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GTN-H : Network of Federated Global Data Centres in Support of GCOS

Overview

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About GTN-H

- Links existing terrestrial observation networks for integrated observations of the global water cycle
- Established in 2001
- “Network of Networks” for global and regional climate and water applications

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Goals of GTN-H

- Maintain a global hydrometeorological network of networks of GCOS Essential Climate Variables
- Plans and implements activities that facilitate access to hydrological, hydrometeorological and observation data, and generates derived products
- Forms an essential component for integrated global and regional hydrological products

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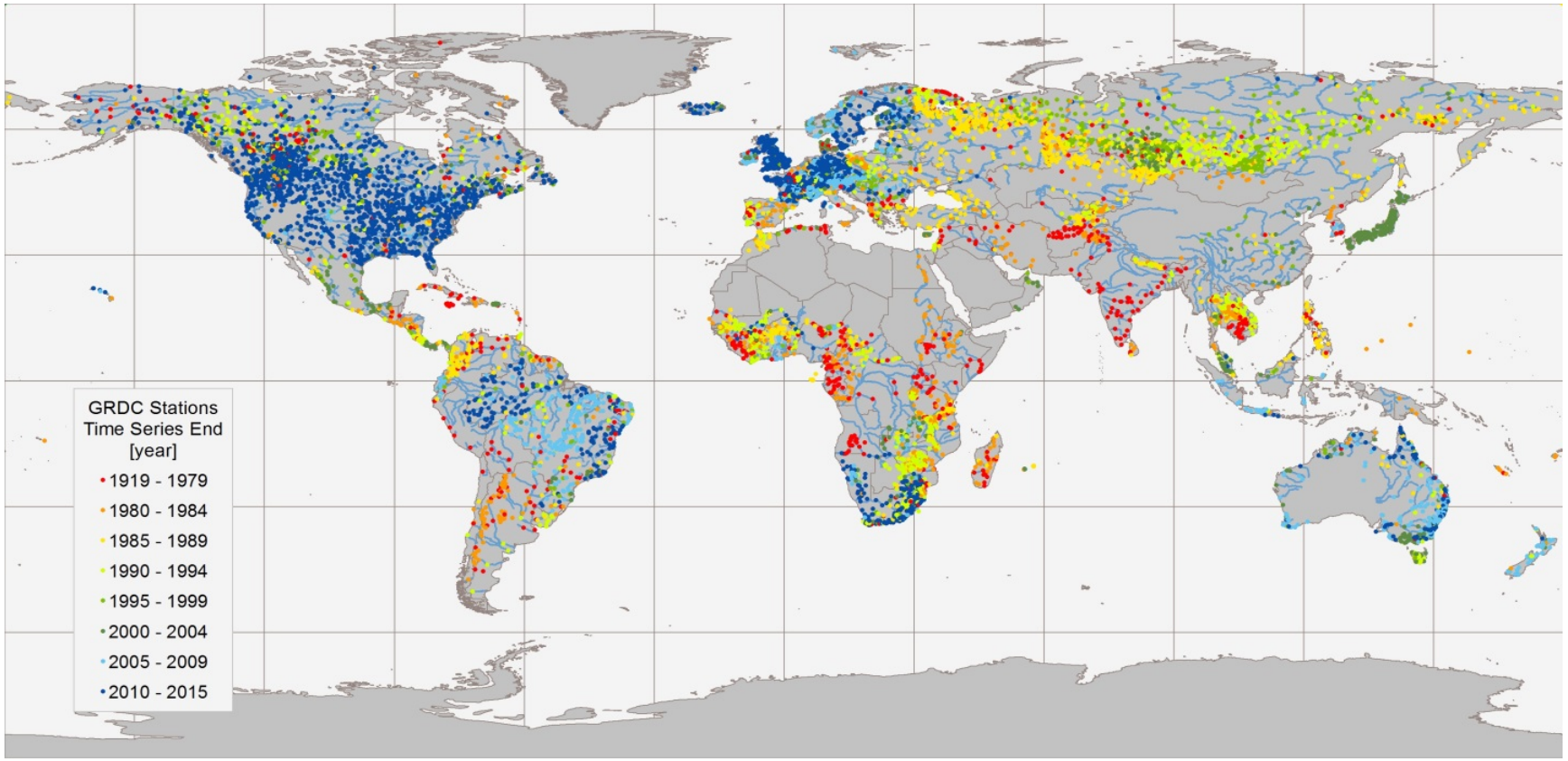
Example : Global Runoff Data Centre (GRDC): Network of more than 9.000 hydrological stations



9213 GRDC stations with monthly data, incl. data derived from daily data (Status: 27 May 2015)
Koblenz: Global Runoff Data Centre, 2015.

GRDC

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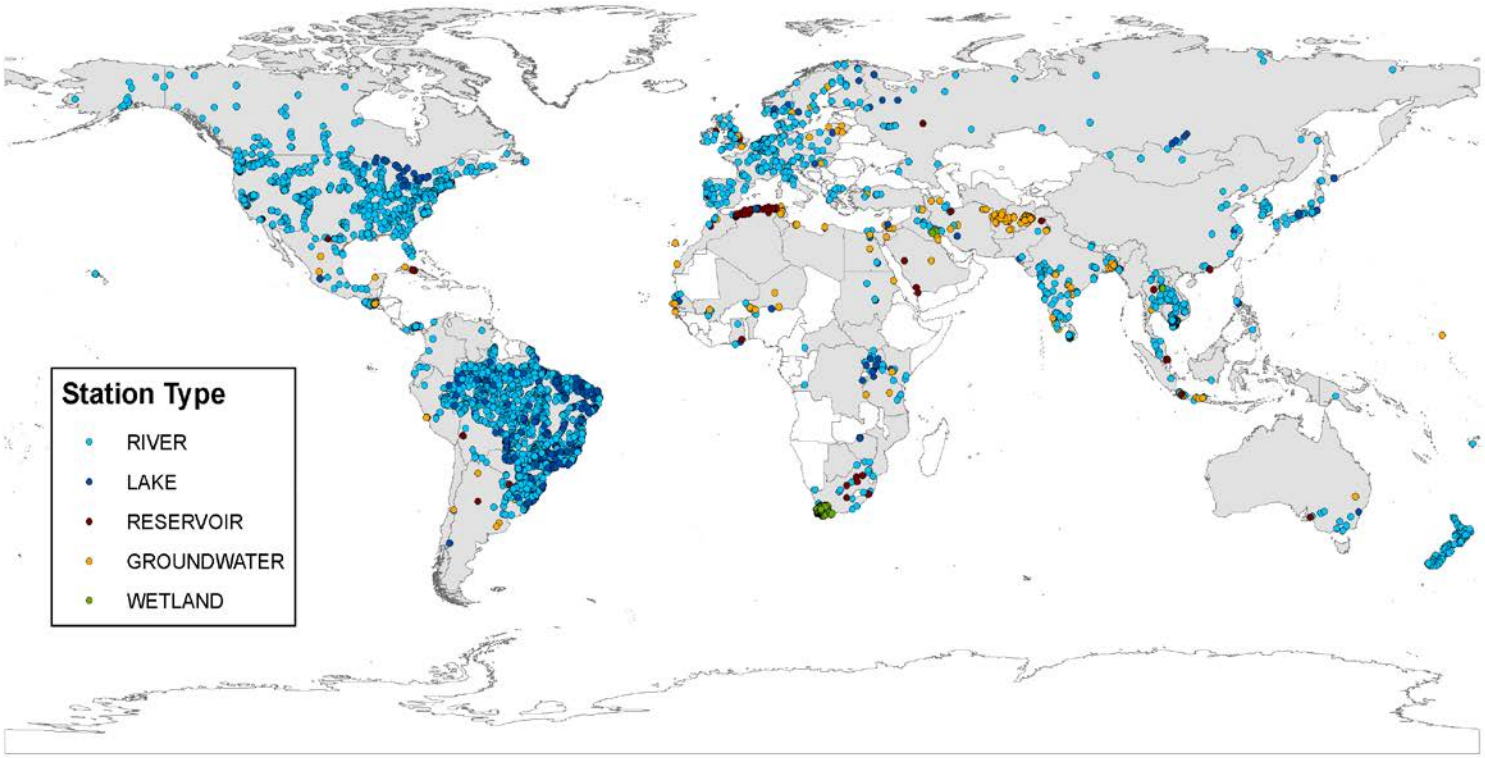
Example : Global Environment Monitoring System (GEMStat): Network of over 4.400 in-situ water quality stations



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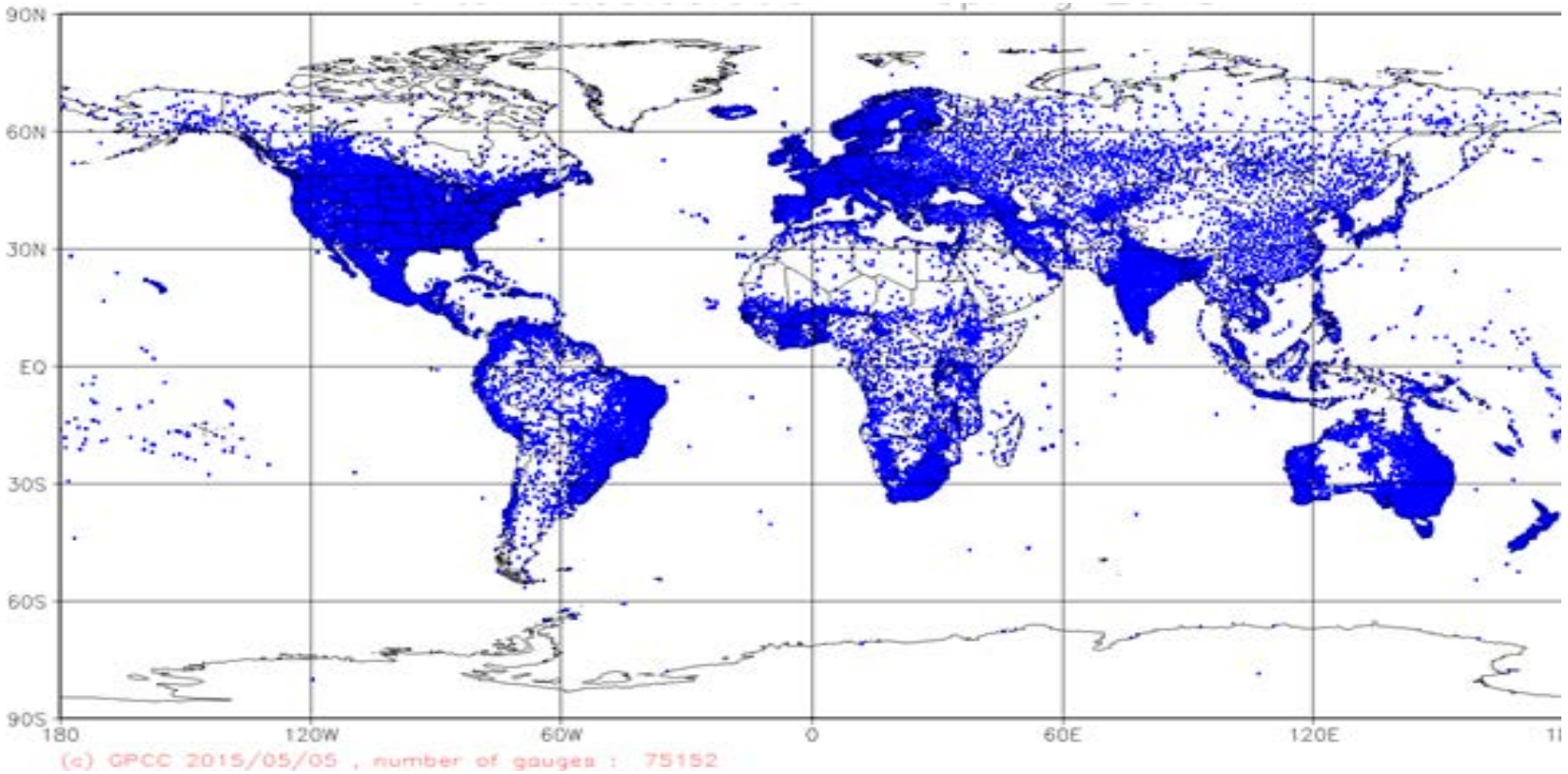
Example : Global Precipitation Climatology Centre (GPCC): Network of more than 75.000 in-situ precipitation stations



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International Soil Moisture Network: Over 2000 stations are hosted in the ISMN (mid June 2015)

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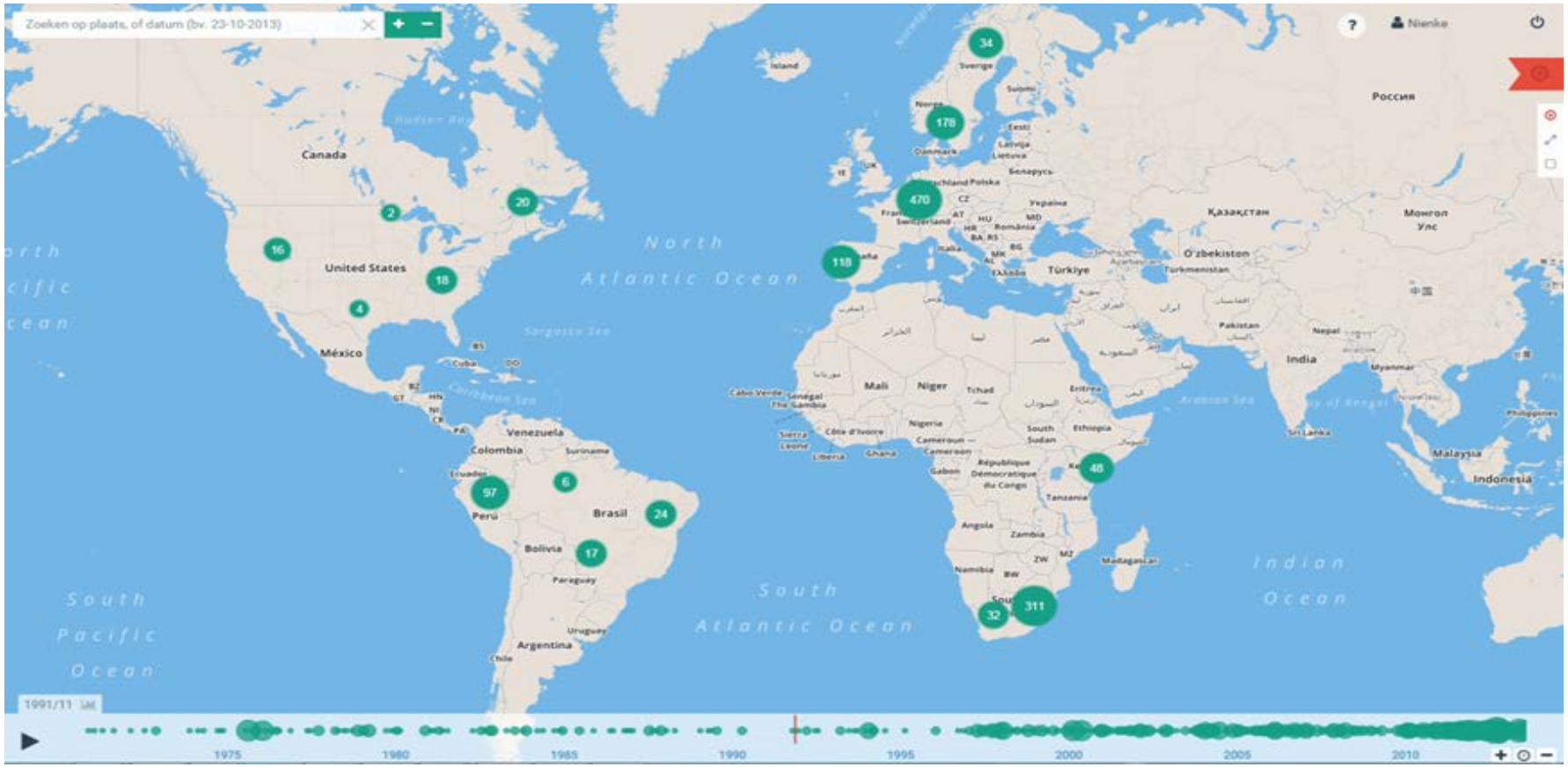
The Global Groundwater Monitoring Network (source: Integrated Groundwater Resources Assessment Centre (IGRAC))



HYDROLARE

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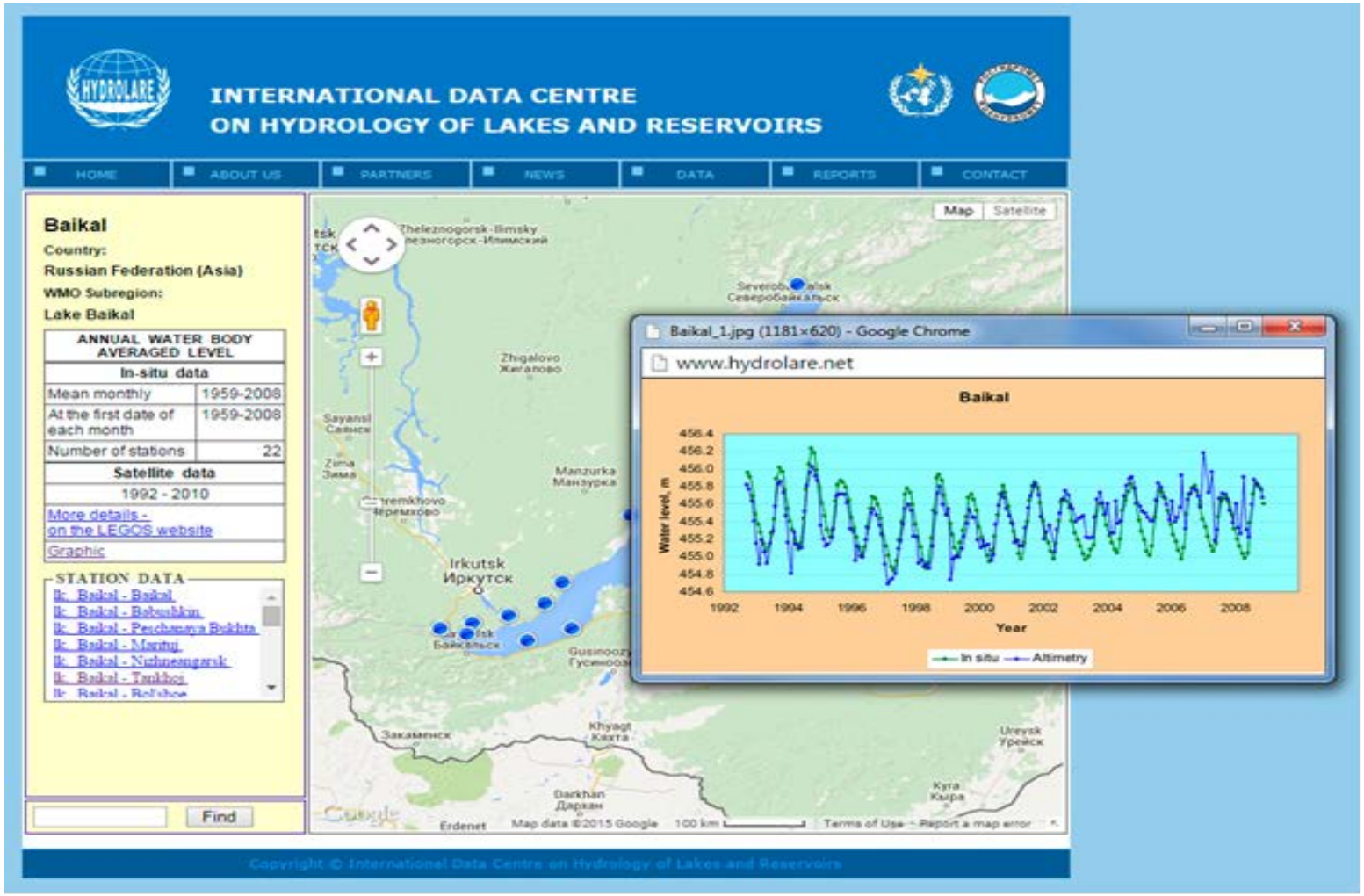
Combination of in-situ lake gauges and virtual gauges obtained from satellite-based altimetry data (from CNES-LEGOS)



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International Data Centre on the Hydrology of Lakes and Reservoirs (HYDROLARE) – HYDROWEB: The satellite input to HYDROLARE

HYDROWEB

Water level of rivers and lakes by satellite altimetry

Lake Baikal available data <-Asia <-Global Map See full list Contact

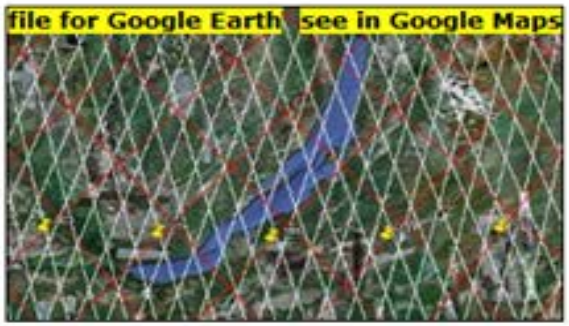
Water level
Water level obtained with satellite altimetry
altimetry processing currently is : **active**

Surface variation
Surface variation observed with optical and radar imagery.

Volume variation
Water level and surface variations are combined to estimate the total volume variation

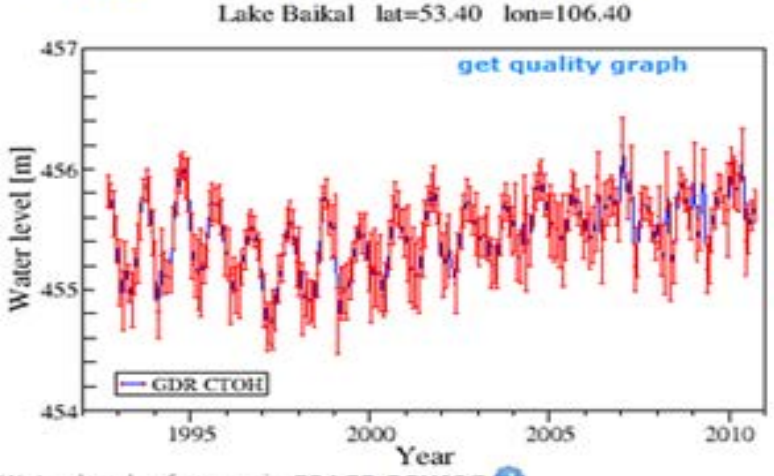
External data
In Situ measurments are **available** on Hydrolare website.

Image below shows Lake Baikal in color composition.
Legend : Jason 1&2 Topex/Poseidon Envisat & ERS GFO



Water level

Click-here- to download time serie's values in text format.



Water level reference is GRACE GGM02C

When you use our data the appropriate citation is :
"Surface monitoring by satellite altimetry" pdf

Learn more about satellite availability and our processing chain.

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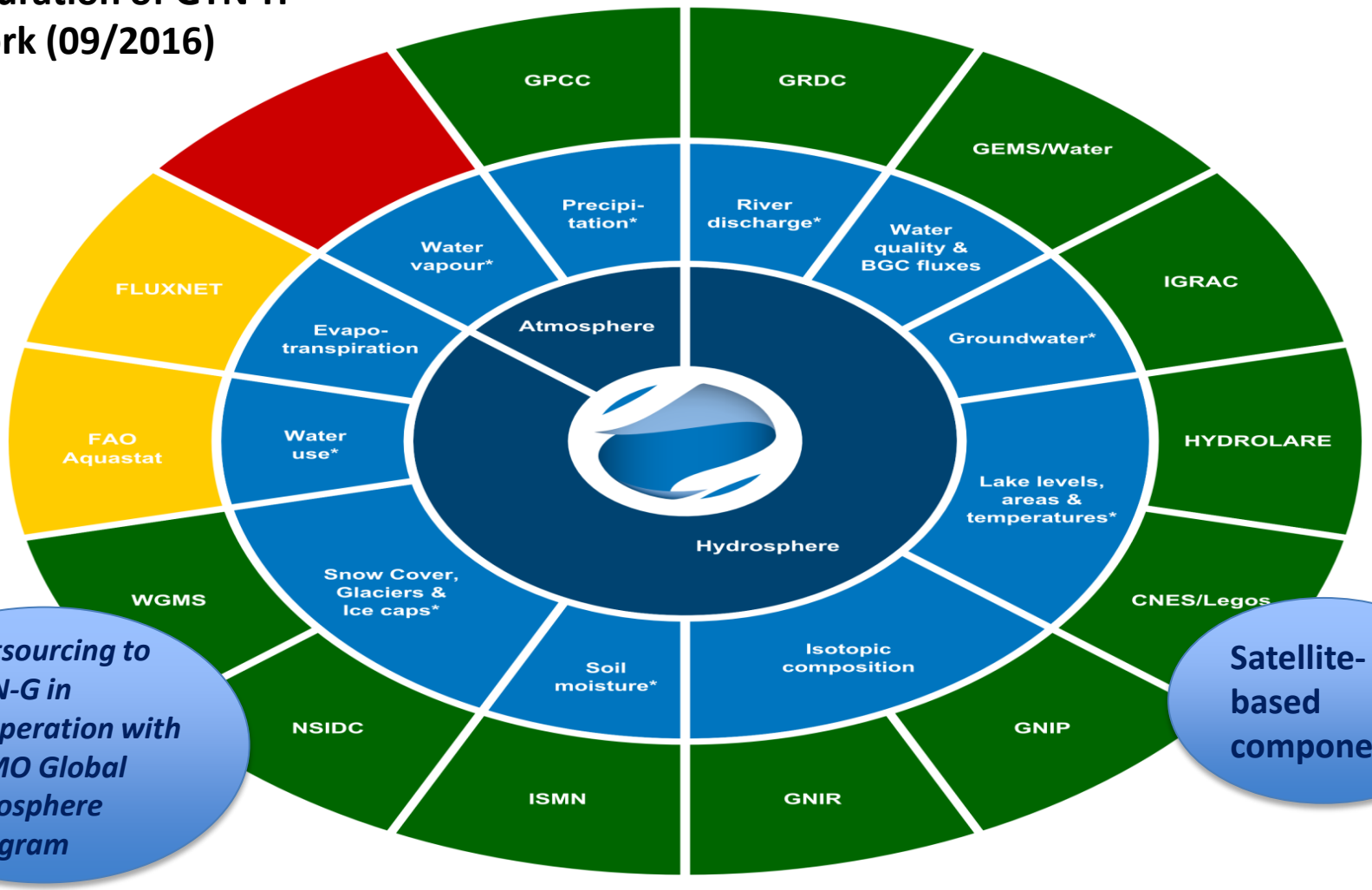
Configuration of GTN-H Network (09/2016)



Outsourcing to GTN-G in cooperation with WMO Global Cryosphere Program

Satellite-based component

Variable/ * GCOS Essential Climate Variable

Global network/coverage defined and contact established

Global network/coverage partly existing/identified and/or contact to be improved

No global network/coverage identified

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International Context

Joint effort of the:

- World Meteorological Organization/Climate and Water Department (WMO/CLW)
- Global Climate Observing System (GCOS)
- Global Terrestrial Observing System (GTOS)
- Observational component of the Group on Earth Observations/ Integrated Global Water Cycle Observations Theme (GEO/IGWCO)

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Added value from GTN-H Federated Data Centres

[1] Products that improve our understanding of what's available and how to access it (Management of Metadata, development of standards such as OGC standards, use of WATER-ML2 etc)

[2] Products that enhance baseline or core hydrological data and improve our knowledge of hydrology (i.e. Development of gridded runoff datasets; production of Hydrological Normals)

[3] Products that result from the integration of existing datasets (i.e. Mapping of Biogeochemical Fluxes)

[4] Products that are designed to address specific science questions (i.e. reference hydrological data sets (pristine basins)

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GTN-H responds to :

User Needs for GEO-driven Essential Water Cycle Variables (EWVs)

- Developed by (1) GEO-UIC-SBA-Water (2010) & GEOSS Water Strategy Report CoP—(2015)
- Through review process with wide acceptance by the community
- EWVs are linked to applications and end-users. They are derived by reviewing/consolidating user-needs/requirements (for observations of water variables) in all GEO user sectors as defined by the GEO SBA's
- Community agreement reached by review (process) and consensus
- EWVs are linked to international bodies (GEO and collaborating Member Organizations)
- Data base with information on EWVs: Various, as maintained by national, regional and international organizations and programs.

Source: Sushil Unninayar (NASA/GSFC-GESTAR)

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GTN-H in the context of Essential Water Variables

Essential Water Variables (EWV) are defined as water variables/parameters that address "user"-defined critical requirements for one or more of the following:

- **(1) Observational "monitoring" of key elements of the global and regional/local water cycle,**
- **(2) Observations required by diagnostic and/or land surface/hydrological prediction models that are used to generate derived products for the end-user communities, and**
- **(3) Observational and model-derived variables and parameters required by users of water data/information products as applied to various inter-disciplinary decision support systems and tools.**

Source: Sushil Unninayar (NASA/GSFC-GESTAR)

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ESSENTIAL WATER VARIABLES

PRIMARY WATER VARIABLES

- Precipitation
- ET
- Snow Cover (& Depth, Freeze/Thaw Margins..)
- Soil Moisture/Temp
- Ground Water
- Runoff/Streamflow/River Discharge
- Lakes/Reservoir Levels and Aquifer Volumetric Change
- Water Quality
- Water Use/Demand (Agro, Hydro, Energy, Urban,…)
- Glaciers/Ice Sheets

Source: Sushil Unninayar (NASA/GSFC-GESTAR)

Note: All primary Essential Water Variables overlap with the GCOS Essential Climate Variables !

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In a wider framework, GTN-H provides the observational basis to monitor water in the context of the Sustainable Development Goal – Water (SDG 6)

Despite overall achievements in making data and information available to stakeholders, key challenges persist including:

- **Overall political will to share data and information related to water**
- **Inadequate data sharing policies and sharing standards**
- **Definition of global core networks for essential in-situ observations and linkage with satellite-based observations**
- **Inadequate knowledge how to use earth observations at the level of policy formulation and decision support at regional and global levels**

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Planned and ongoing activities (selected) 1/2

Strengthen in-situ observations through efforts of the federated data centres, where feasible including complementary satellite observations;

Initiate an overview of quality management procedures at the level of the global federated data centres;

Improve registration of metadata and datasets to existing GEO-Infrastructures (such as WMO-WIGOS, GEOSS-Portal) to improve visibility and access to data and observations;

Both CEOS and GTN-H are expected to make major inputs to facilitate the implementation of the Strategy. While CEOS will mainly cover satellite-based earth observations, GTN-H is expected to cover significant domains of in-situ earth observations;

Work on a concept of Basic Regional Networks of all Essential Climate Variables to identify strenghts and weaknesses of an Integrated Earth Observation System for Climate and identify investment opportunities to improve these networks.

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Planned and ongoing activities (selected) 2/2

- In April 2016, GTN-H and several of its federated data centres participated in the 18th session of the Terrestrial Observation Panel on Climate (TOPC) under the leadership of the Global Climate Observing System (GCOS). Here and in subsequent activities, GTN-H with its partner data centres contributed significantly towards discussions to improve in-situ observation systems related to hydrometeorological variables, including the development and update of the basic requirements tables that are the observational back-bone to the GCOS Implementation Plan to be prsesented during the upcoming meeting of the Conference of the Parties (COP).

- Major efforts were undertaken to improve the interoperability of the exchange of data as a milestone for enhanced efforts to develop tailored data products from a multitude of databases.

- In cooperation with the Open Geospatial Consortium (OGC) and its HydroDomain Working Group made significant progress in matters related to standards and standardization of communication including the use of Water –ML

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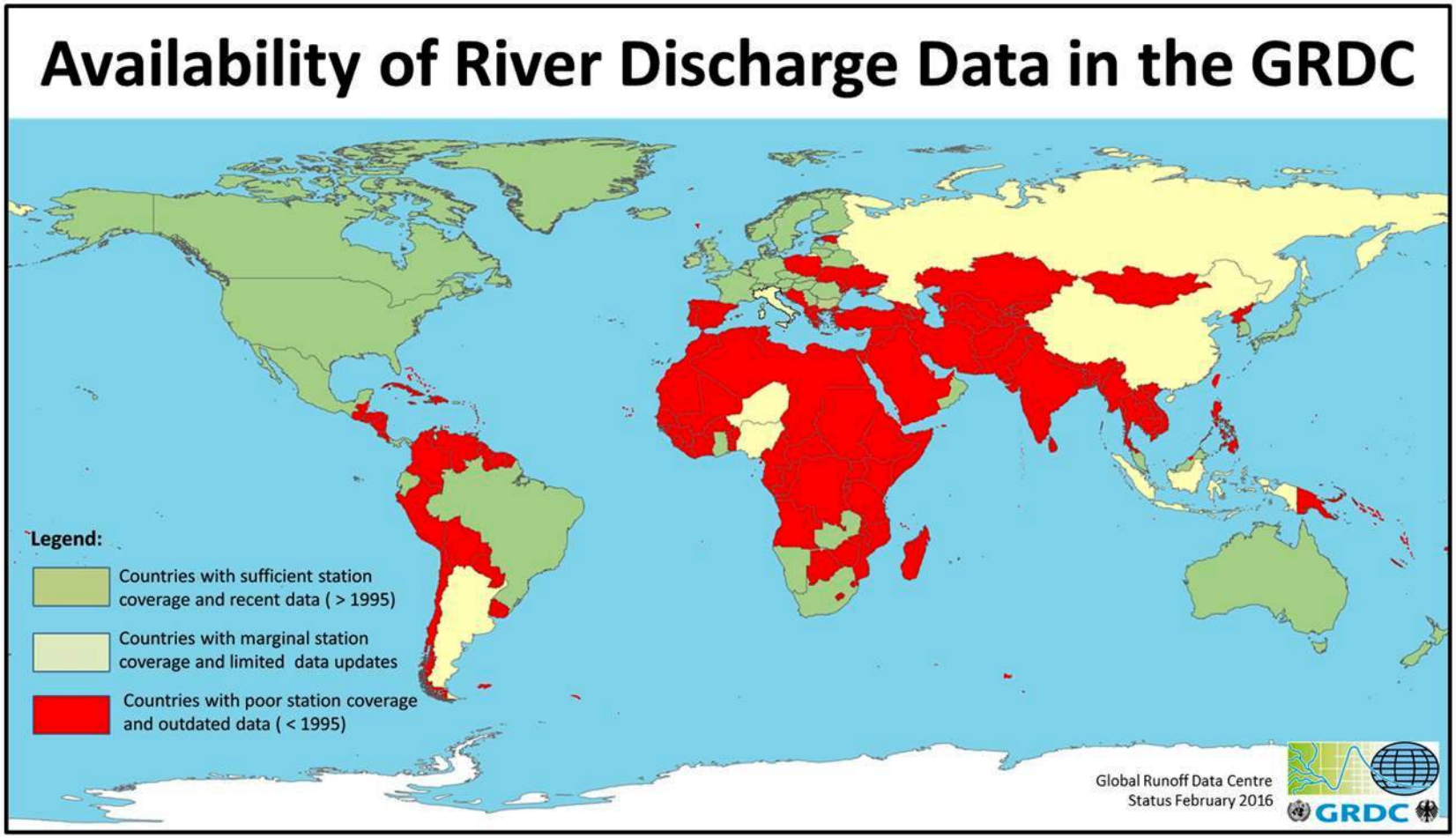
Gap Analysis:



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Thank You