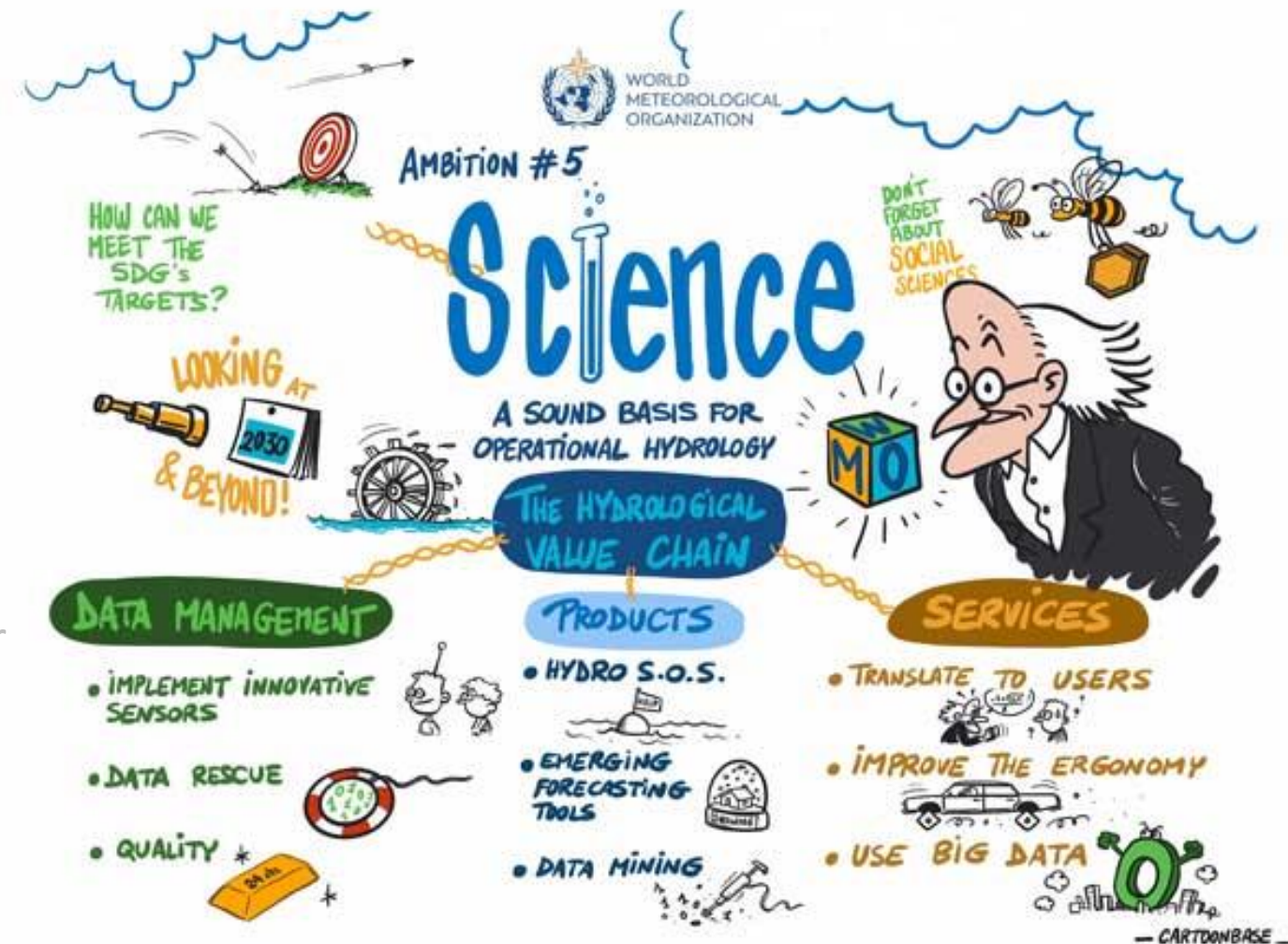
- 3.1. Development and use of scientific research methods by the scientific community supported to **correctly collect, analyse, interpret and exchange data**.
- 3.2. **Establishment of harmonized experimental basins** by Member States, scientific and research communities, supported to collect scientific data and gain knowledge for hydrological research and holistic water management.
- 3.3. **Comparing and validating open access data on water quantity, quality and use** and their sharing by the scientific community supported for sustainable water management.
- 3.4. Capacity of scientific community strengthened to develop, share and apply **scientific tools for data processing** (like data assimilation and visualization methods, quality assurance protocols to connect existing databases and outreach protocols).

Potential support (inter alia):



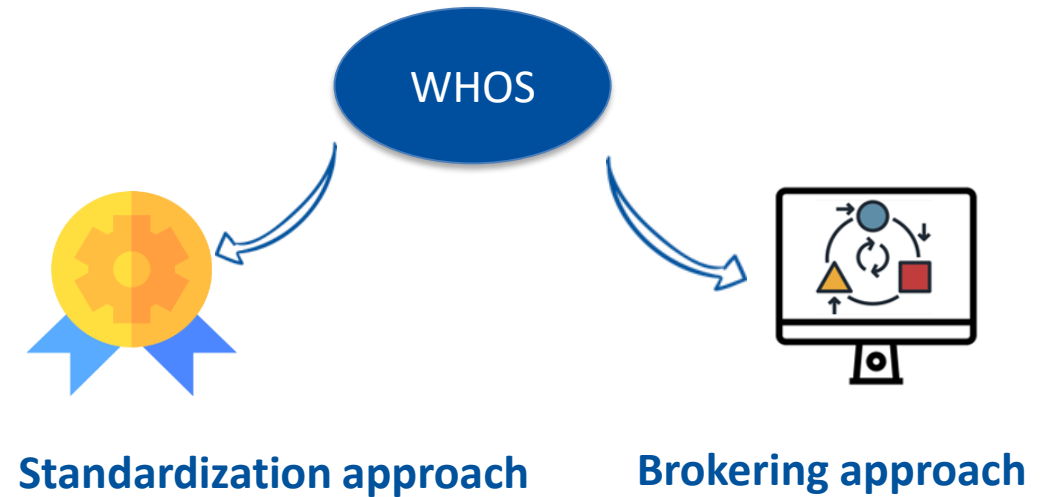
Eight long-term ambitions for hydrology:

1. No one is surprised by a flood
2. Everyone is prepared for drought
3. Hydro-climate and meteorological data support the food security agenda
4. High-quality data supports science
5. Science provides a sound basis for operational hydrology
6. We have a thorough knowledge of the water resources of our world
7. Sustainable development is supported by information covering the full hydrological cycle
8. Water quality is known



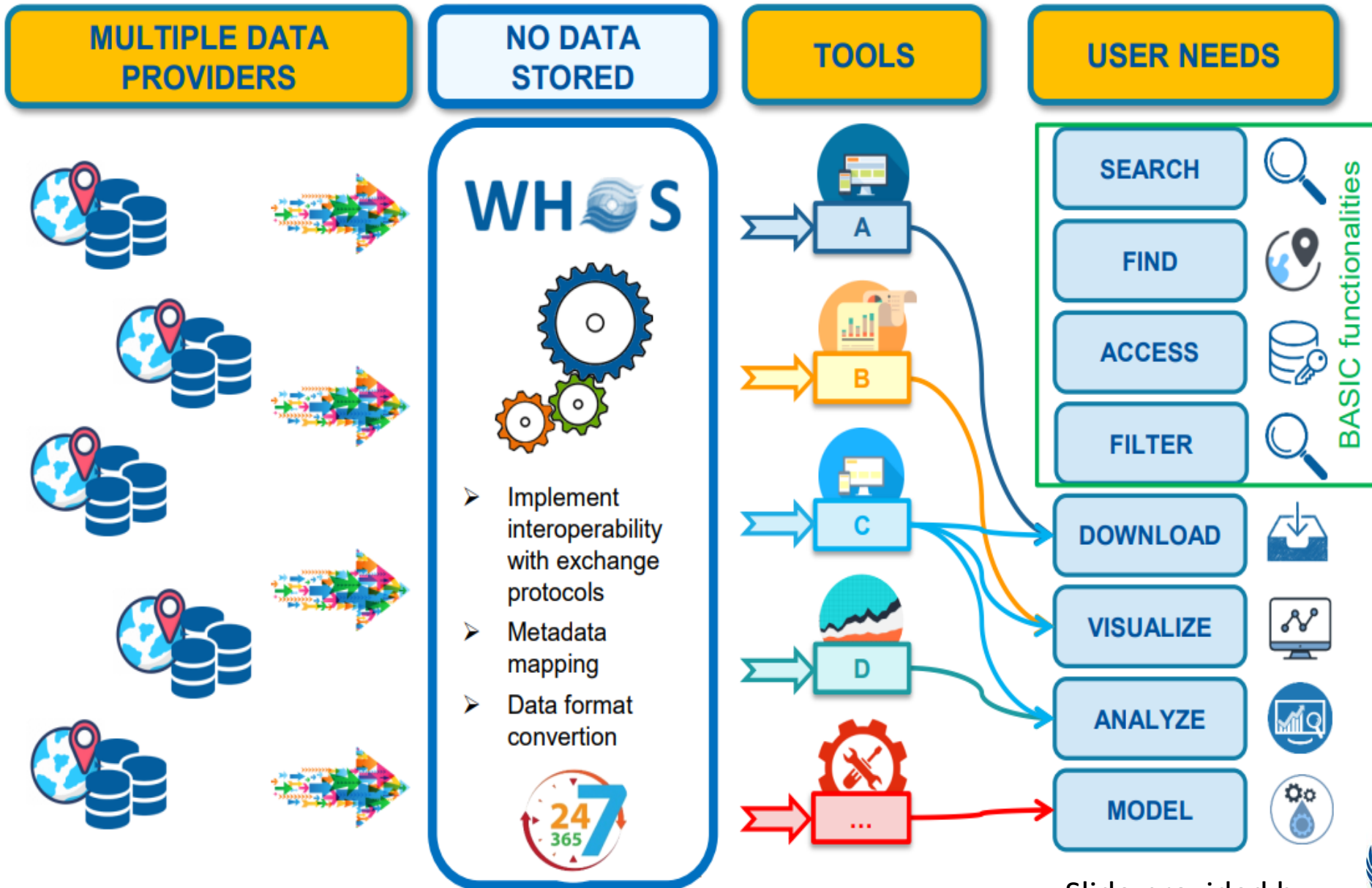
source: <https://community.wmo.int/activity-areas/hydrology-and-water-resources/wmo-hydrological-research-strategy-call-research-proposals>, <https://www.hydroref.com/wmo/hcp/index.php>

- **WMO Unified Data Policy (Open and unrestricted Access)**
 - Core and recommended data
 - Reference stations for hydrology
- **Interoperable Data management and Access tools**
- **Promoting standards, harmonization**



FAIR principles

- **Findable** > metadata
- **Accessible** > Open
- **Interoperable** > Standards
- **Reusable** > Domain relevant, replicated



Slide provided by

https://unfccc.int/sites/default/files/resource/cop27_auv_2_cover%20decision.pdf

Decision -/CP.27

Sharm el-Sheikh Implementation Plan

The Conference of the Parties,

Recalling decisions 1/CP.19, 1/CP.20, 1/CP.21, 1/CP.22, 1/CP.23, 1/CP.24, 1/CP.25 and 1/CP.26,

Noting decision -/CMA.4,¹

Guided by science and principles,



V. Adaptation

20. *Highlights* the role of the Least Developed Countries Fund and the Special Climate Change Fund in supporting actions by developing countries to address climate change, *welcomes* the pledges made to the two Funds and *invites* developed countries to further contribute to the two Funds;

21. *Emphasizes* the importance of protecting, conserving and restoring water and water-related ecosystems, including river basins, aquifers and lakes, and *urges* Parties to further integrate water into adaptation efforts;

VII. Early warning and systematic observation

26. *Emphasizes* the need to address existing gaps in the global climate observing system, particularly in developing countries, and *recognizes* that one third of the world, including sixty per cent of Africa, does not have access to early warning and climate information services, as well as the need to enhance coordination of activities by the systematic observation community and the ability to provide useful and actionable climate information for mitigation, adaptation and early warning systems, as well as information to enable understanding of adaptation limits and of attribution of extreme events;

Filling the data gaps is essential for

- the access to available and clean water resources
- global climate monitoring
- disaster risk reduction

Future observation strategies should

- consider holistic approaches
- improve interoperability between communities
- plan for operational uptake and financing

To be improved

- How to bridge gaps between research and operational hydrology
- Or how to connect WMO, UNESCO and EGU GC-8 Hydro community?
- Technically WMO WHOS?

We seek for case studies

- that demonstrate the added value of in situ observations
- for the entire value chain of hydrological disaster and climate change warning systems.
- please contact gtn-h@bafg.de