



***TPE-GHP/GEWEX Joint Workshop***  
*Status Report of Global Data Centres*  
***GPCP (Global Precipitation Climatology Centre)***  
***HYDROLARE (International Centre on the Hydrology of Lakes  
and Reservoirs)***  
***GRDC (Global Runoff Data Centre)***

***Ulrich Looser***

*Global Runoff Data Centre at the  
Federal Institute of Hydrology (BfG) Koblenz, Germany*

# GTN Hydrology

## Global Terrestrial Network

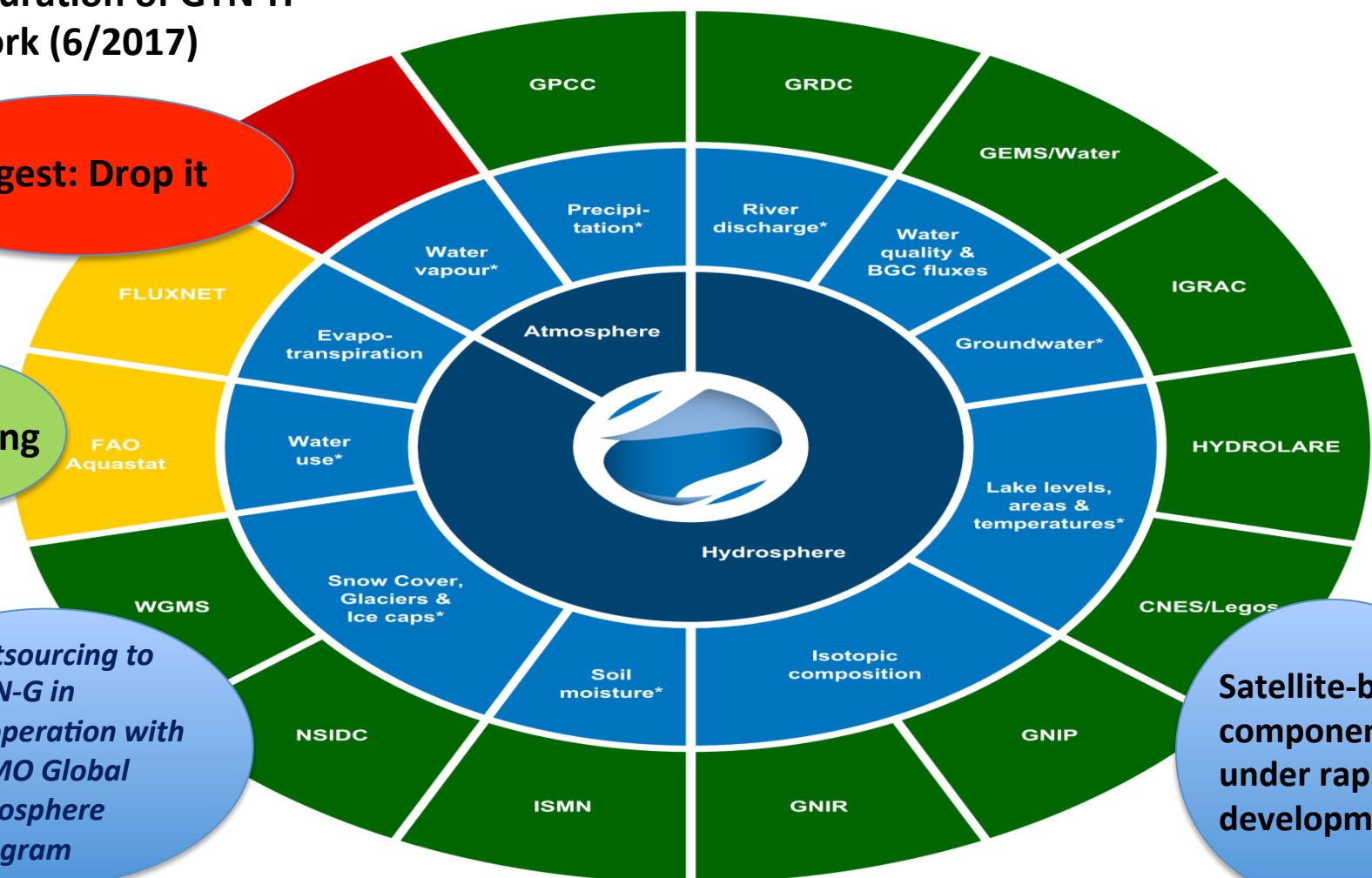
Configuration of GTN-H Network (6/2017)

**Suggest: Drop it**

**Emerging**

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

**Satellite-based component under rapid development**



- 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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*Precipitation: GPCC*  
**Global Precipitation Climatology Centre**  
*Offenbach, Germany*



[gpcc.dwd.de](http://gpcc.dwd.de)

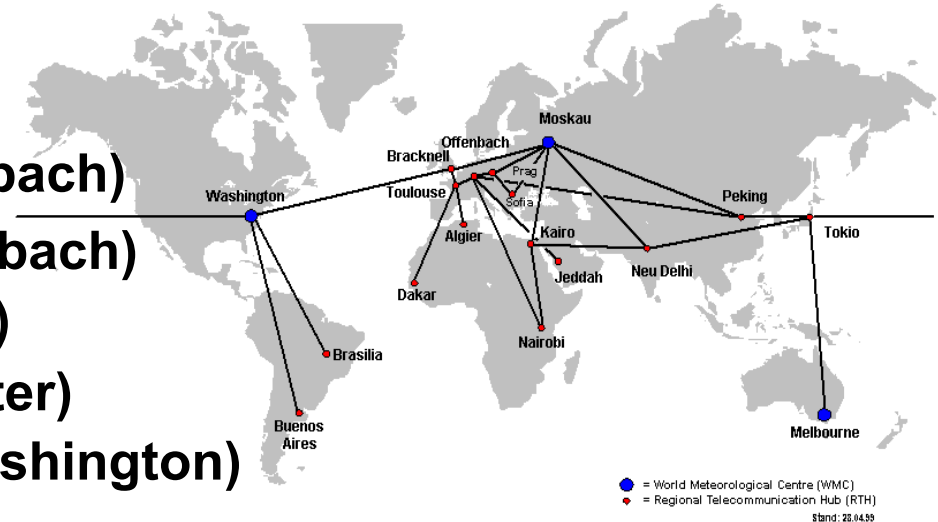
# GPCC data sources

## Near real-time (GTS):

- GTS SYNOP (**DWD RTH Offenbach**)
- GTS CLIMAT (**DWD RTH Offenbach**)
- GTS CLIMAT (**JMA RTH Tokyo**)
- GTS CLIMAT (**UKMO RTH Exeter**)
- SYNOP-based (**NOAA RTH Washington**)

## Main Telecommunication Network (MTN)

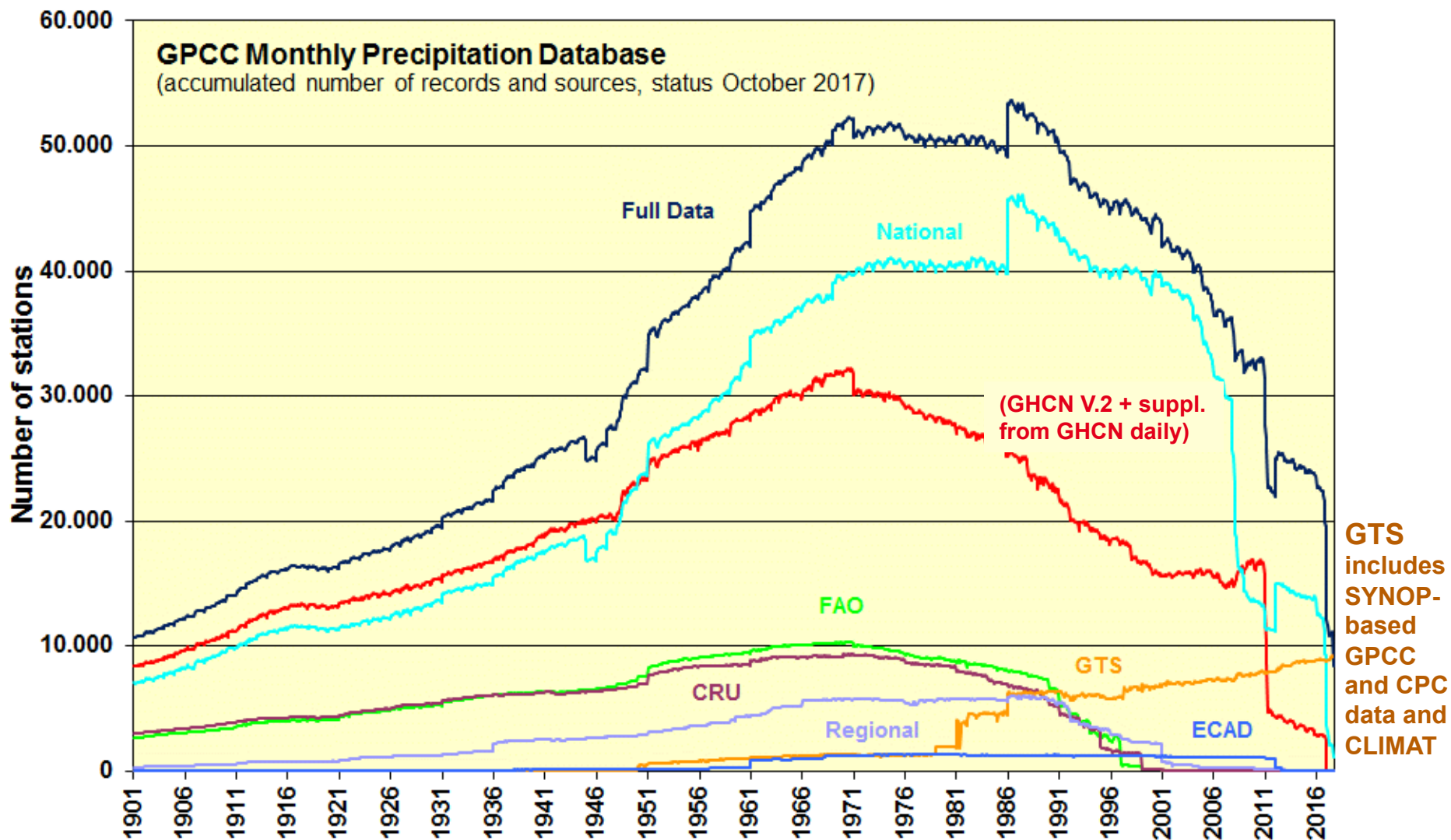
ein globales, standardisiertes Netzwerk zur Verteilung von Wetterdaten innerhalb der WMO Mitgliedsstaaten



## Non real-time:

- Additional data from **ca. 190 countries**
- International project data (**GEWEX-related and other**)
- Historical data collections (**CRU, FAO, GHCN, ECA&D**)  
**+ GHCN daily**

# GPCC monthly data base (source specific)



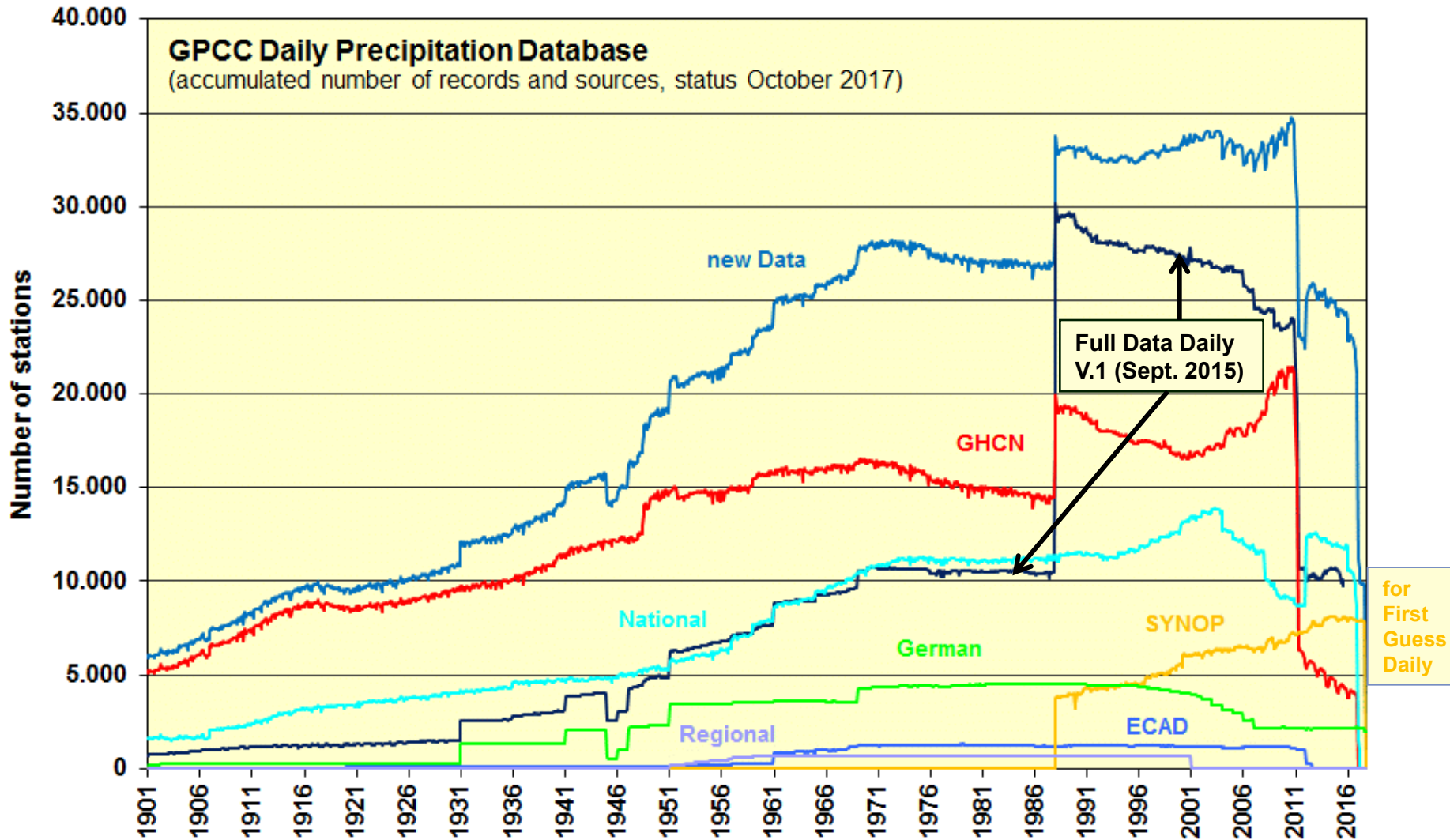
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## **GPCC daily data base**

**With the beginning of 2012 the GPCC started with the acquisition, processing and analysis of **daily** precipitation data**

- **Almost from the start of this new activity the GPCC ran into the problem **“How is the day defined?”****
- **Daily precipitation - generally being observed at about 07:00 local time - should be assigned to the previous day (most of the accumulation period is lying in the previous day)**
- **Unfortunately this is not done consistently in the different countries; most countries are assigning the daily totals to the previous day, but others are doing this differently (i.e. assigning precip to the day when the observation is taken)**
- **The GPCC is correcting this, as far as possible, to provide a consistent precipitation data set**

# GPCC daily data base (source specific)



## QC of precipitation data - Summary

- Almost every large data set is containing more or less frequently erroneous data
- “Bad data” should not simply be thrown away, but corrected where possible (data errors are often obvious and thus can be corrected (*data maybe important in data sparse areas*))

### Important:

- True extreme values must not be eliminated by “QC” (therefore **semi-automatic QC at GPCC**; automatic pre-checks and visual control)
- Corrected data always archived together with the original data
- GPCC is archiving the data from different sources separately in source-specific slots in its relational data base management system (RDBMS) to enable intercomparison of the data from the different sources

➤ **Careful data QC is necessary !!**



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## Outlook

- **Homogenized Precipitation Analysis (HOMPRA) for 1951-2005 for Europe** (in cooperation with Met. Institute of Univ. Bonn) has been completed in April 2017, will be generated on a global scale later
- A new release of GPCC's Monthly product portfolio (**Precipitation Climatology, Full Data Reanalysis V.8, Monitoring Product**) is now planned for December 2017 (for period 1901-2016)
- A new release of GPCC's Full Data Daily (V.2 for period 1986-2016) is planned for spring 2018



# Visualize and Download GPCC Products



GPCC Product	Spatial Resolution	Time Coverage	Possible Application
<i>First Guess Monthly</i>	<b>1.0°</b>	<b>2004 - present</b>	<b>drought monitoring</b>
<i>First Guess Daily</i>	<b>1.0°</b>	<b>2009 - present</b>	<b>analysis of extremes</b>
<i>Monthly Monitoring Version 5</i>	<b>1.0°, 2.5°</b>	<b>1982 - present</b>	<b>calibration of satellite data</b>
<i>Full Data Monthly Version 7</i>	<b>0.5°, 1.0°, 2.5°</b>	<b>1901 - 2013</b>	<b>hydrological studies</b>
<i>Full Data Daily Version 1</i>	<b>1.0°</b>	<b>1988 - 2013</b>	<b>analysis of extremes</b>
<i>HOAPS/GPCC global daily precipitation Version 1</i>	<b>0.5°, 1.0°, 2.5°</b>	<b>1988 - 2008</b>	<b>analysis of extremes</b>
<i>HOMPRA Europe Version 1</i>	<b>0.5°, 1.0°, 2.5°</b>	<b>1951 - 2005</b>	<b>trend analysis</b>
<i>VASClimo Dataset</i>	<b>0.5°, 1.0°, 2.5°</b>	<b>1951 - 2000</b>	<b>trend analysis</b>
<i>Precipitation Climatology Version 2015</i>	<b>0.25°, 0.5°, 1.0°, 2.5°</b>	<b>1951/2000</b>	<b>for application as a reference, and for utilization of the anomaly interpolation method</b>
<i>Interpolation Test Dataset</i>	<b>1.0°</b>	<b>1988</b>	<b>comparison of interpolation schemes</b>
<i>Drought Index Version 1</i>	<b>1.0°</b>	<b>2013 - present</b>	<b>drought monitoring</b>
<i>Drought Index Version 1.1</i>	<b>1.0°</b>	<b>1952 - 2013</b>	<b>drought monitoring</b>
<i>GPCC Visualizer</i>			<b>access to the GPCC Visualizer, where you can create maps with your own coordinates and parameters</b>
<i>GPCC Home</i>			<b>detailed information about GPCC</b>

[ftp://ftp-anon.dwd.de/pub/data/gpcc/html/download\\_gate.html](ftp://ftp-anon.dwd.de/pub/data/gpcc/html/download_gate.html)

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*Lakes and Reservoirs: HYDROLARE*  
***International Centre on the Hydrology of Lakes and Reservoirs***  
*St. Petersburg, Russian Federation*



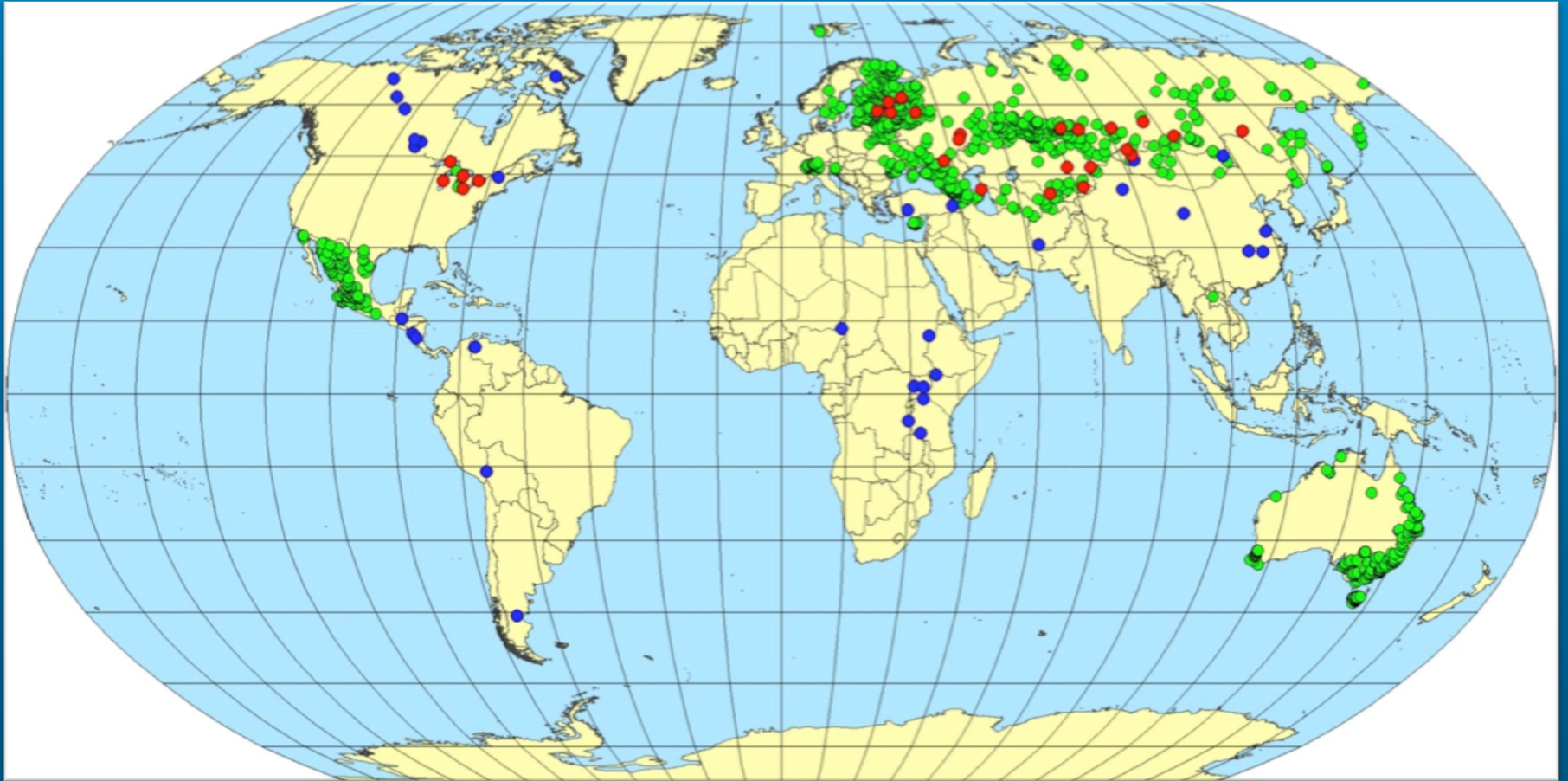
[www.hydrolare.ru](http://www.hydrolare.ru)

# Collection of data on hydrology of lakes and reservoirs from WMO Members

Currently the HYDROLARE database holds data for 1103 lakes and reservoirs and 1121 stations from 48 countries of the world.

Europe	
Azerbaijan	Lithuania
Armenia	Moldova
Belarus	Russian Federation
Cyprus	Slovenia
Estonia	Sweden
Finland	Switzerland
Georgia	Turkey
Latvia	Ukraine
Asia	
China	Mongolia
Iran	Tajikistan
Kazakhstan	Turkmenistan
Kyrgyzstan	Uzbekistan
Africa	
Burundi	Malawi
Cameroon	Mozambique
Chad	Niger
Congo	Nigeria
Democratic Republic of Congo	Uganda
Ethiopia	Tanzania
Kenya	Zambia
North America, Central America and the Caribbean	
Canada	Nicaragua
Guatemala	United States
Mexico	
South America	
Argentina	Peru
Bolivia	Venezuela
South-West Pacific	
Australia	

## Lakes and reservoirs in the HYDROLARE database



*in-situ* observations are highlighted in green, satellite observations - in blue, both type of observations – in red.

# The special HYDROLARE search and explore tool helps users to search information about database content through Google Maps

**INTERNATIONAL DATA CENTRE  
ON HYDROLOGY OF LAKES AND RESERVOIRS**

HOME ABOUT US PARTNERS NEWS DATA REPORTS CONTACT

**Erie**  
Country: United States  
WMO Subregion: Lake Erie

ANNUAL WATER BODY AVERAGED LEVEL	
In-situ data	
Mean monthly	1918-2015
At the first date of each month	1900-2000
Number of stations	10
Satellite data	
Monthly	1992-2016

[detailed information on Hydroweb website](#)

**STATION DATA**  
[lk. Erie - Barcelona](#)  
[lk. Erie - Buffalo](#)  
[lk. Erie - Cleveland](#)  
[lk. Erie - Erie](#)  
[lk. Erie - Fairport](#)  
[lk. Erie - Fermi Power Plant](#)  
[lk. Erie - Marblehead](#)

**RivSTATIONS DATA**  
[detailed information on GRDC website](#)  
No data.

Map Satellite

Map data ©2017 Google 50 km Terms Use Report a map error

Copyright © International Data Centre on Hydrology of Lakes and Reservoirs

Regularly updated information on the status of the database content is available on the website at: [www.hydrolare.net](http://www.hydrolare.net)

Within HYDROLARE-LEGOS cooperation activities were implemented aimed at integration of *in-situ* and satellite data available in HYDROLARE and LEGOS (Hydroweb).

A direct access from HYDROLARE to Hydroweb website was enabled for acquiring information on availability of satellite data for selected lakes on Hydroweb website and vice versa.

The screenshot shows the HYDROLARE website interface. At the top, it reads "INTERNATIONAL DATA CENTRE ON HYDROLOGY OF LAKES AND RESERVOIRS". The main content area is titled "Baikal" and provides details for the Russian Federation (Asia) WMO Subregion. It lists "ANNUAL WATER BODY AVERAGED LEVEL" with "In-situ data" from 1959-2013 and "Satellite data" from 1992-2015. A map of Lake Baikal is displayed with various stations marked. The bottom of the page includes a search bar and a copyright notice: "Copyright © International Data Centre on Hydrology of Lakes and Reservoirs".

The screenshot shows the LEGOS (Hydroweb) website interface. At the top, it features logos for Theia, LEGOS, and cnes, along with navigation links for "Sign In", "Sign Up", and "Help". The main content area displays a satellite map of Lake Baikal with a pink circle highlighting a specific location. Below the map, there is a search bar and a legend for "lake(s)", "virtual station(s)", and "lake(s) and virtual station(s)". A table titled "LAKE PRODUCTS" shows the following data for Lake Baikal:

Lake	Drainage basin	Continent	Start date	End date	Type
Baikal	Yenisei	Europe	1992/09/27	2017/06/05	Operational

Cross-links between HYDROLARE and LEGOS (Hydroweb) web pages

# Informing users about availability of data on water temperature

Until 2015 the only type of data in the database was *in-situ* and remote sensing water levels of lakes and reservoirs.

In 2016 HYDROLARE started updating its database with *in-situ* water temperature data.

The screenshot displays the HYDROLARE website interface. At the top, the logo and name 'INTERNATIONAL DATA CENTRE ON HYDROLOGY OF LAKES AND RESERVOIRS' are visible. A navigation menu includes 'HOME', 'ABOUT US', 'PARTNERS', 'NEWS', 'DATA', 'REPORTS', and 'CONTACT'. The main content area is titled 'Baikal' and provides details for the 'Russian Federation (Asia)' and 'Lake Baikal'. It features two data tables: 'ANNUAL WATER BODY AVERAGED LEVEL' and 'STATION INFO'. The 'ANNUAL WATER BODY AVERAGED LEVEL' table shows 'In-situ data' for 'Mean monthly' (1959-2008) and 'Satellite data' (1992-2010). The 'STATION INFO' table lists 'Ik. Baikal - Tankhoj' with 'Mean monthly level' (1940-2011), 'Temperature' (1945-2013), and 'Ice' (No). A map of Lake Baikal is shown with a callout box for 'Ik. Baikal - Tankhoj' providing the same data. A browser window in the foreground shows the 'STATION INFO' page for 'Ik. Baikal - Tankhoj' with the same data. The footer of the website reads 'Copyright © International Data Centre on Hydrology of Lakes and Reservoirs'.

ANNUAL WATER BODY AVERAGED LEVEL	
In-situ data	
Mean monthly	1959-2008
At the first date of each month	1959-2008
Number of stations	22
Satellite data	
	1992 - 2010

STATION INFO	
Ik. Baikal - Tankhoj	
Mean monthly level	1940-2011
Temperature	1945-2013
Ice	No



# Information about availability of ice thickness data in the database is displayed on the website

In 2017, the IT-infrastructure has been further developed to include new type of information - maximum ice cover thickness - to the database.

The screenshot displays the website interface for the International Data Centre on Hydrology of Lakes and Reservoirs. The header includes the organization's name and logos. A navigation menu is located below the header. The main content area is divided into a left sidebar and a right main panel. The sidebar contains metadata for Lake Baikal, including its country, WMO subregion, and lake name. It also features two tables: 'ANNUAL WATER BODY AVERAGED LEVEL' with 'In-situ data' and 'Satellite data' sections, and 'STATION DATA' and 'RivSTATIONS DATA' sections with lists of station names and links for more information. The main panel shows a map of Lake Baikal with various data points marked by blue circles and red triangles. A pop-up window titled 'lk. Baikal - Bol'shoo Goloustnoe' is open, displaying 'Annual data' for mean monthly level, temperature, and ice cover. The footer contains the Google logo, copyright information, and a scale bar.

**INTERNATIONAL DATA CENTRE ON HYDROLOGY OF LAKES AND RESERVOIRS**

HOME ABOUT US PARTNERS NEWS DATA REPORTS CONTACT

**Baikal**  
Country: Russian Federation (Asia)  
WMO Subregion:  
Lake Baikal

ANNUAL WATER BODY AVERAGED LEVEL	
In-situ data	
Mean monthly	1959-2013
At the first date of each month	1959-2013
Number of stations	22
Satellite data	
Monthly	1992-2015

[detailed information on Hydroweb website](#)

**STATION DATA**

- [lk. Baikal - Babushkin](#)
- [lk. Baikal - Baikal](#)
- [lk. Baikal - Baikal'sk](#)
- [lk. Baikal - Baikal'skoe](#)
- [lk. Baikal - Bol'shie Koty](#)
- [lk. Baikal - Bol'shoo Goloustnoe](#)

**RivSTATIONS DATA**

[detailed information on GRDC website](#)

- [Anga - Yelantsy](#)
- [Angara - Irkutskaya Ges](#)
- [Barguzin - Barguzin](#)
- [Bezinyannaya - Mangutay](#)
- [Bolshaya - Pokrovskoye](#)
- [Bolshaya Rechka - Posolskaya](#)
- [Bolshaya Sulchava - Sulchava](#)

Map: lk. Baikal - Bol'shoo Goloustnoe

Annual data	
Mean monthly level	1943-1957, 1965-2013
Temperature	1945-1947, 1949-1957, 1970-2013
Ice	1945-2012

Copyright © International Data Centre on Hydrology of Lakes and Reservoirs

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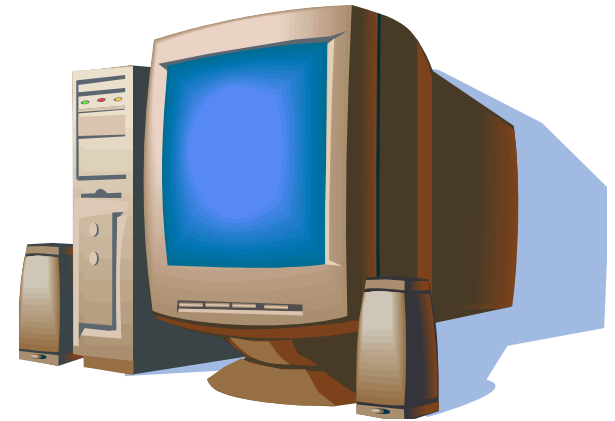
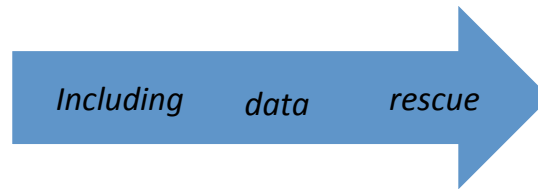
*River Discharge: GRDC  
Global Runoff Data Centre  
Koblenz, Germany*



<http://grdc.bafg.de>

# GRDC Main functions

**Acquisition and storage** of global historical discharge data and associated metadata



**Dissemination** of historical discharge data and derived data products of more than 9500 stations in 160 countries (“One-stop shop”)

## **GRDC Data Policy**

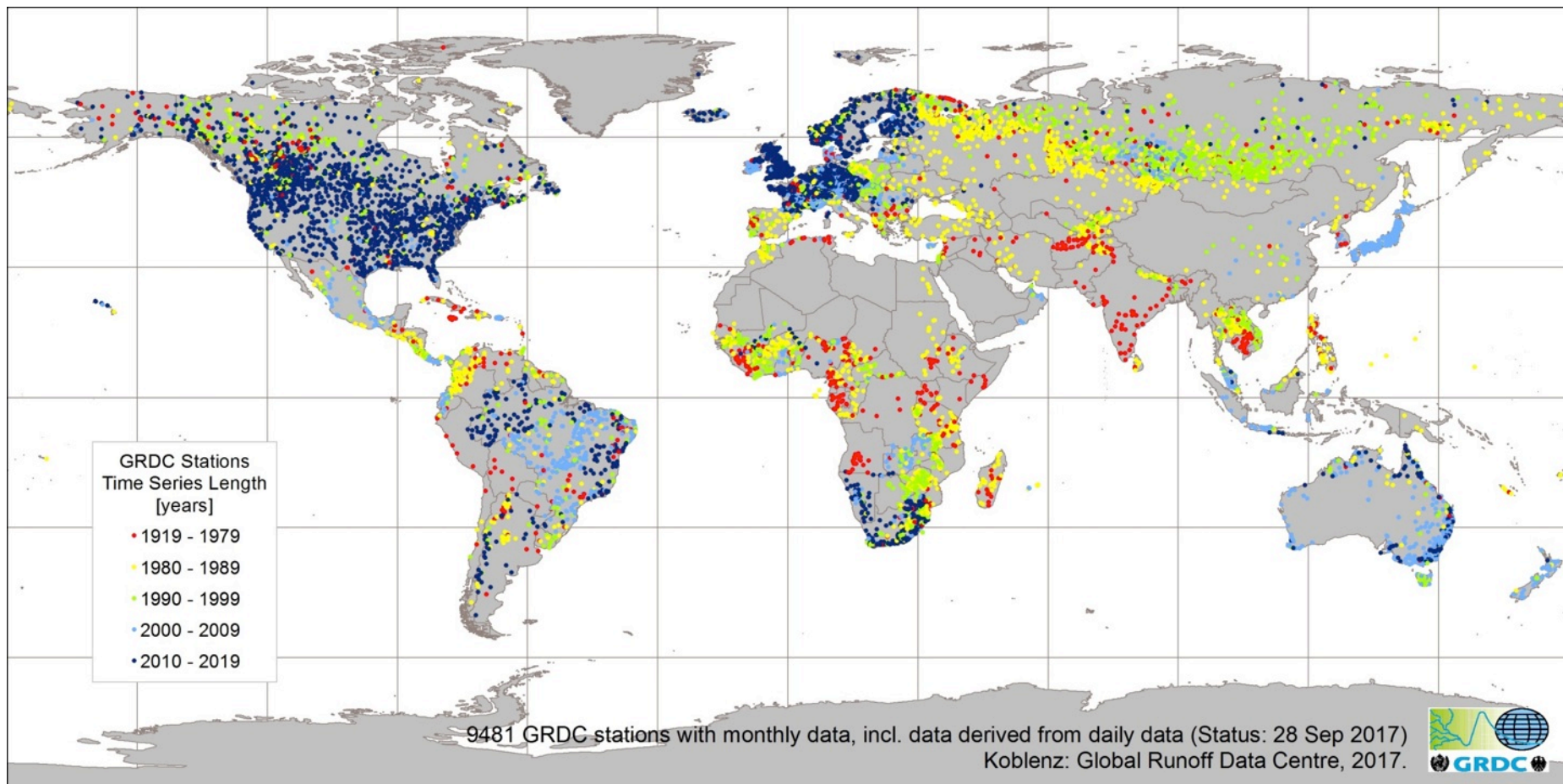
Data are provided on request for science, research and teaching.

*A user declaration must be signed*

# Status of the Global Runoff Database

160 countries, ~10,000 stations,

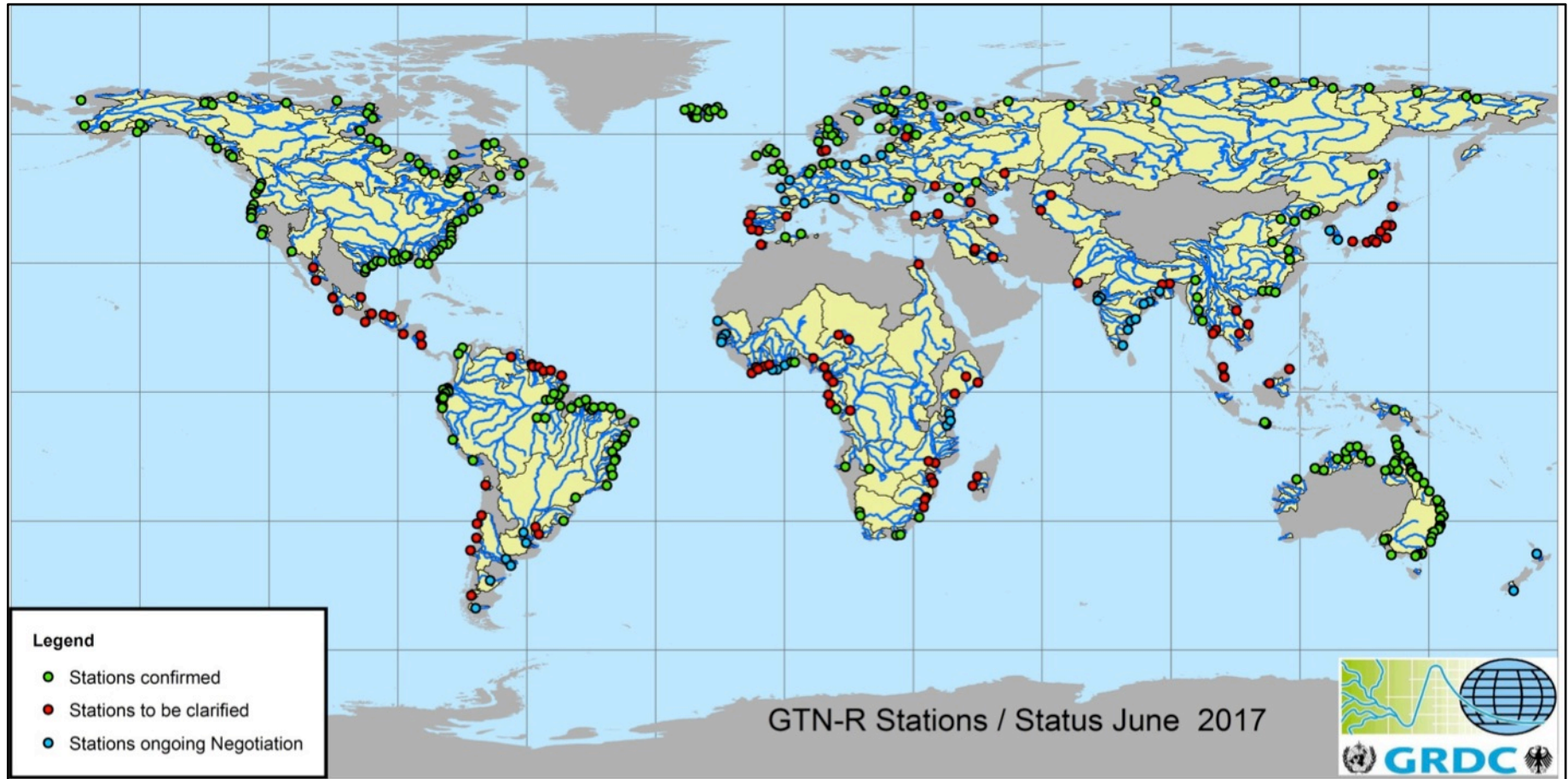
Global Coverage of GRDC Stations indicated by **time series end**



# GRDC Station Selection for the Global Terrestrial Network for River Discharge (GTN-R) Freshwater Flux to the World Oceans

280 Stations confirmed

160 Stations to be clarified



# GTN-R data available from GRDC website in WaterML2.0 format



The GRDC
Standard Services
Data Products
Special Datasets
Collaboration
News and Updates

You are here: [GRDC](#) > [Special Datasets](#) > [GTN-R](#) > [GTN-R Online](#)

- ARDB →
- EWA →
- SA Flow →
- GTN-R ↓
- Climate Sensitive Stations →
- GRDC Reference Dataset →

**Services**

- [Global Runoff Database](#)
- [River Discharge Data](#)
- [Geospatial Data Products](#)

## GTN-R Online

The GTN-R Online data service provides time series of monthly mean discharge of the GRDC stations corresponding to the GCOS Baseline River Network. The monthly means of river discharge are provided for the WMO reference periods 1931-1960, 1961-1990 and 1981-2010.

The timeseries of monthly means, *MonthMean (Daily)*, are aggregated from daily discharge data as released by the National Hydrological Services. If a National Hydrological Service additionally provided monthly means, these timeseries of 'original' monthly means, *Monthly Mean*, are also given. Please note, that for a few stations daily data are not available at the GRDC, and only *Monthly Mean* timeseries will be provided.

WMO Region	Stations	1931-1960	1961-1990	1981-2010
WMO Region 1 (Africa)	1 TXT	1 WML2	1 WML2	1 WML2
WMO Region 2 (Asia)	1 TXT	1 WML2	1 WML2	1 WML2
WMO Region 3 (South America)	1 TXT	1 WML2	1 WML2	1 WML2
WMO Region 4 (North, Central America and Caribbean)	1 TXT	1 WML2	1 WML2	1 WML2
WMO Region 5 (South-West Pacific)	1 TXT	1 WML2	1 WML2	1 WML2
WMO Region 6 (Europe)	1 TXT	1 WML2	1 WML2	1 WML2

**Background**

[GTN-H Project Homepage](#)

# GRDC Map Products

The screenshot shows a web browser window with the URL [www.bafg.de/GRDC/EN/02\\_srvcs/22\\_gslrs/gislayers\\_node.html](http://www.bafg.de/GRDC/EN/02_srvcs/22_gslrs/gislayers_node.html). The page features a navigation menu with items: The GRDC, Standard Services, Data Products, Special Datasets, Collaboration, and News and Updates. A breadcrumb trail indicates the current location: GRDC > Standard Services > GIS Layers. A search bar is present with the text "search item".

On the left side, there is a sidebar menu with the following items:

- River Discharge Data
- GIS Layers (selected)
- Major River Basins
- Watershed Boundaries of GRDC Stations
- WMO Regions
- GRDC Report Series
- GRDC Hydro Terms

Below the sidebar, there is a "Services" section with links to:

- Global Runoff Database
- River Discharge Data
- GIS Layers
- BfG Homepage

The main content area is titled "GRDC Map Products" and contains the following text:

All map products are provided under the conditions of the GRDC Data Policy, which states the non-commercial use of the data and the overall citation of GRDC as the source. If you are interested to use GRDC data or products for your research, please accept and sign the Declaration of the explanatory summary of the project. Please cite in all publications and projects GRDC as the source of data: Global Data Centre, Koblenz, Federal Institute for Hydrology.

*Disclaimer: GRDC reserves the right to change the completeness or quality of the data and responsibility for errors remains with the user. It is recommended to check data for plausibility and errors in the data unknown to the GRDC are held responsible for the consequences.*

Below the text, there is a small map icon and the heading "Major River Basins of the World". The text below it reads: "The Major River Basins of the World (MRB) is a dataset of the Global Runoff Data Centre (GRDC) that aims at the provision of a set of shape files for the use with Geographic Information Systems (GIS). This dataset was created for the generation of GRDC map products and will be updated from time to time whenever extensions are required by future GRDC projects. At present the dataset comprises the GIS layer of 405 river basins and 687 associated rivers." A "More ..." link is provided at the end of the text.

On the right side, there is a "Background" section with links to:

- GRDC User Declaration for GIS Layer (pdf, 16 KB)
- GRDC Order Form for GIS

A large white box with a black border is overlaid on the page, containing the following text:

- Major River Basins of the World
- Watershed Boundaries of GRDC Stations
- WMO Regions and Sub-Regions

The Windows taskbar at the bottom shows several open applications: Start, Programm\_dt\_Septembe..., 2014-07 WLRC Manaus, Microsoft PowerPoint - [...], and BfG - GIS Layers - Go... The system clock shows 23:45.

# Registration of GRDC Services in WMO & GEOSS Portals



[Feedback for this page](#)

[Back](#)

[GEOSS Registry Publication Portal](#)

## Search GEOSS Resource

Free Text Search:



**Advanced Search** (Define more query conditions: Resource Category, Societal Benefit Areas, GEO affiliation)



(Leaving all search fields blank will return a list of all registered Resources)

### 8 Matched Resource ( ✓ indicates Approved)

[First Page](#)

[Previous Page](#)

[Next Page](#)

[Last Page](#)

1.	Global Terrestrial Network for River Discharge (GetCapabilities for Sensor Observation Service)	<a href="#">Details</a>	✓
2.	Global Terrestrial Network for River Discharge (dataset in WaterML 2.0)	<a href="#">Details</a>	✓
3.	Global Freshwater Fluxes into the World Ocean for use within GIS clients	<a href="#">Details</a>	✓
4.	Long-Term Mean Monthly Discharges and Annual Characteristics of GRDC Stations	<a href="#">Details</a>	✓
5.	Global Runoff Data Centre	<a href="#">Details</a>	✓
6.	Global Freshwater Fluxes into the World Oceans	<a href="#">Details</a>	✓
7.	World-wide Hydrogeological Mapping and Assessment Programme	<a href="#">Details</a>	✓
8.	Global Runoff Data Centre (GRDC) Streamflow Stations	<a href="#">Details</a>	✓

(This public search page is provided as a convenience to allow users to browse and search the GEOSS Component and Service Registry. The information found here is intended to assist software developers and data integrators in identifying registered GEO resources at a high level. The information stored in this Registry is used by the GEOSS Clearinghouse to develop a more comprehensive list of GEO Resources. The GEOSS Web Portal candidates are required to support search into detailed Clearinghouse and Registry resources.)  
Please note that only approved Components will be listed here.

Last updated: Wed Sep 23 2015



# GEWEX – GHP Partner Data Centres

Precipitation: GPCC

[gpcc.dwd.de](http://gpcc.dwd.de)

Global Precipitation Climatology Centre

Offenbach, Germany



Lakes and Rivers

[www.hydroinformatics.org](http://www.hydroinformatics.org)

International Commission on Large Rivers

St. Petersburg, Russia



River Discharge

<http://grdc.bafg.de>

Global Runoff Data Centre

Koblenz, Germany



Thank you for your