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

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RivEx Meeting
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RivEx

BfG Federal Institute of Hydrology

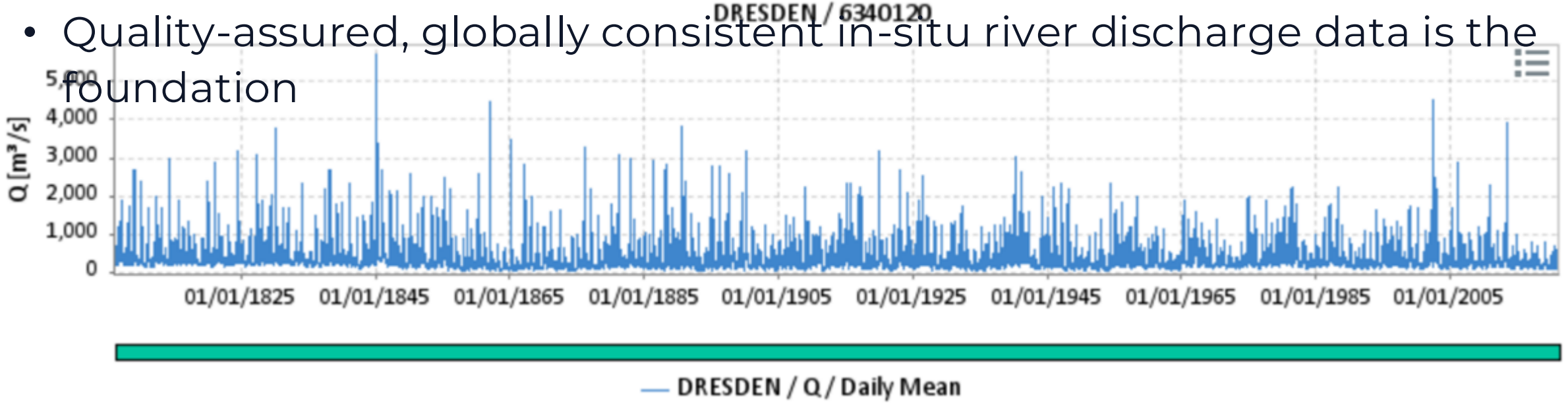
WORLD METEOROLOGICAL ORGANIZATION

GEWEX The Global Energy & Water Exchanges Project

GRDC

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

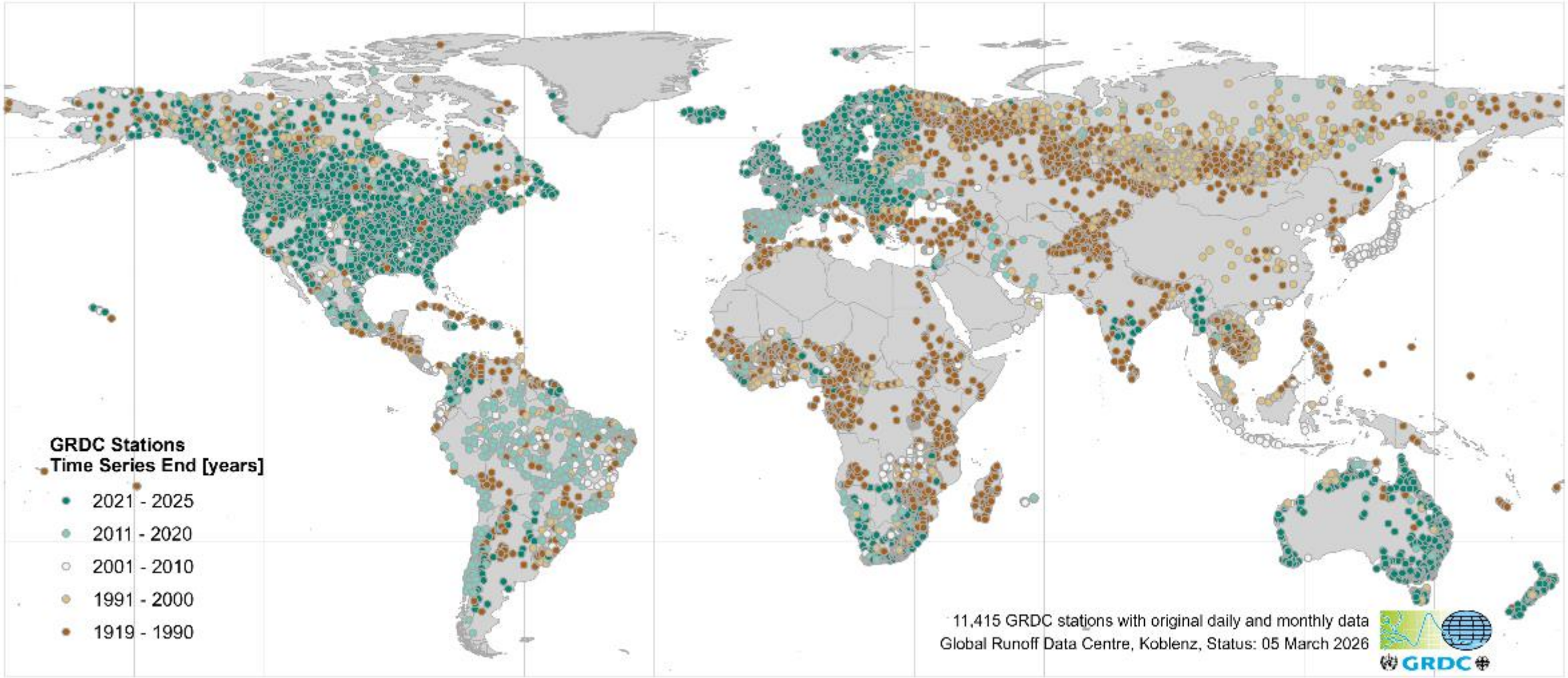
Global database
holds the most substantive collection of **quality assured** river discharge data on global scale

under the auspices of the World Meteorological Organisation (WMO)

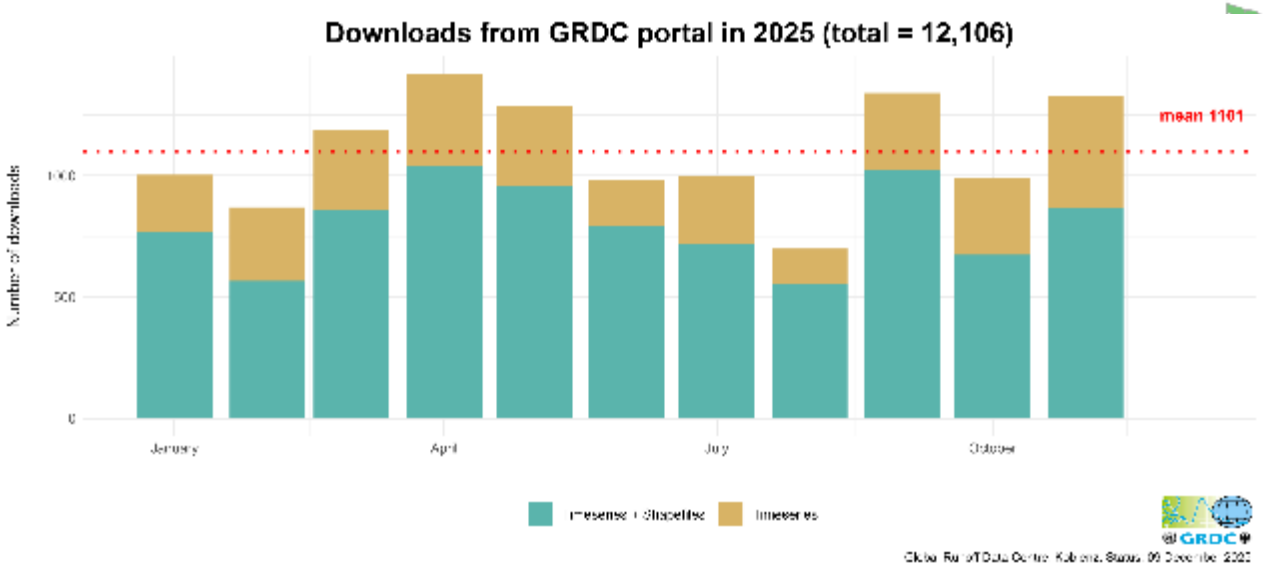
with financial support of the Federal Republic of Germany

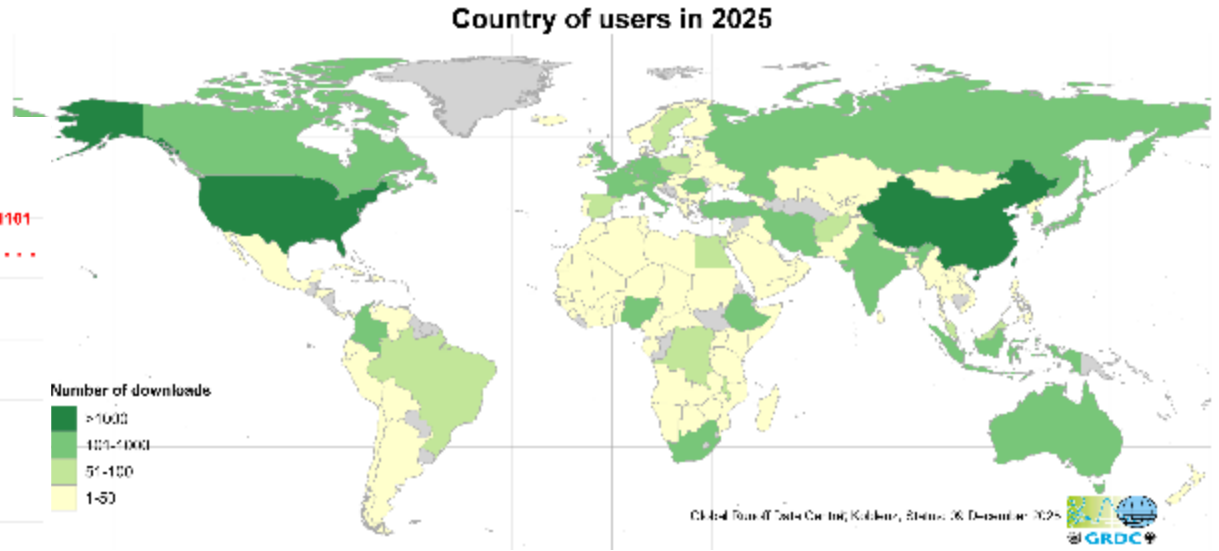
hosted by the Federal Institute of Hydrology (BfG)

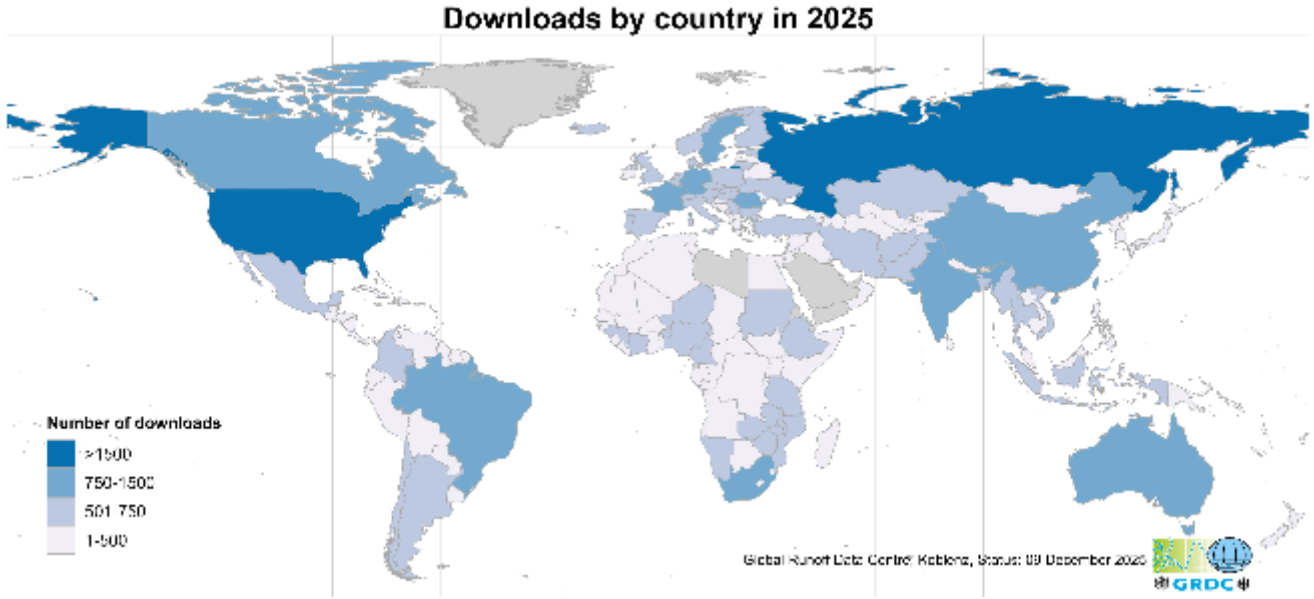
Global Runoff Database



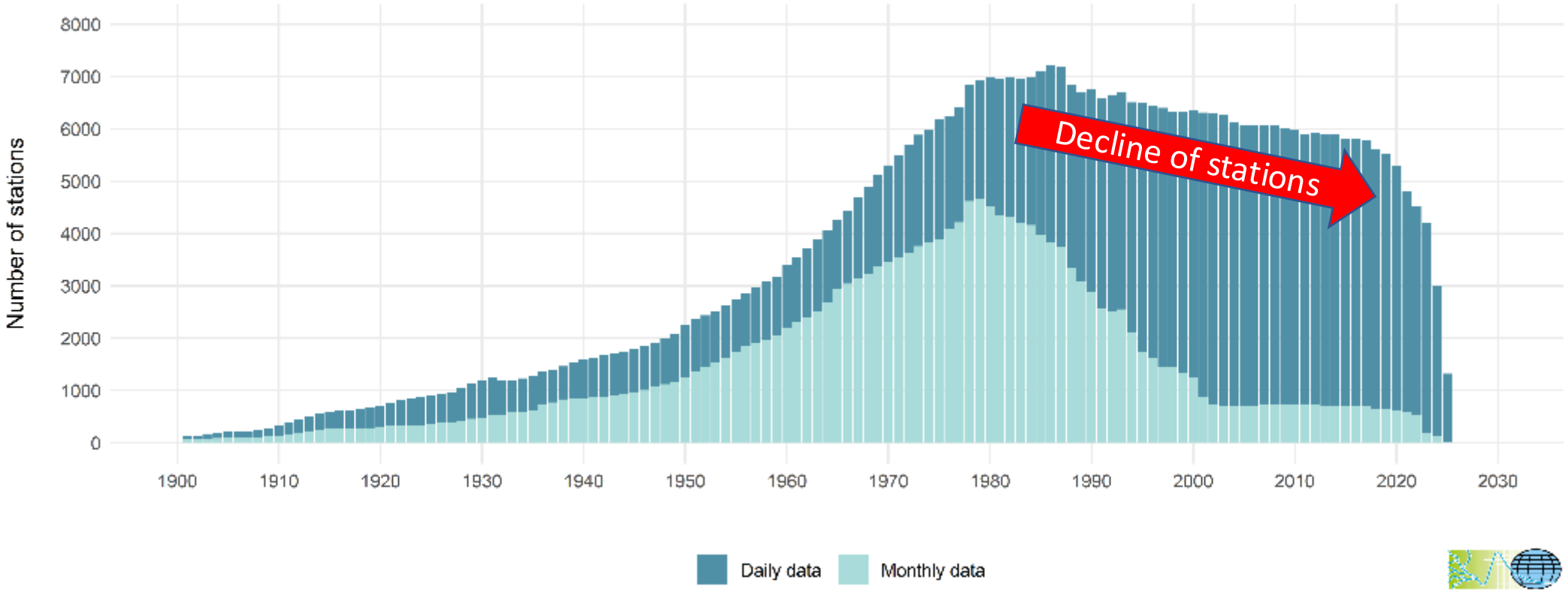
GRDC – Statistics of 2025







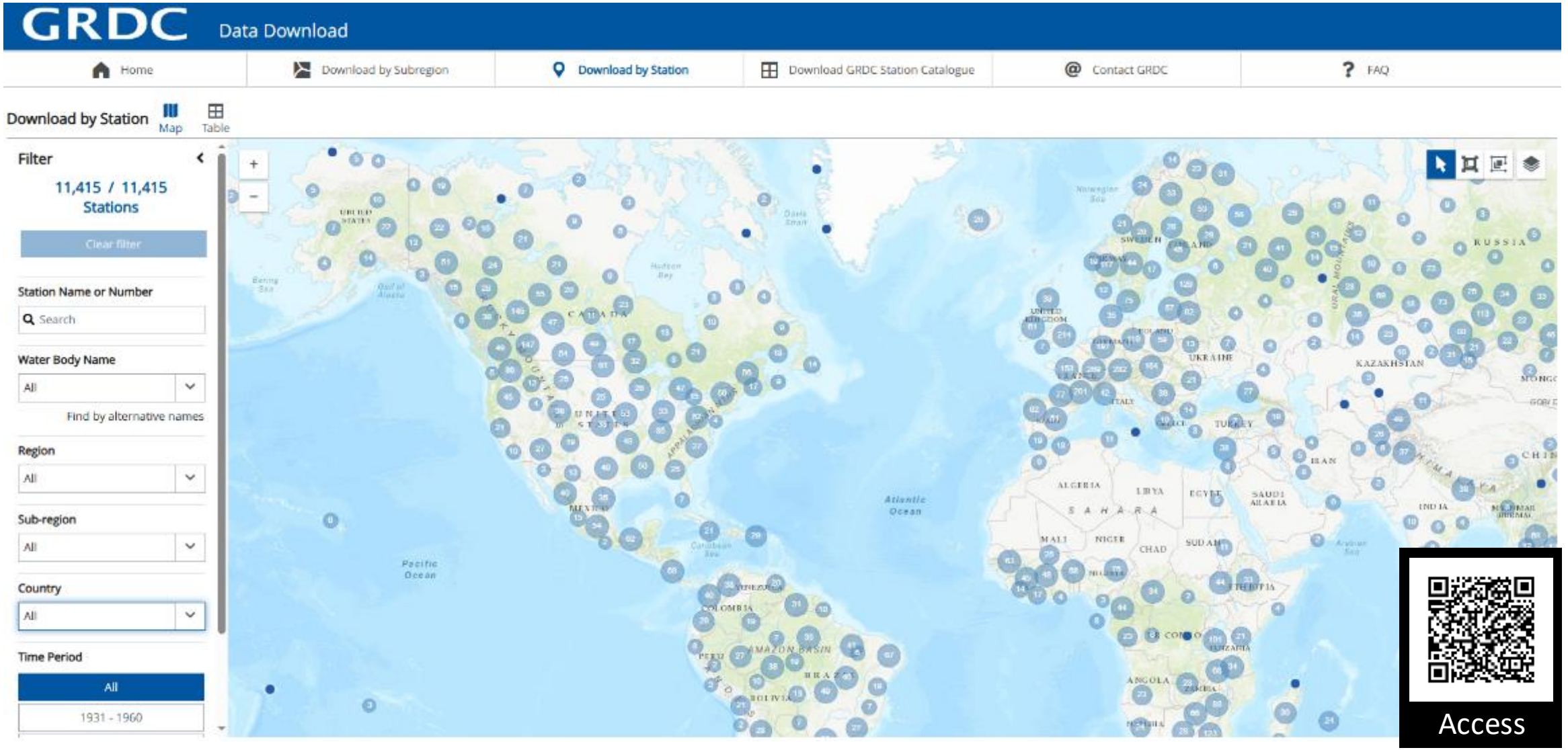
Availability of discharge data in the GRDC database



GRDC

Global Runoff Data Centre, Koblenz, Status: 22 September 2025

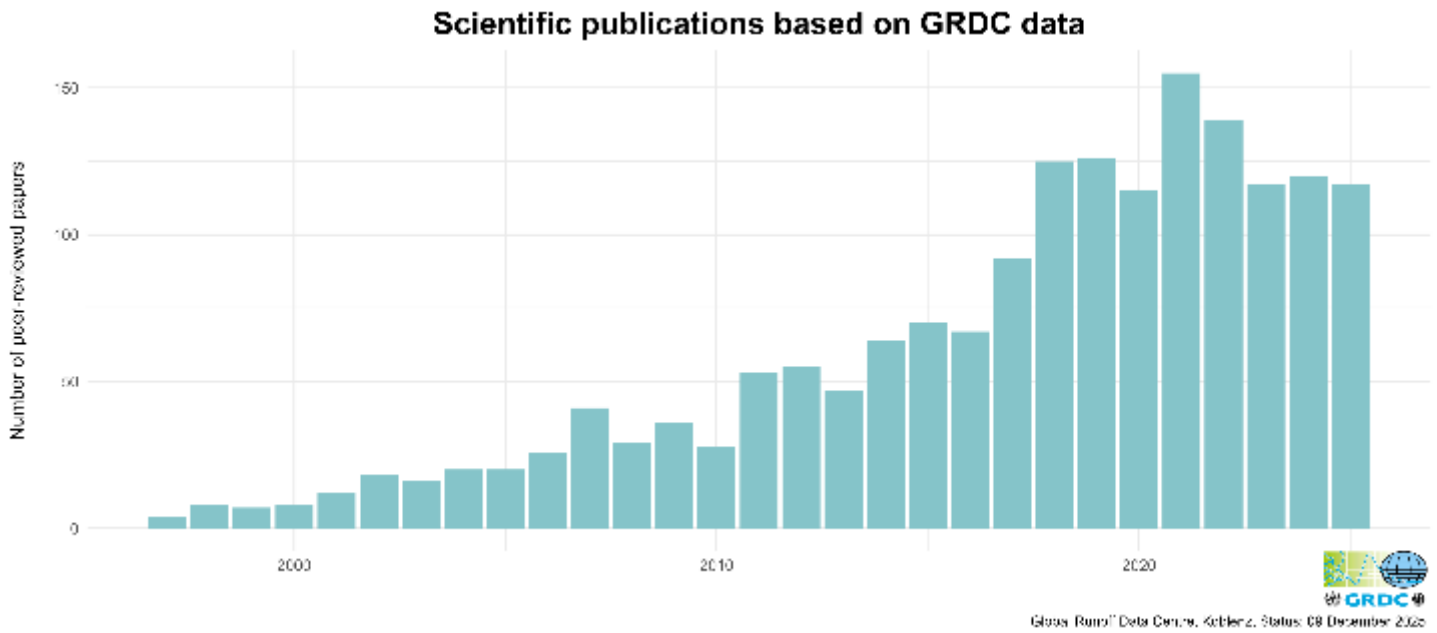
GRDC Data Portal

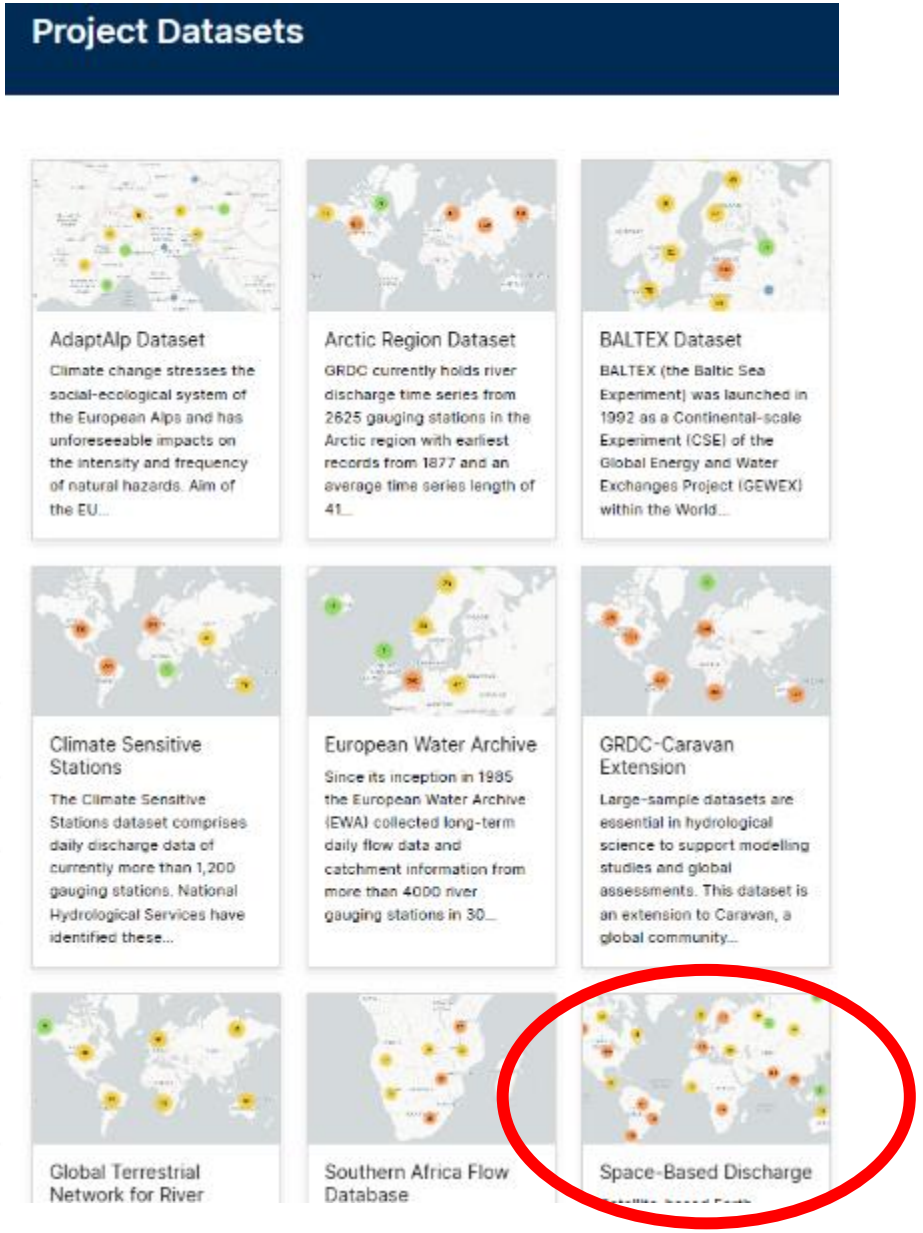


https://portal.grdc.bafg.de/

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





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Open Access Earth System Science Data

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

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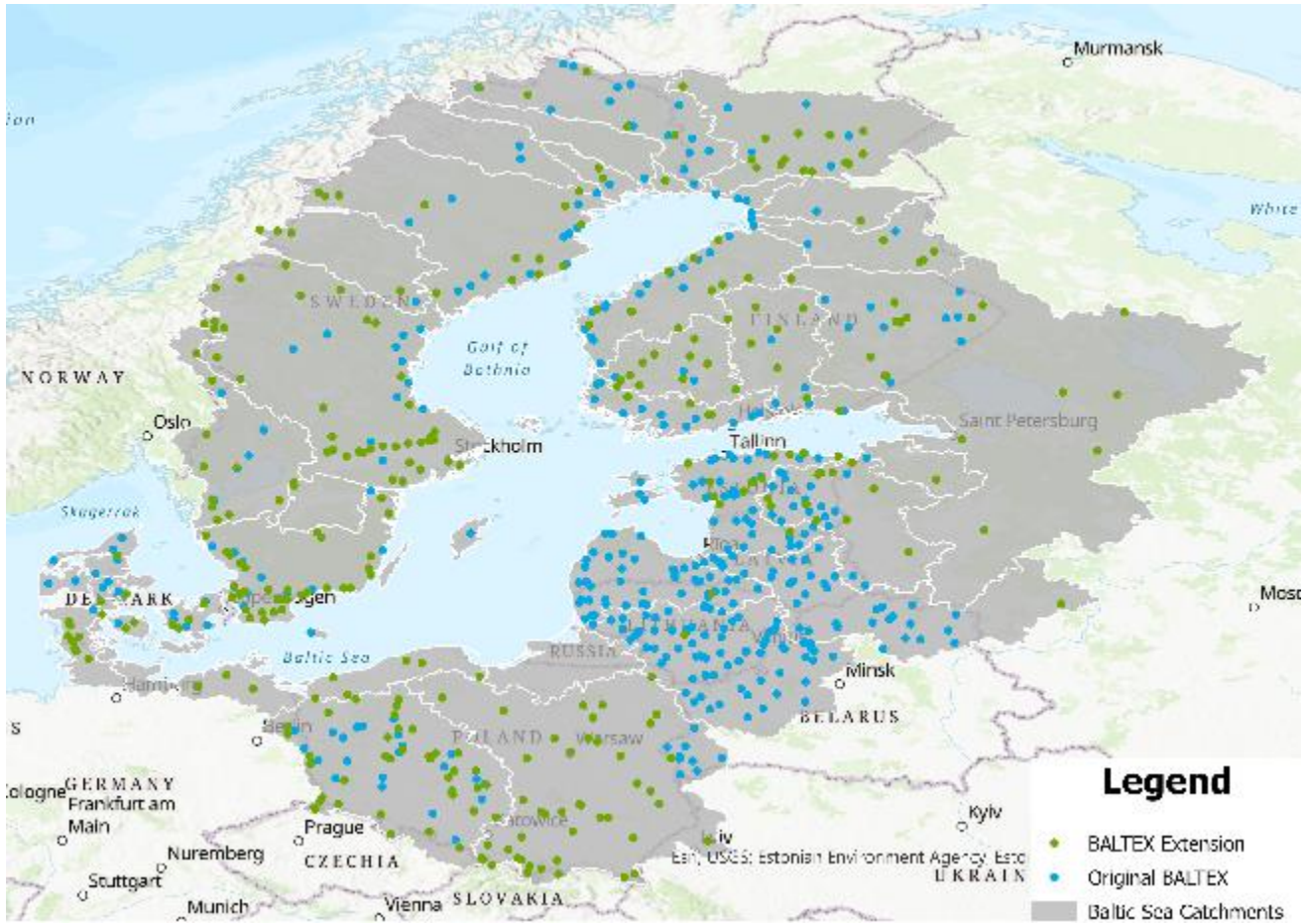

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The BALTEX dataset of the Global Runoff Data Centre (GRDC): a dataset of river discharge draining into the Baltic Sea

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OPEN ACCESS

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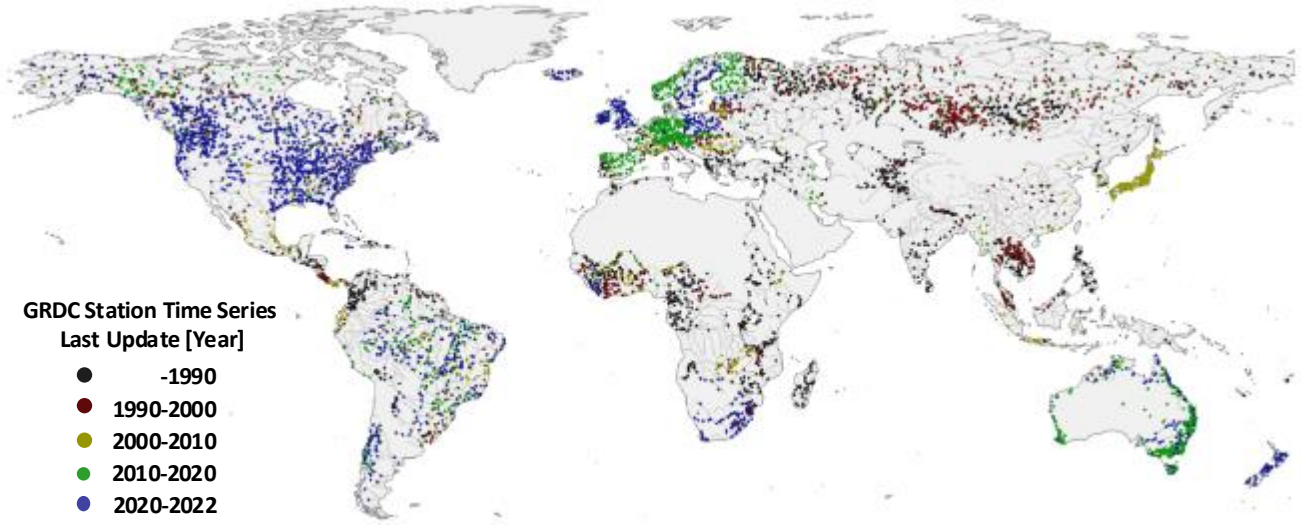
KEYWORDS
baltic sea, river discharge, catchment areas, time series, *in situ* stations

1 Introduction

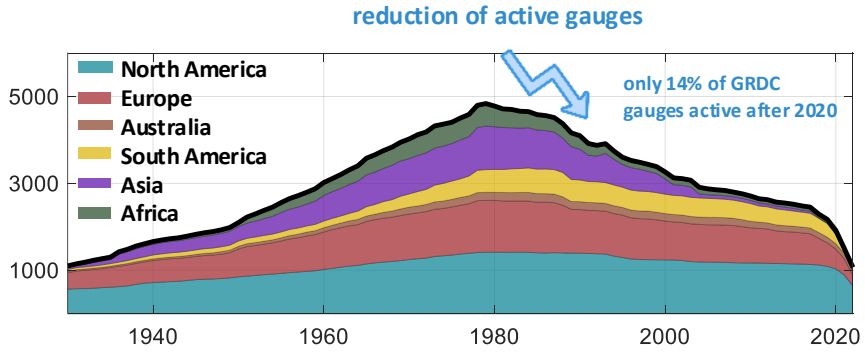
Due to its separation from the Atlantic Ocean, the Baltic Sea is a special marine environment, with a unique brackish water regime (Meier et al., 2022). Its salinity setting is an important driver for the biogeochemical functioning and the ecological status of the Baltic Sea (Kuliński et al., 2022). 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).

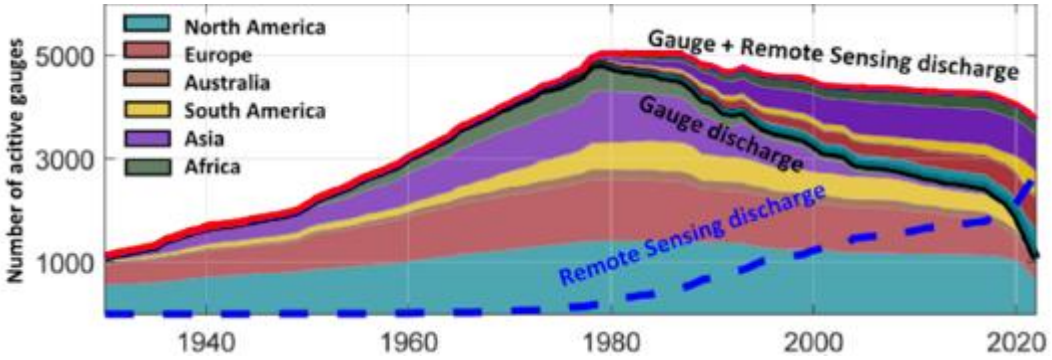
Bridging the gap: In-situ observations and Earth Observation



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.





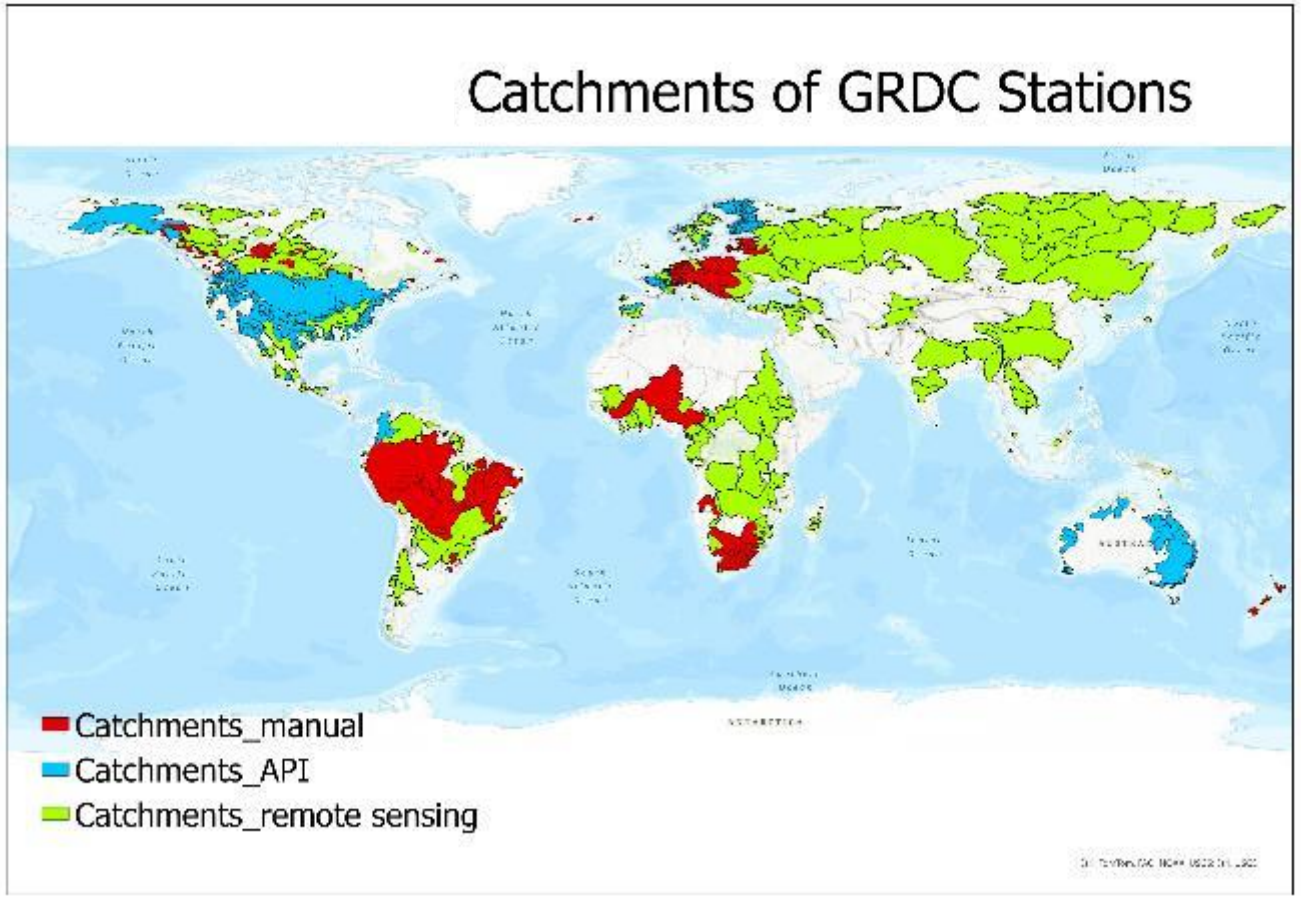
A closer look at the data availability, the most recent year

	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

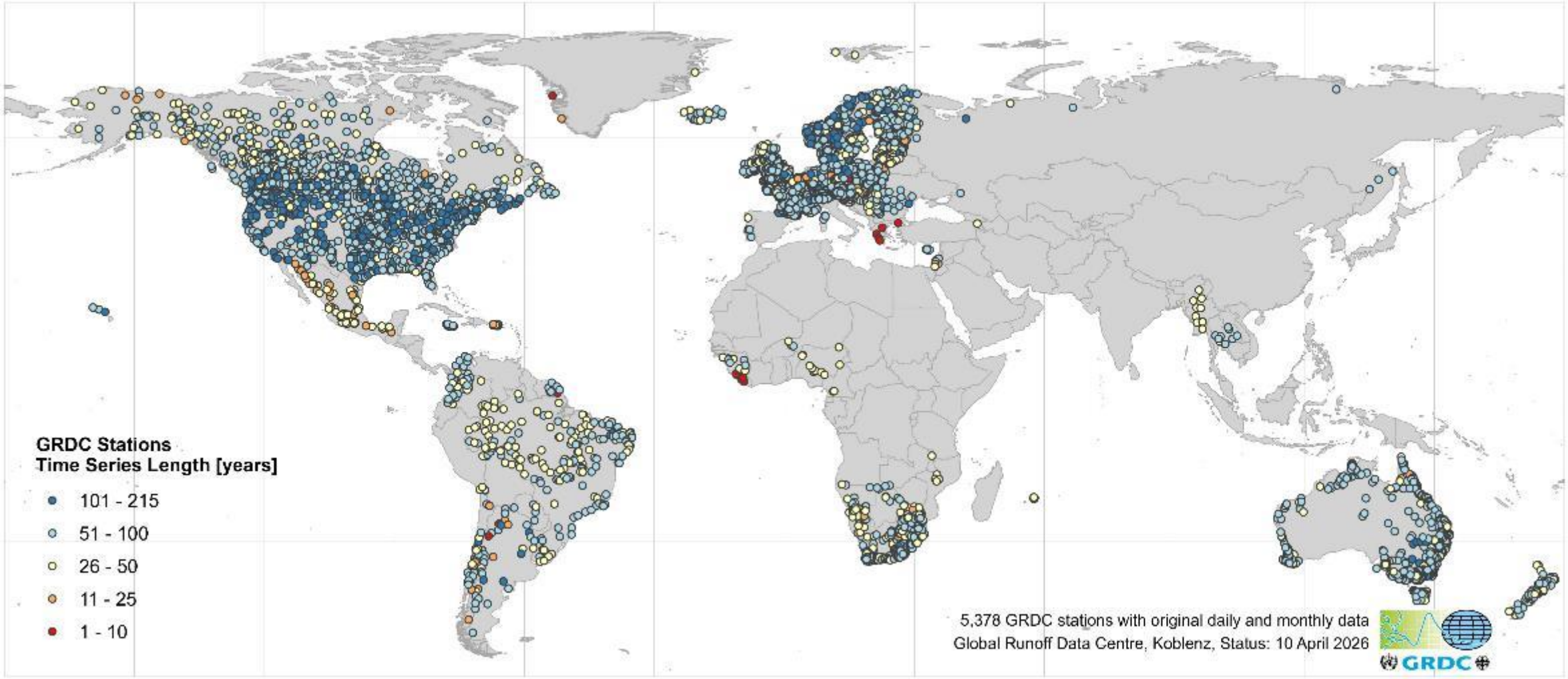
Published dataset: 1800+ stations

zenodo

10.5281/zenodo.19126732



The RivEx Station Catalogue



Stations:	Countries:	Mean record length:	Stations 100+ years:	Core period:
5,378	57	67 years	811	1991–2025

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)


https://hgss.copernicus.org/articles/10/109/2019/#&gid=1&pid=1

- **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

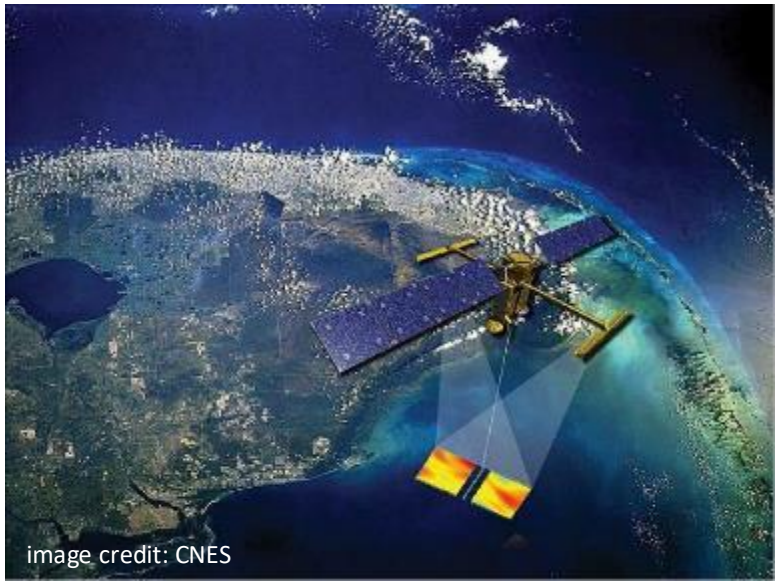


image credit: CNES

Thank you for your attention

…37 years of service

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