

The Role of GRDC in the framework of RivEx: Delivering the Observational Foundation

Simon Mischel

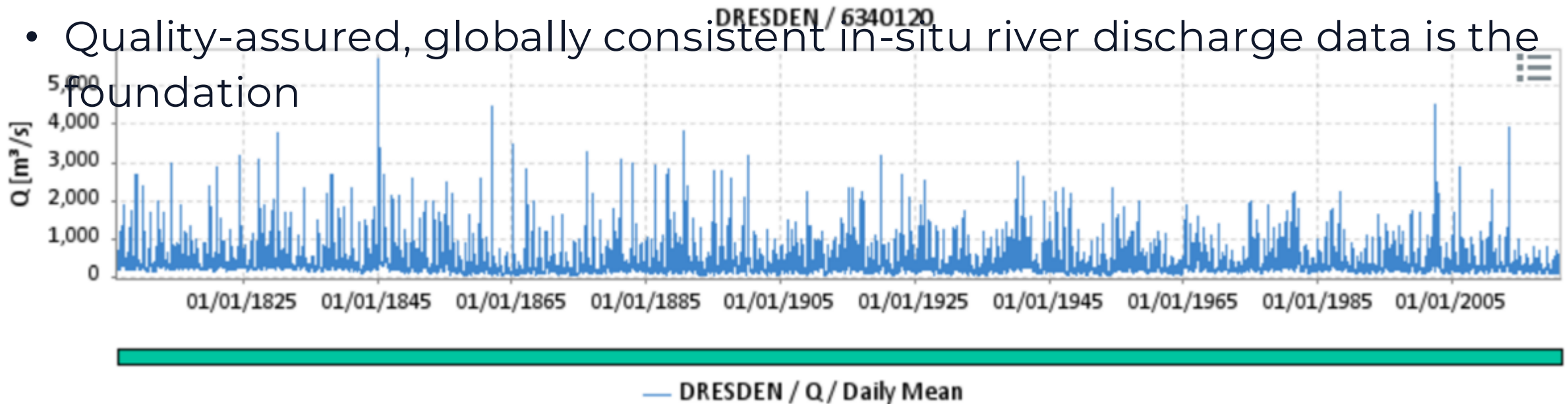
Global Runoff Data Centre (GRDC),
Federal Institute of Hydrology (BfG), Koblenz

RivEx Meeting
14 April 2026



Why in-situ data matters

- Long-term meteorological and hydrological observations are crucial in serving the needs of current and future generations for long-term high quality climate records.
- They are unique sources of past information about atmospheric and hydrologic parameters, which serve as references for climate variability and climate change assessments.
- Quality-assured, globally consistent in-situ river discharge data is the foundation



Global Runoff Data Centre

Official mandate

operates under the auspices of the **World Meteorological Organization (WMO)** at the German Federal Institute of Hydrology (BfG)

Extensive experience

established in 1988 to support research on global and climate change and integrated water resources management

Global database

holds the most substantive collection of **quality assured** river discharge data on global scale



under the auspices of the World
Meteorological Organisation (WMO)



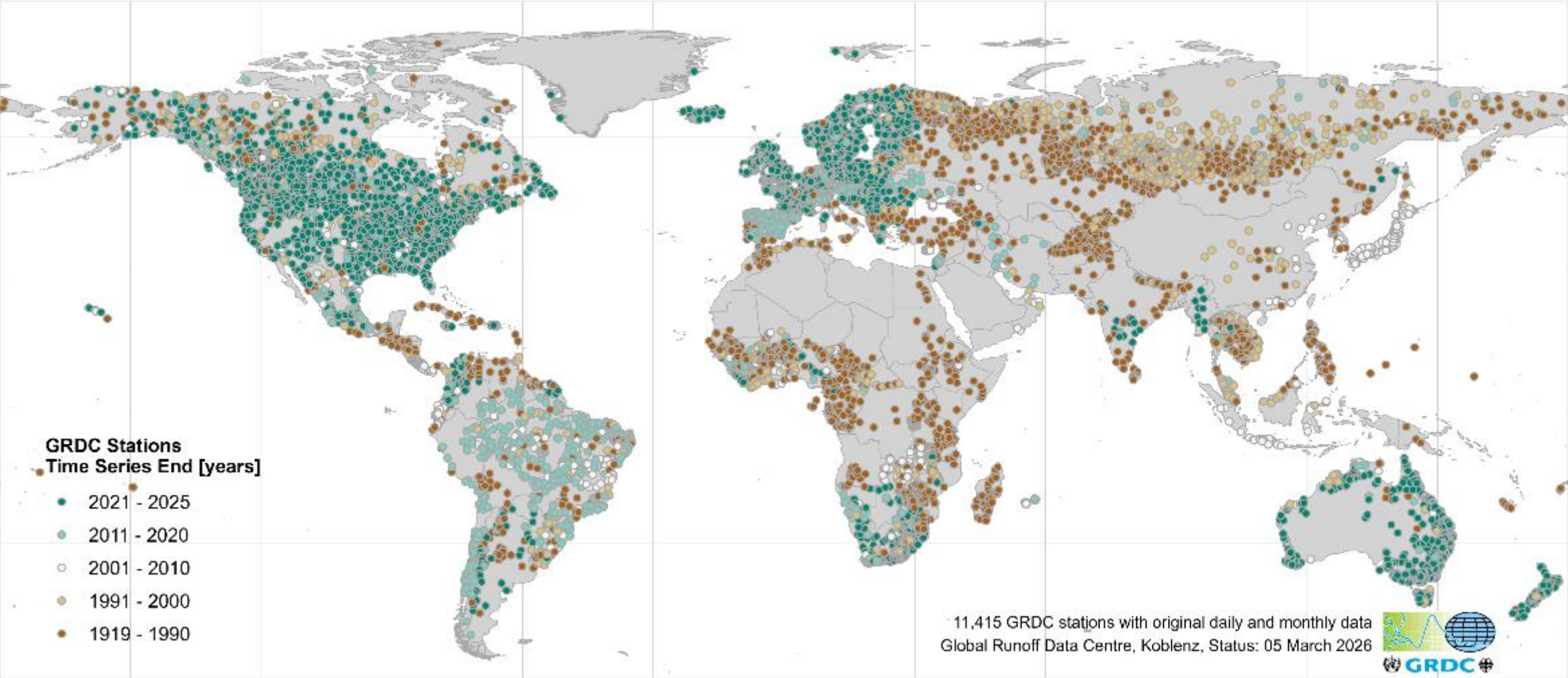
with financial support of the Federal
Republic of Germany



BfG Federal Institute
of Hydrology

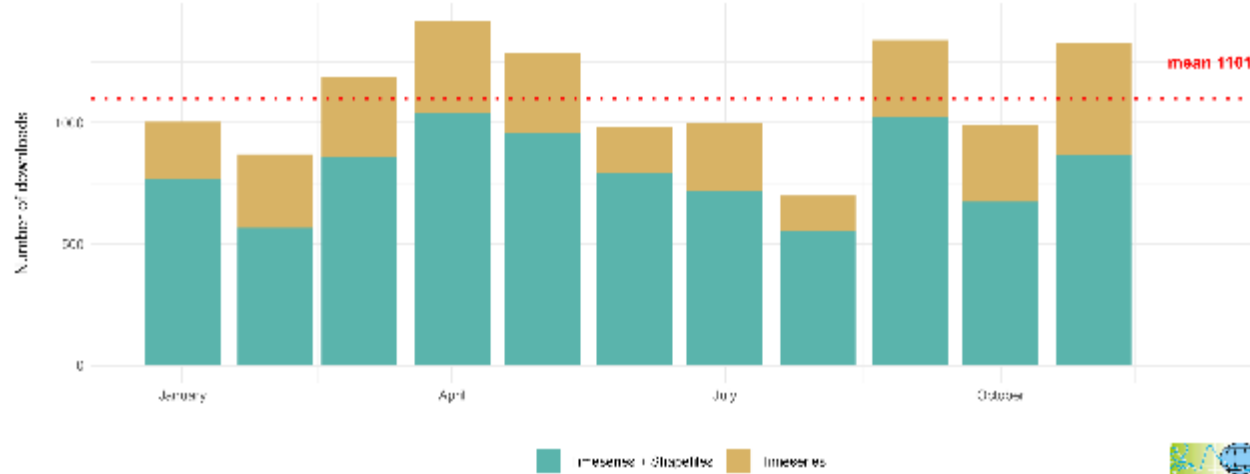
hosted by the Federal Institute of
Hydrology (BfG)

Global Runoff Database



GRDC – Statistics of 2025

Downloads from GRDC portal in 2025 (total = 12,106)

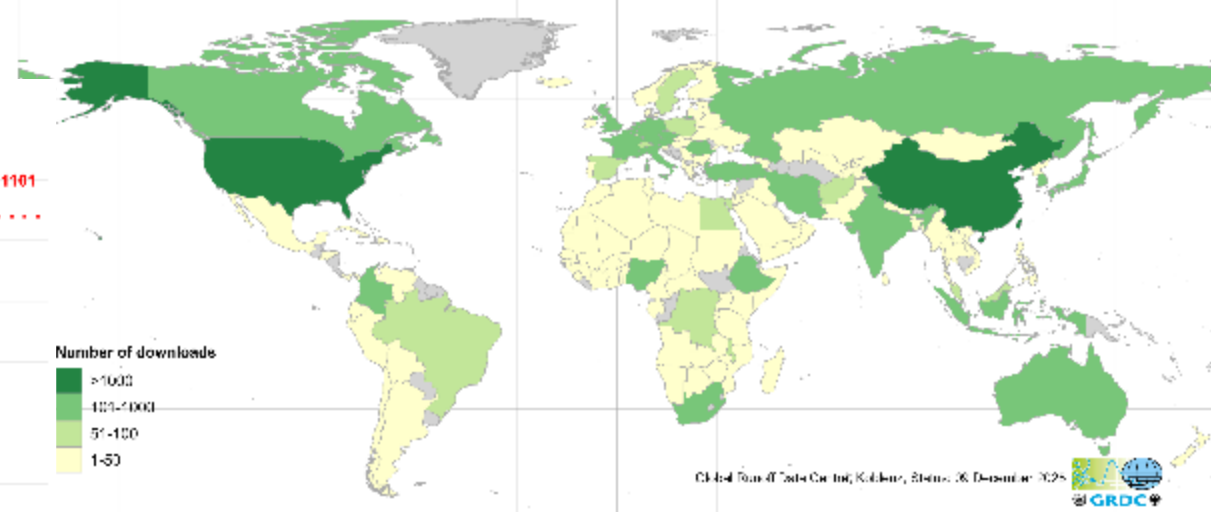


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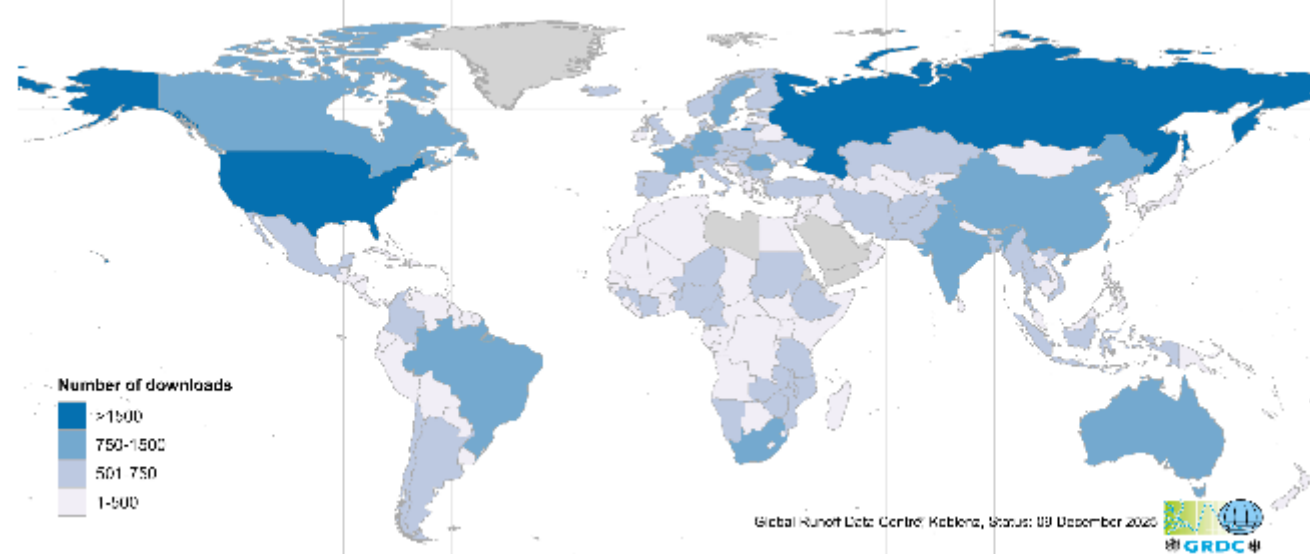


Global Runoff Data Centre, Koblenz, Status: 09 December 2025

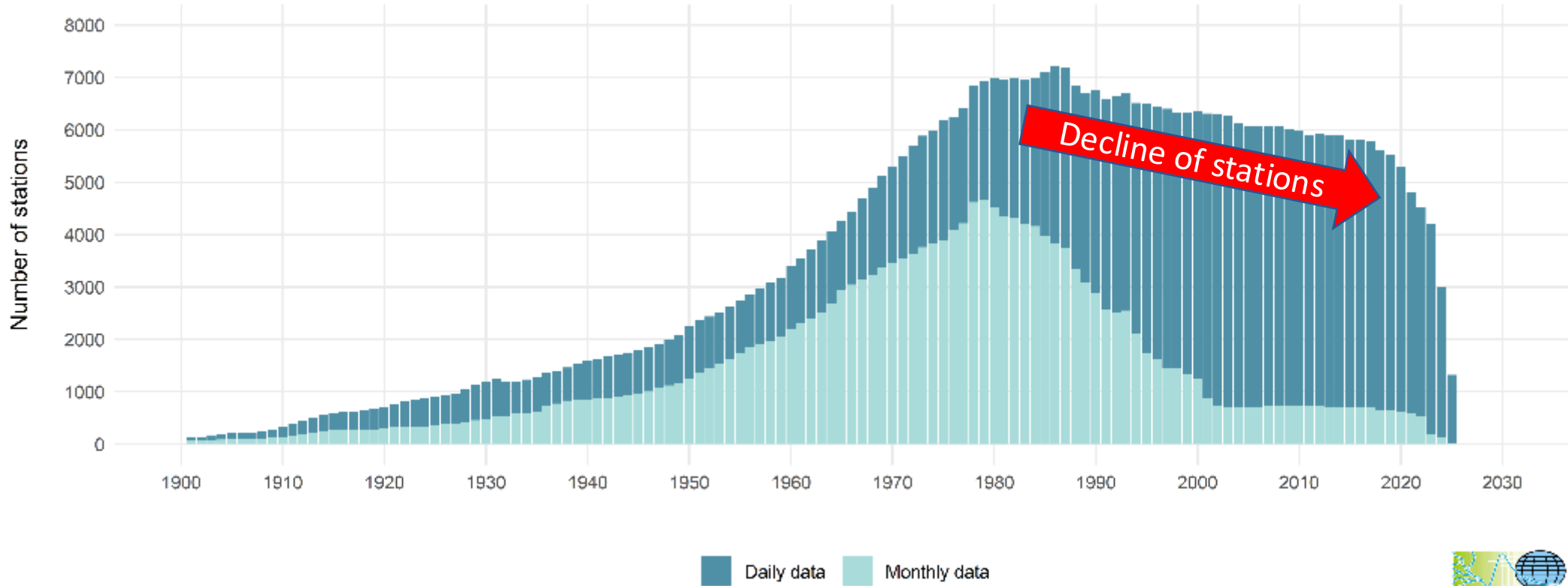
Country of users in 2025



Downloads by country in 2025



Availability of discharge data in the GRDC database



GRDC Data Portal

The screenshot displays the GRDC Data Portal interface. At the top, a blue header contains the logo and the text "Data Download". Below this is a navigation bar with icons and labels for "Home", "Download by Subregion", "Download by Station", "Download GRDC Station Catalogue", "Contact GRDC", and "FAQ".

The main content area is titled "Download by Station" and includes a "Map" icon and a "Table" icon. On the left, a "Filter" sidebar is visible, showing "11,415 / 11,415 Stations" and a "Clear filter" button. The filter options include:

- Station Name or Number: Search input field.
- Water Body Name: Dropdown menu set to "All".
- Region: Dropdown menu set to "All".
- Sub-region: Dropdown menu set to "All".
- Country: Dropdown menu set to "All".
- Time Period: Radio buttons for "All" (selected) and "1931 - 1960".

The main map area shows a world map with numerous blue circular markers representing GRDC stations, each labeled with a number. The map includes labels for major oceans (Atlantic, Pacific, Indian, Arctic) and various countries and regions (USA, Canada, Europe, Africa, South America, etc.).

In the bottom right corner, there is a QR code and the text "Access".

Global Runoff Data Centre

- Dedicated project datasets
- Well known source of river discharge data
- Data from GRDC is widely used, with more than 100 publications using GRDC data yearly

Project Datasets

AdaptAlp Dataset
Climate change stresses the social-ecological system of the European Alps and has unforeseeable impacts on the intensity and frequency of natural hazards. Aim of the EU...

Arctic Region Dataset
GRDC currently holds river discharge time series from 2625 gauging stations in the Arctic region with earliest records from 1877 and an average time series length of 41...

BALTEX Dataset
BALTEX (the Baltic Sea Experiment) was launched in 1992 as a Continental-scale Experiment (CSE) of the Global Energy and Water Exchanges Project (GEWEX) within the World...

Climate Sensitive Stations
The Climate Sensitive Stations dataset comprises daily discharge data of currently more than 1,200 gauging stations. National Hydrological Services have identified these...

European Water Archive
Since its inception in 1985 the European Water Archive (EWA) collected long-term daily flow data and catchment information from more than 4000 river gauging stations in 30...

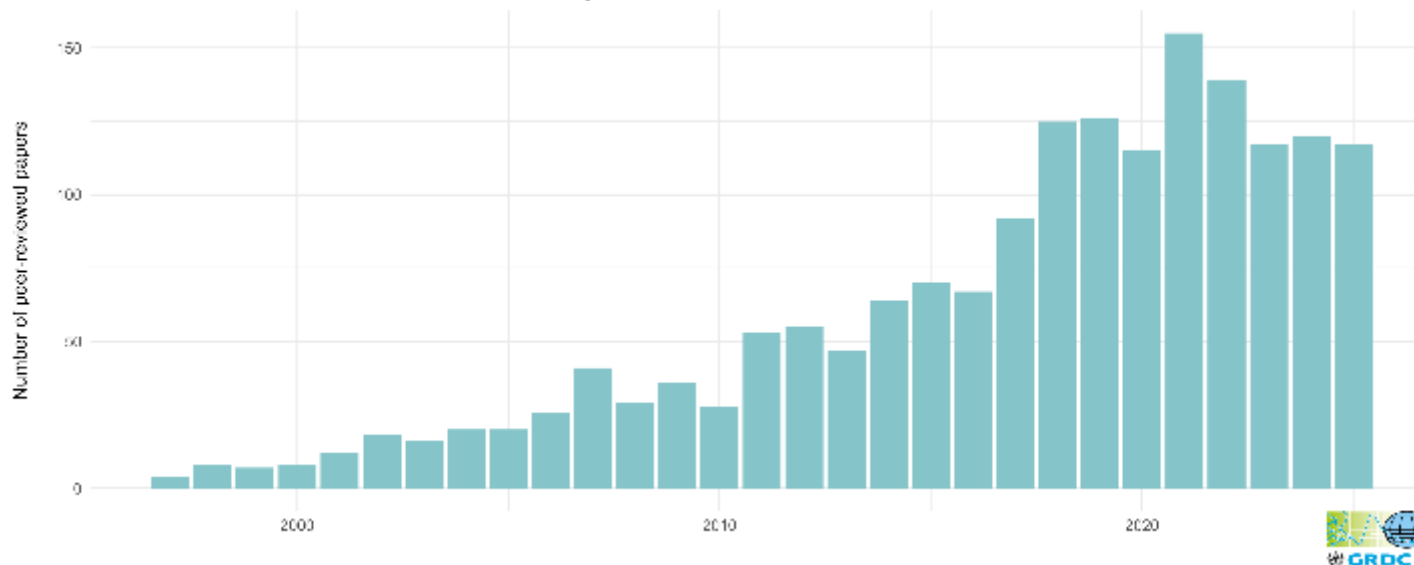
GRDC-Caravan Extension
Large-sample datasets are essential in hydrological science to support modelling studies and global assessments. This dataset is an extension to Caravan, a global community...

Global Terrestrial Network for River

Southern Africa Flow Database

Space-Based Discharge

Scientific publications based on GRDC data



Global Runoff Data Centre, Koblenz, Status: 08 December 2025



GRDC-Caravan: extending Caravan with data from the Global Runoff Data Centre

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The BALTEX dataset of the Global Runoff Data Centre (GRDC): a dataset of river discharge draining into the Baltic Sea

Simon A. Mischel*, Claudia Zentis and Henning Plessow

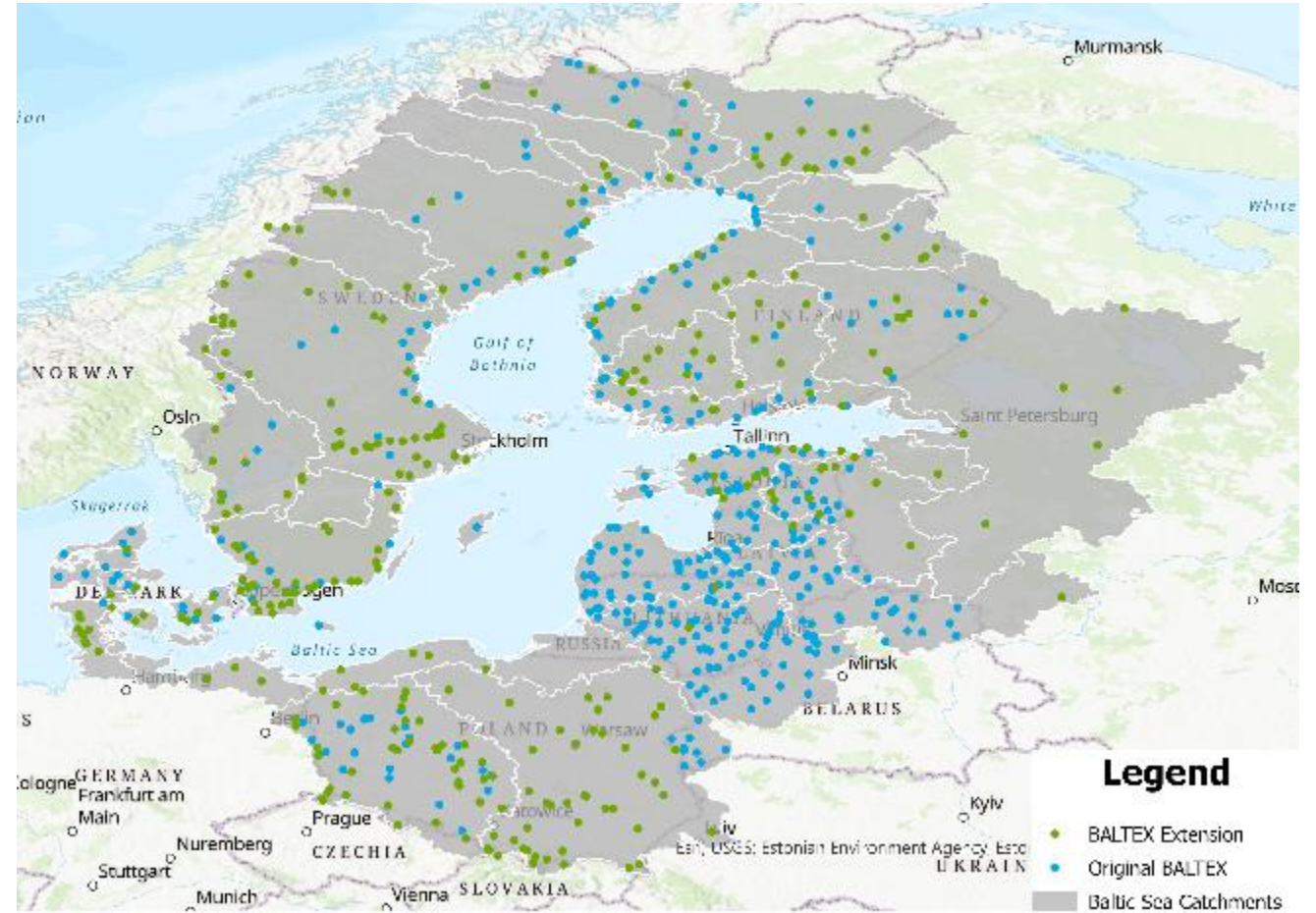
Global Runoff Data Centre (GRDC), Federal Institute of Hydrology, Koblenz, Germany

KEYWORDS

baltic sea, river discharge, catchment areas, time series, in situ stations

1 Introduction

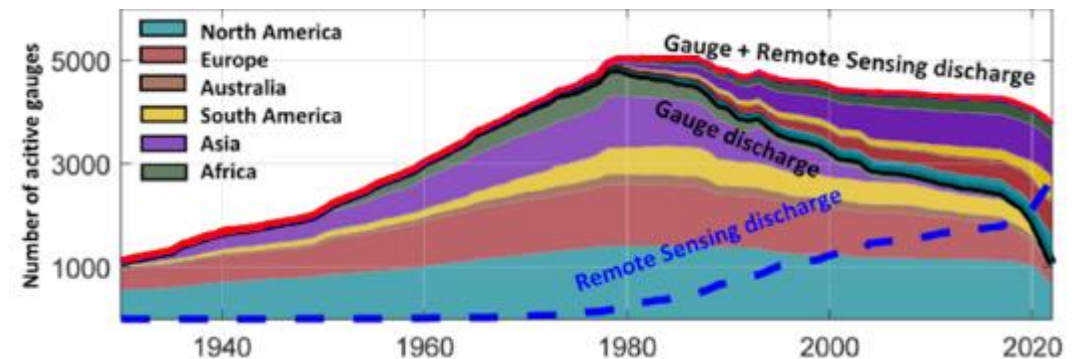
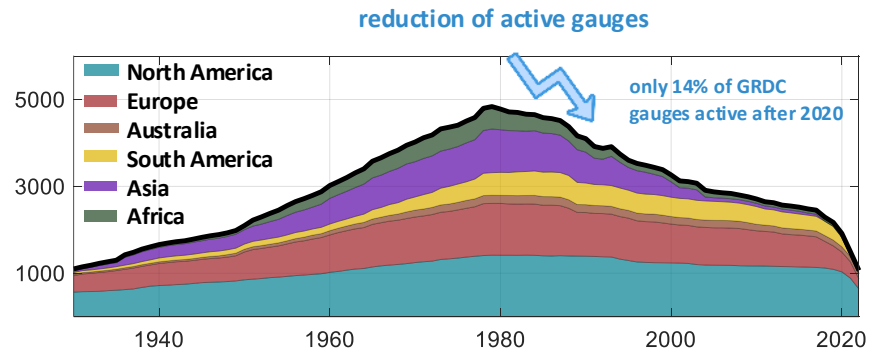
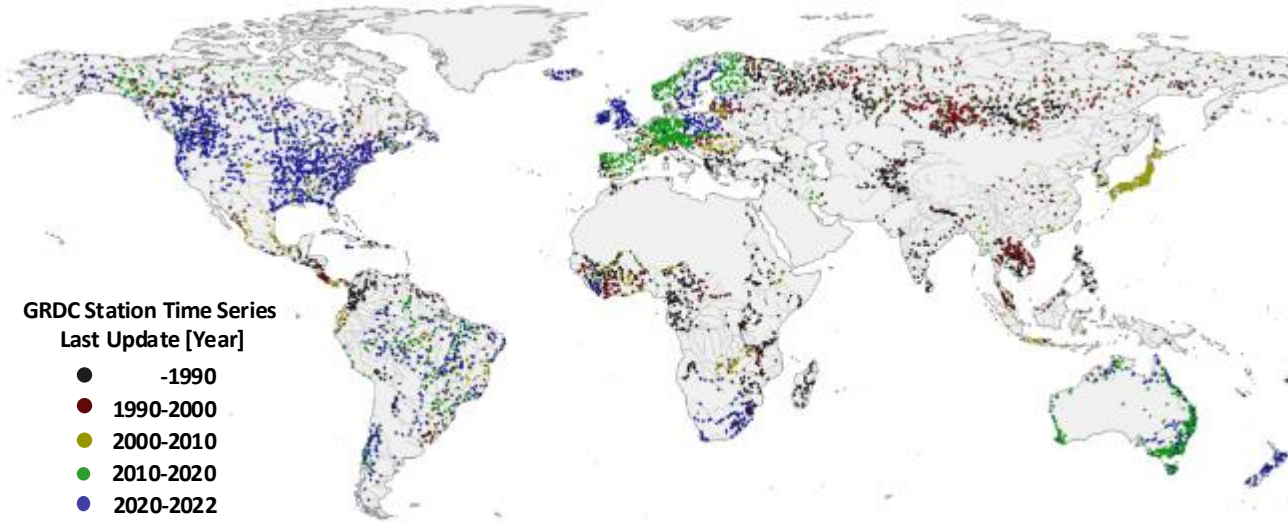
Due to its separation from the Atlantic Ocean, the Baltic Sea is a special marine environment, with a unique brackish water regime (Meier et al., 2022). Its salinity setting is an important driver for the biogeochemical functioning and the ecological status of the Baltic Sea (Kulinski et al., 2022). Global and climate change, however, alter the hydrological cycle including river discharge, which is responsible for most of the freshwater input into the Baltic Sea (Meier et al., 2022).



Bridging the gap: In-situ observations and Earth Observation

Elmi, O., Tourian, M. J., Saemian, P., & Sneeuw, N. (2024): Remote Sensing-Based Extension of GRDC Discharge Time Series-A Monthly Product with Uncertainty Estimates. *Scientific Data*, 11(1), 240. doi.org/10.1038/s41597-024-03078-6

Saemian, P., Elmi, O., Stroud, M., Riggs, R., Kitambo, B. M., Papa, F., Allen, G., & Tourian, M. J. (2024): Satellite Altimetry-Based Extension of Global-Scale In Situ River Discharge Measurements (SAEM). *Earth System Science Data Discussions*, 2024, 1–29.



A closer look at the data availability, the most recent year

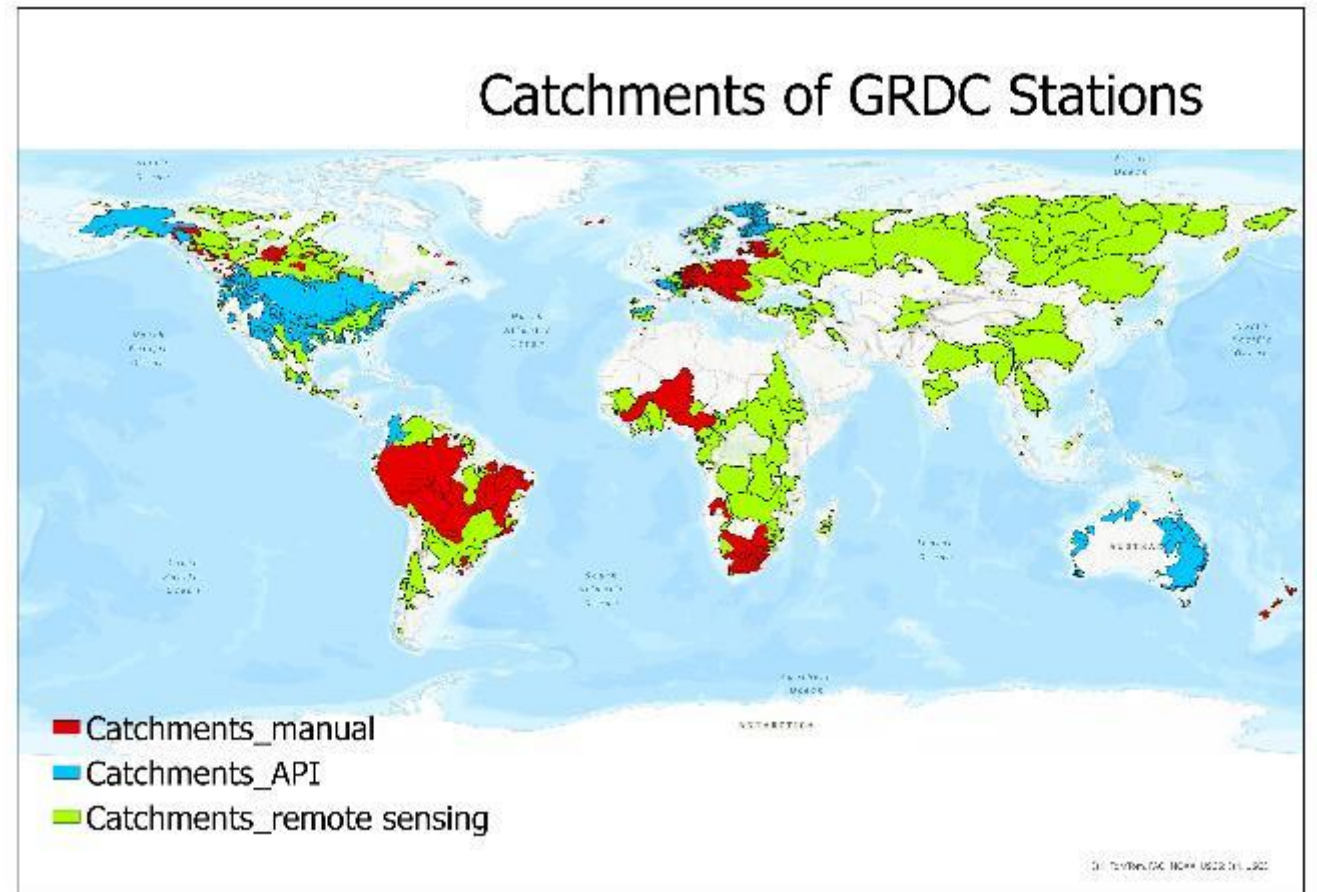
	All	Manual delivery	API	Remote Sensing
Nr. of countries		21	10	
Nr. of stations	2660	635	1613	412
Catchment size	151,2 M	32,1 M	34,1 M	85 M



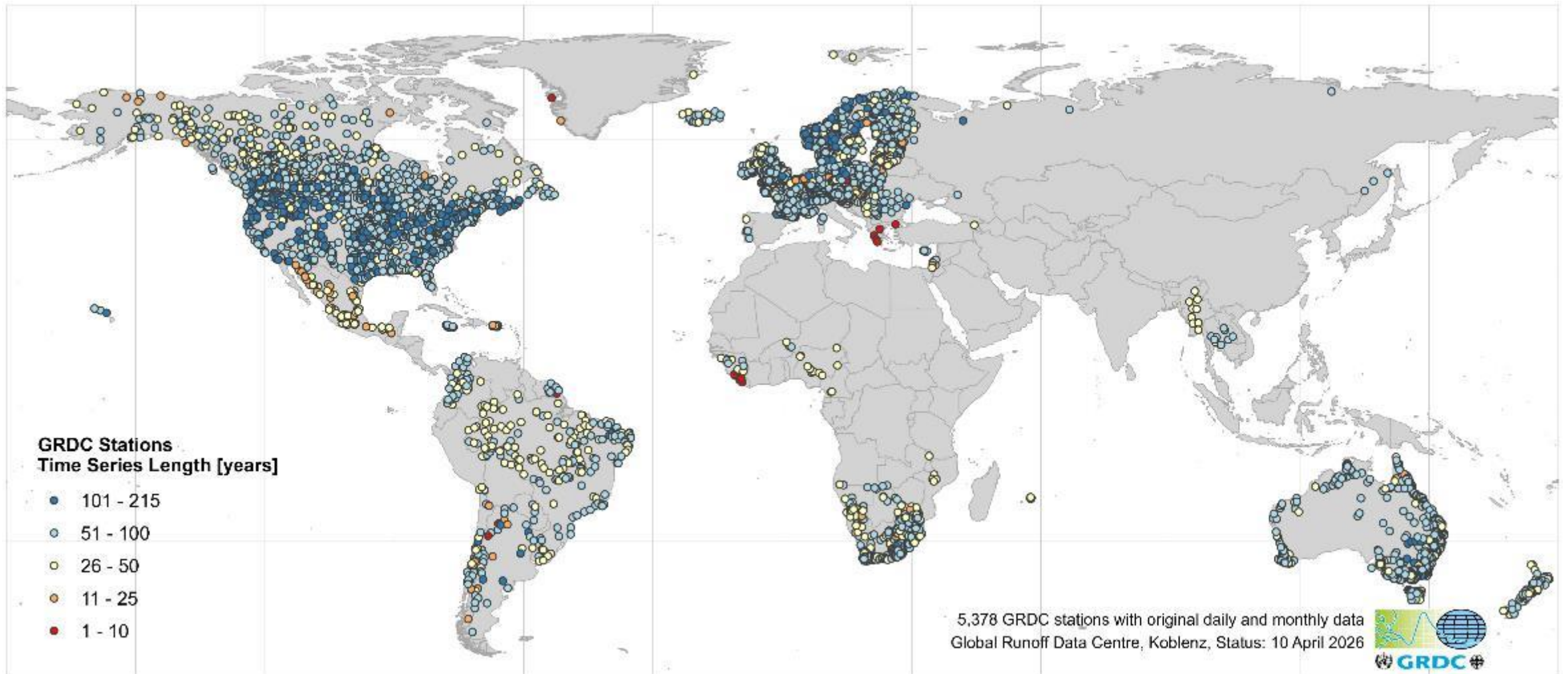
Published dataset: 1800+ stations



[10.5281/zenodo.19126732](https://doi.org/10.5281/zenodo.19126732)



The RivEx Station Catalogue



GRDC × RivEx: Building the data foundation together

- **GRDC - RivEx Dataset**

- Curated, quality-assured in-situ river discharge data
- All stations have data at least until 2020 or newer
- Whole timeseries is provided
- Data provision via Data Portal
(or as an internal available dataset as whole download)

- **Filling white spaces with RivEx data**

- Further collaboration with EO community
- Collaboration with modelling community

Wishlist of GRDC

- **Gridded Runoff Product (joint RivEx output?)**
 - Discussing the GRDC data + RivEx effort



Thank you for your attention

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...37 years of service

