Global Terrestrial Network of Water Resources Observation Infrastructures

The Global Terrestrial Network – Hydrology (GTN-H)

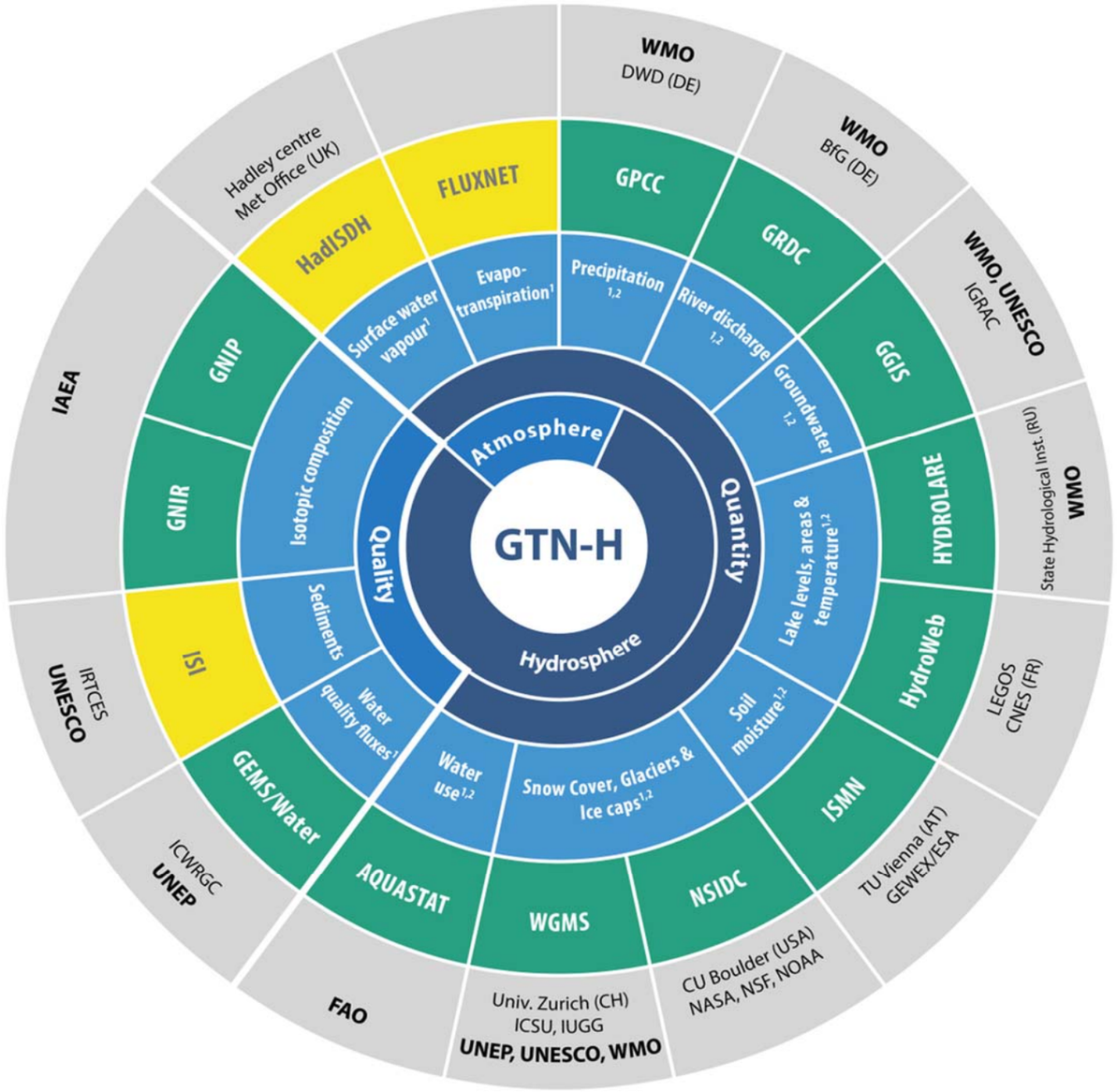
Stephan Dietrich (ICWRGC)

GTN-H and the existing operational global data centers of essential water variables

GTN-H

Network of the global water data centres, most of them operating under the umbrella of UN organizations.

Joint project of the World Meteorological Organization (WMO) and the Global Climate Observing System (GCOS); implemented in 2001



GTN-H and its multilateral network

Scientific communities

UNESCO IHP

United Nations Educational, Scientific and Cultural Organization · International Hydrological Programme

IHP-WINS

WMO HWRP

WORLD METEOROLOGICAL ORGANIZATION

WHYCOS

HydroHub

HydroSOS

WHOS

GEO Water Strategy

(From observations to decisions)

GROUP ON EARTH OBSERVATIONS

GEOGLOWS

GEOSSENTIAL

AquaWatch

IGWCO-CoP

Essential Water Variables

UNEP GEMS/Water

SDG 6: Water Quality

UN environment

GEMS Water

GCOS → UNFCCC

Mitigation / Adaptation

GCOS

GLOBAL CLIMATE OBSERVING SYSTEM

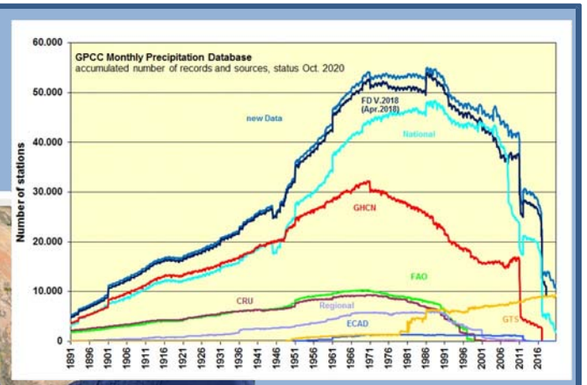
GCOS · WCRP TOPC

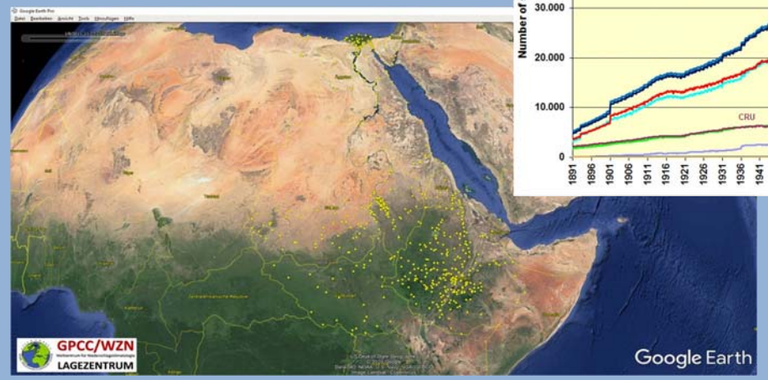
Essential Climate Variables

Global Stocktake

GTN-H status: some examples

Precipitation



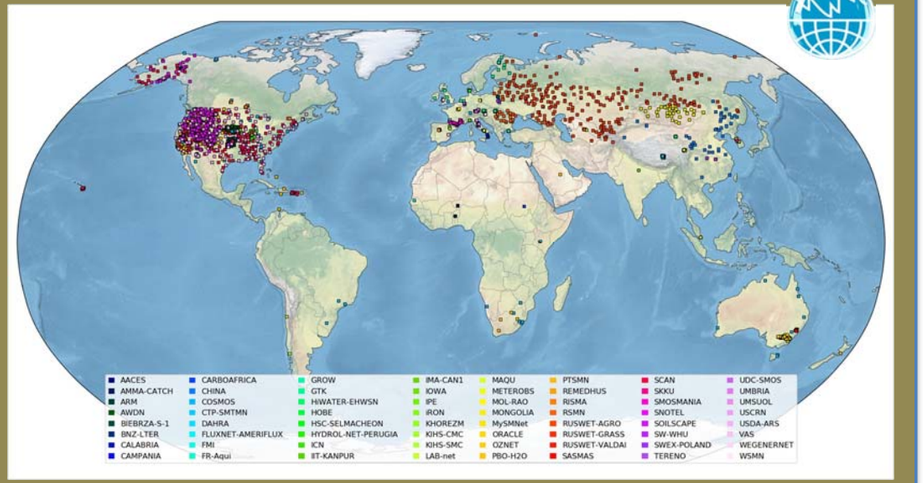


GPCC Precipitation Stations in the Nile catchment

Data allocation over time in the GPCC data base

Soil Moisture

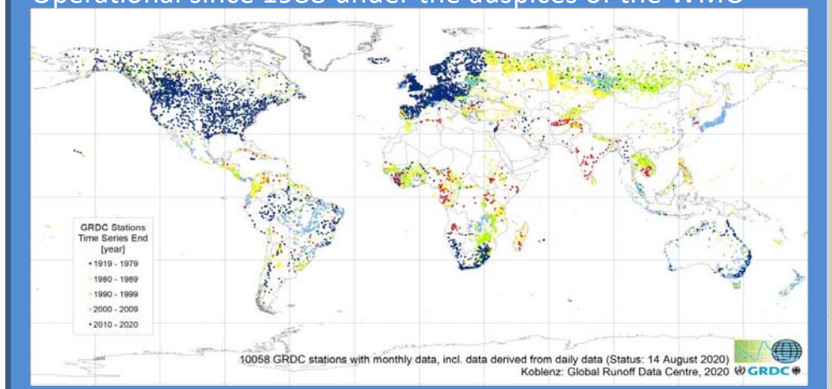
Dorigo et al., (HESS in review : "The International Soil Moisture Network (ISMN): serving Earth system science for over a decade".



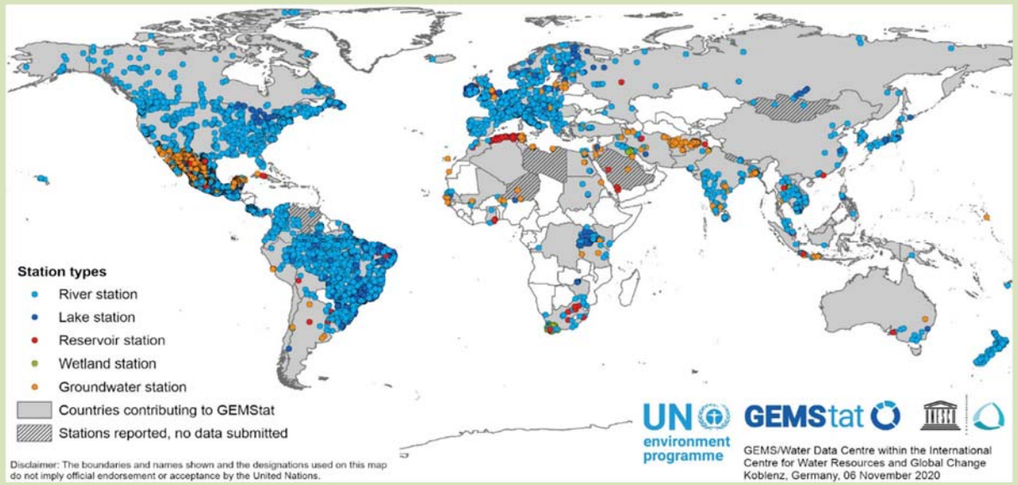
Discharge

Global Runoff Data Centre (GRDC)

Operational since 1988 under the auspices of the WMO



Water Quality



Closing the water cycle from observations across scales: Where do we stand?

https://journals.ametsoc.org/view/journals/bams/aop/BAMS-D-19-0316.1/BAMS-D-19-0316.1.xml

By assessing the capability of available ground and Earth observations of water cycle ECVs, we

- provide the most-recent observation based assessment of the water cycle and global water storages,
- discuss gaps in existing observation systems,
- formulate guidelines for future water cycle observation strategies.

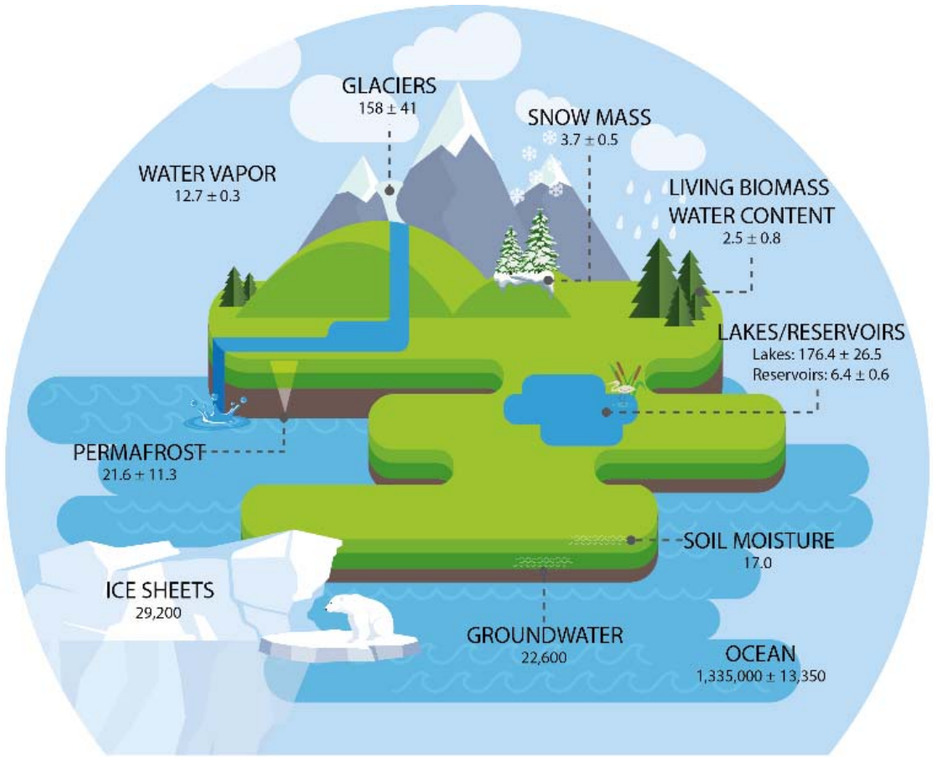


Fig. 1. Observed estimates of global water cycle storages (in 10^3 km^3) and their uncertainties.

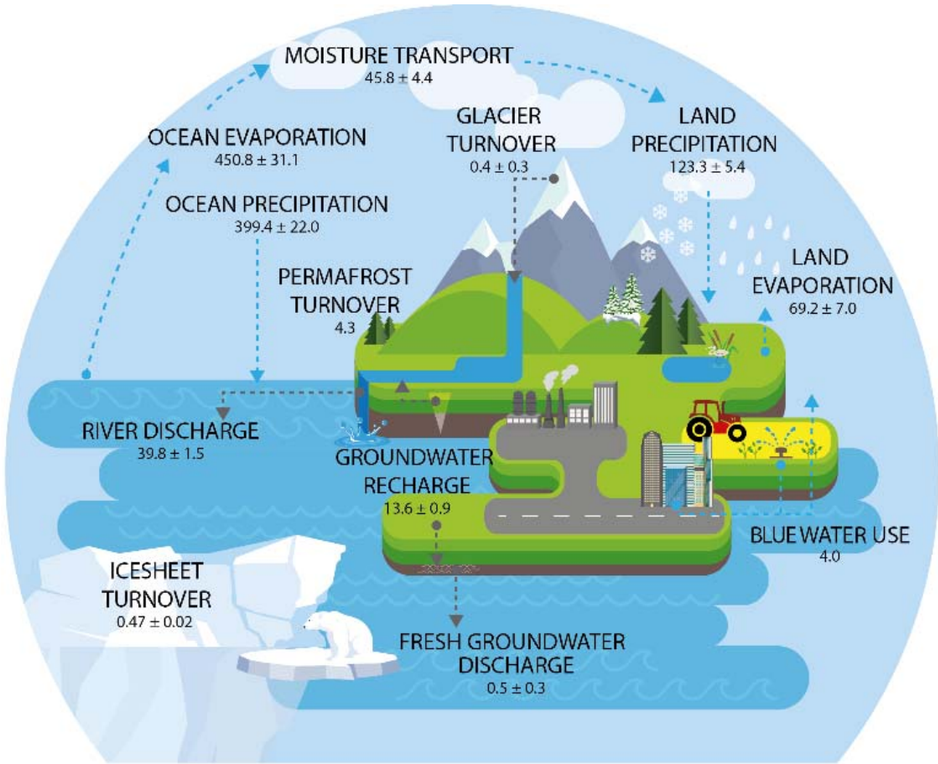


Fig. 2. Observed estimates of annual global water cycle fluxes in 10^3 km^3 .

Dorigo, Dietrich et al. (BAMS, acc.)

GTN-H: Competences and Issues

What we are good at

- ✓ 12 data centres and networks covering terrestrial water observations: water quantity and quality
- ✓ powerful reference for global water observations
- ✓ long-term service: often operational since decades
- ✓ member of the UN WATER family (WMO, UNESCO, FAO, UNEP)
- ✓ Climate Observations under auspices and in support of GCOS and WMO
- ✓ GTN-H members act as stewards for Essential Climate Variables (ECVs)
- ✓ GTN-H members act as hosts to contribute to SDG: e.g. UNEP's GEMS/Water Data Centre is implementing partner for the SDG indicator 6.3.2 for Water Quality.

What needs to improve

- ❑ Observational gaps: not complete in spatial and temporal coverage
- ❑ Timeliness: collection of quality approved data needs time (provided data are often years old)
- ❑ Consistent data sets for in-situ and satellite Earth Observations
- ❑ pressing need for improved data management for the whole value chain of original data producers to global data centres
- ❑ sustainable funding mechanisms for local/regional observation networks and global data centers
- ❑ essential to have a clear data policy: free, open and easily accessible

GCOS Status report 2021 (draft)

Data Exchange in Hydrology?

Status of selected Action Task for the GCOS status report 2021. The greener, the more improved.

G19	Data access and discoverability	(3) some gaps remain – e.g. in hydrology
T7	Exchange of hydrological data	(1) No improvement despite the efforts of GTN-H and WMO

GCOS recommendations (JPM-2021) for Data

FAIR data principle framework

- Findable
- Accessible (free and open)
- Interoperable
- Reusable

- Should be the underlying framework within which we encourage data centre development and operation

Integration

- Aim for integrated holdings – combine data rather than divide data

- Global data centres build upon and require national and regional data management – they do not replace them

- Good showcases such as the EU ENVRI FAIR initiative

GCOS activities

- Work towards global integrated and interoperable data centres and strong national / regional competencies

https://gcos.wmo.int/en/gcos-joint-panels-meeting-2021

GTN-H: Ongoing and Future Tasks

- GTN-H 10th **Panel Meeting** (June 15-16, 2021), focussing on discoverability and accessibility. Feedback will be shared.

- GTN-H **Discovery service**, to link various water quantity and quality data from world water data centres (pilot is in development, we seek for funding for operational use)

- GTN-H Data Centres are asked to provide detailed information about their **data stewardship maturity**, based on the WMO maturity matrix for climate data (https://climatedata-catalogue.wmo.int/) and the GEO DMP (https://www.geolabel.info/).

- Collabration with **WMO** to promote hydrological data exchange (WHOS) and data license issues (Resolution 42)

- We co-organize a **Workshop Series** (2021-24) on Regional Water Exchange in Central Asia and Middle East (High Level Opening on Minister Level in June); sponsores: UNESCO, WMO, UNEP, GEO

List of actions to improve data exchange requires additional resources

- Data Exchange and collaboration from authorities and scientific observations is necessary to fill gaps (in both directions)

- GTN-H data centres already act as community recognized reference data centres

- **Aim**: joint H2020 proposal for "GTN-H goes FAIR" or alternative to request funding with the clear goal of operationalization

- We are looking for partners as the project results will be open to the scientific communities