An introduction to the UNEP GEMS/Water Data Centre (GWDC)

Data Storage Solution Workshop

Philipp Saile, GEMS/Water Data Centre, International Centre for Water Resources and Global Change, Federal Institute of Hydrology

Andrew Gemmel, UMVOTO

The Global Environment Monitoring System for Freshwater (GEMS/Water)

1978

GEMS/Water is established to collect **world-wide water quality data** for assessments of status and trends in **global inland water quality**.

2014

The **GEMS/Water** mandate was renewed and strengthened by UNEA 1 (Res. 1/9) and it was restructured with **new partners** and **donors** from the **Governments of Ireland and Germany**.

UN environment assembly

#SolveDifferent

Overview of GEMS/Water

Global Environment Monitoring Unit
Nairobi, Kenya

Assessments

Data

Water quality monitoring

Capacity development

Networks
National and Collaborating Focal Points

GEMS/Water Data Centre
Koblenz, Germany

United Nations Educational, Scientific and Cultural Organization

International Centre for Water Resources and Global Change under the auspices of UNESCO

Bundesanstalt für Gewässerkunde

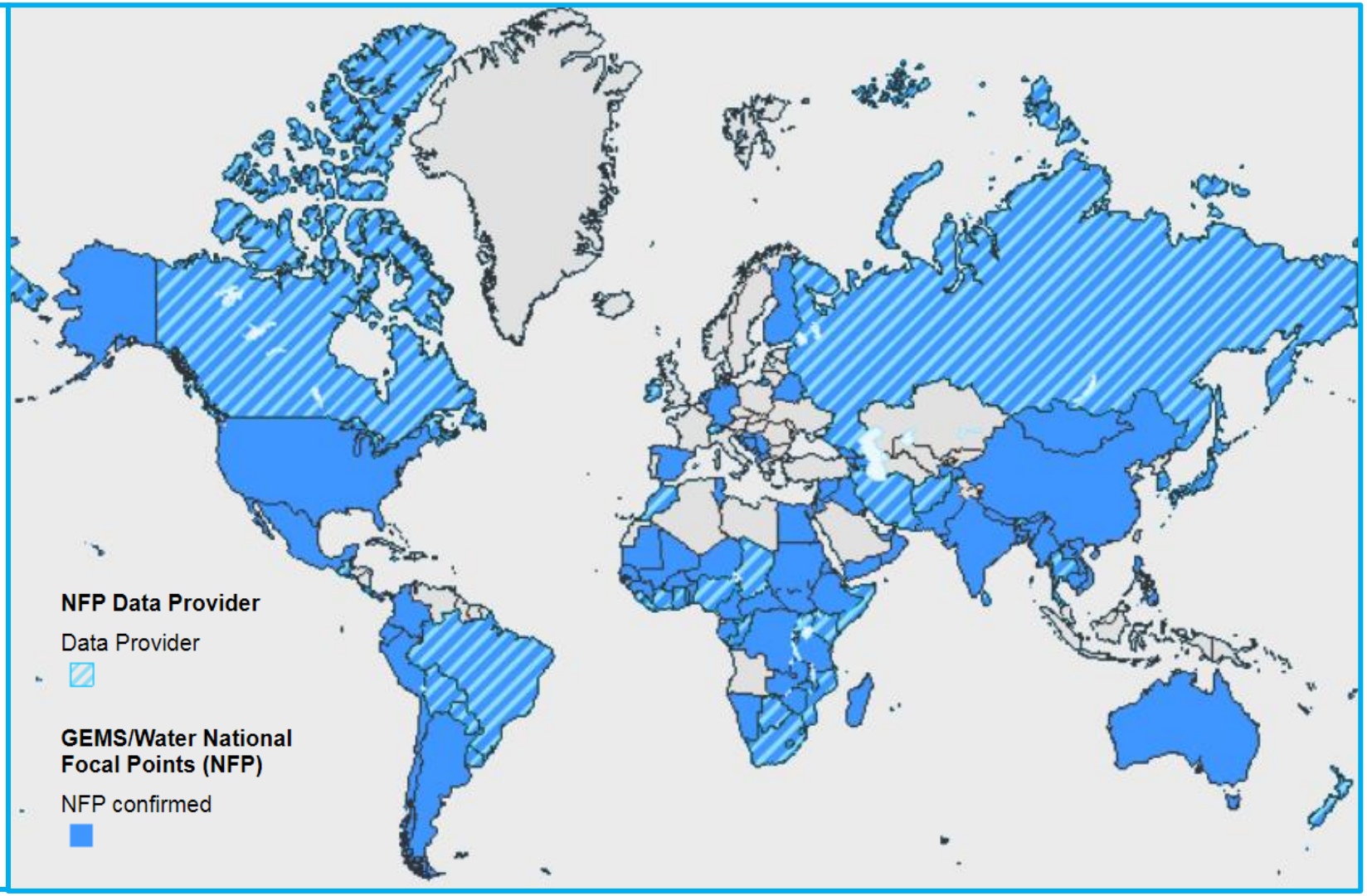
GEMS/Water Capacity Development Centre
Cork, Ireland

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

The GEMS/Water Global Monitoring Network

GEMS/Water works globally with the assistance of government nominated National Focal Points, River Basin Commissions and Collaborating Focal Points for specific monitoring programmes

The GEMU in Nairobi is re-establishing old focal points and encouraging new focal points where none existed before



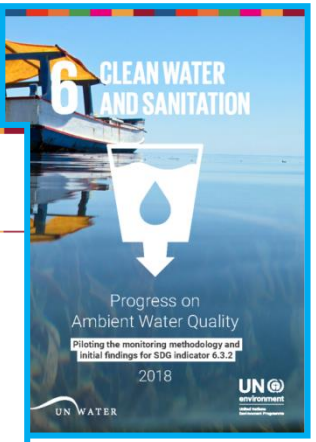
GEMS/Water supports the Sustainable Development Goals

2015

Meeting the global water quality challenge
Under the umbrella of the UN-Water Integrated Monitoring Initiative for SDG 6, GEMS/Water coordinates the global monitoring of SDG Indicator 6.3.2.

2020

GEMS/Water supports the UN Member States in increasing their capacity to monitor and assess the quality status of theirs water bodies.

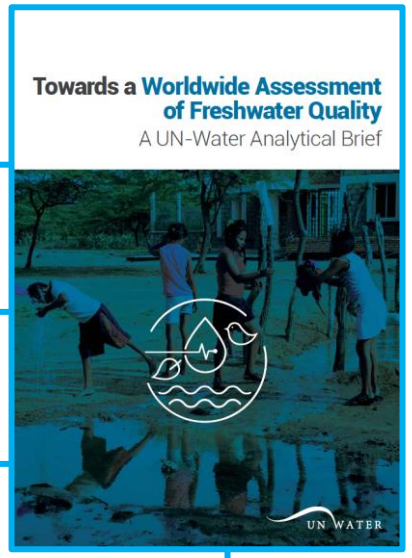


www.sdg6monitoring.org

GEMS/Water supports global water quality assessments

2016

A snapshot of the World's Water Quality

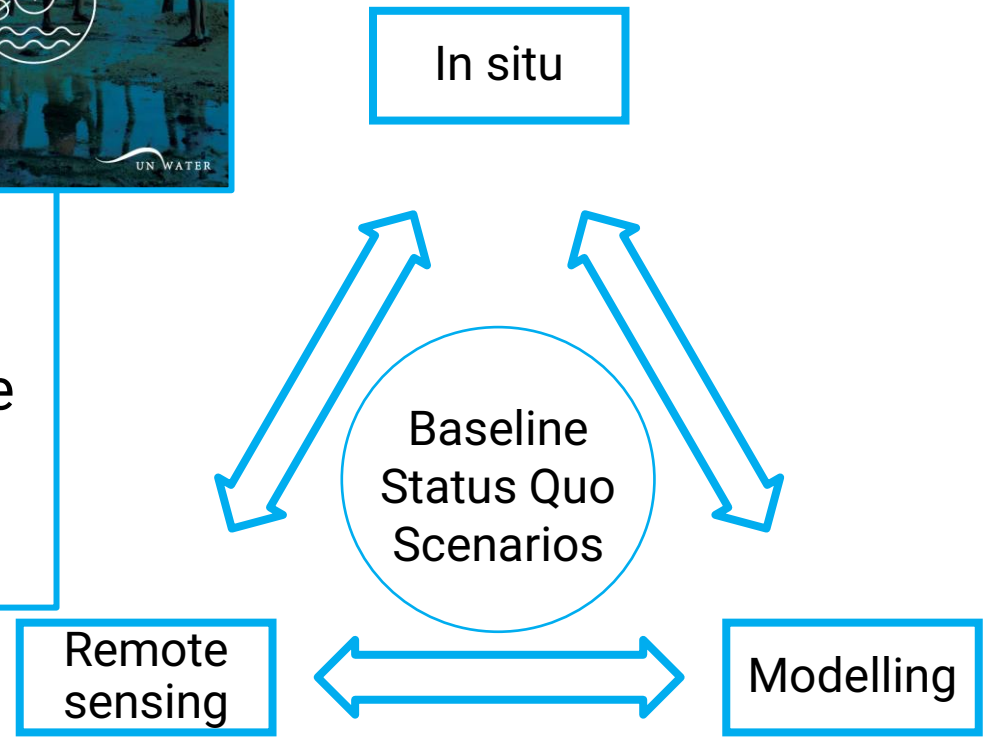


WWQA
World Water Quality Alliance

2017

World Water Quality Assessment

- World Water Quality Alliance
- Stakeholder driven co-design and co-production of a global water quality baseline assessment integrating in situ, remote sensing and modelling data



2023

GEMStat

GLOBAL WATER QUALITY DATABASE GEMStat

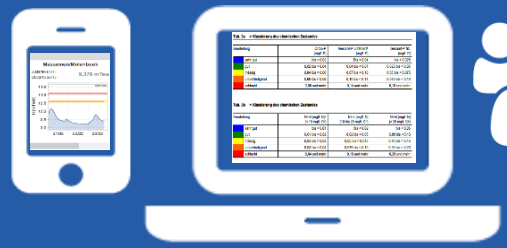
GEMStat is hosted, operated, and maintained by the International Centre for Water Resources and Global Change (ICWRGC) in Koblenz (Germany) within the framework of the GEMS/Water Programme (UN Environment), and in cooperation with the Federal Institute of Hydrology.

www.gemstat.org

GEMStat/GRDC system architecture

Specialists
Government, Authorities,
Research partner

Browser



Desktop

Browser

Consumers
Private public
Engineers, Industry,
Politics

Interfaces
Open standards, Industry standards

Calculations
Quality checks
Data analysis
Load calculations

Interfaces
Open standards, Industry standards

Products
Reports, Statistics, Maps

Meta data Samplings Discharge data

GRDC

UN environment programme GEMStat

UN environment programme GEMS Water UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh UNESCO bfg Bundesanstalt für Gewässerkunde

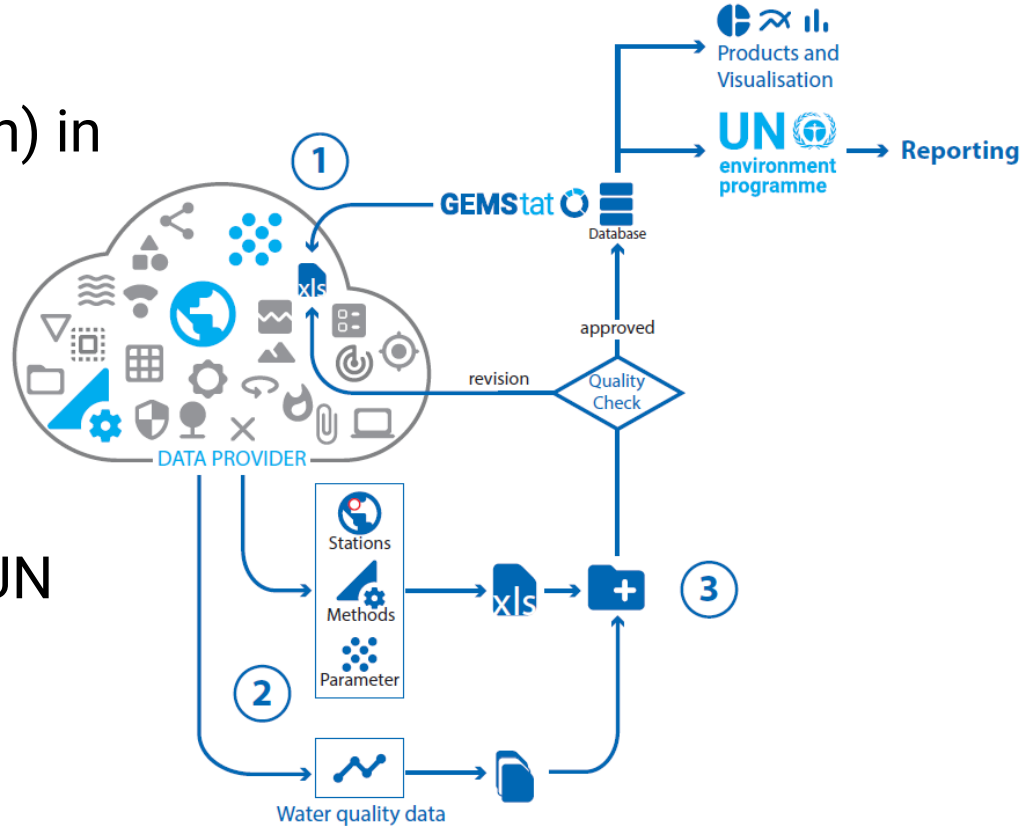
GEMStat data acquisition and sharing

- Data providers: mostly national water agencies, sometimes research programmes
- Data collection: reporting templates or (more often) in available formats
- Data sharing (data policy)

  Open: Data is publicly available

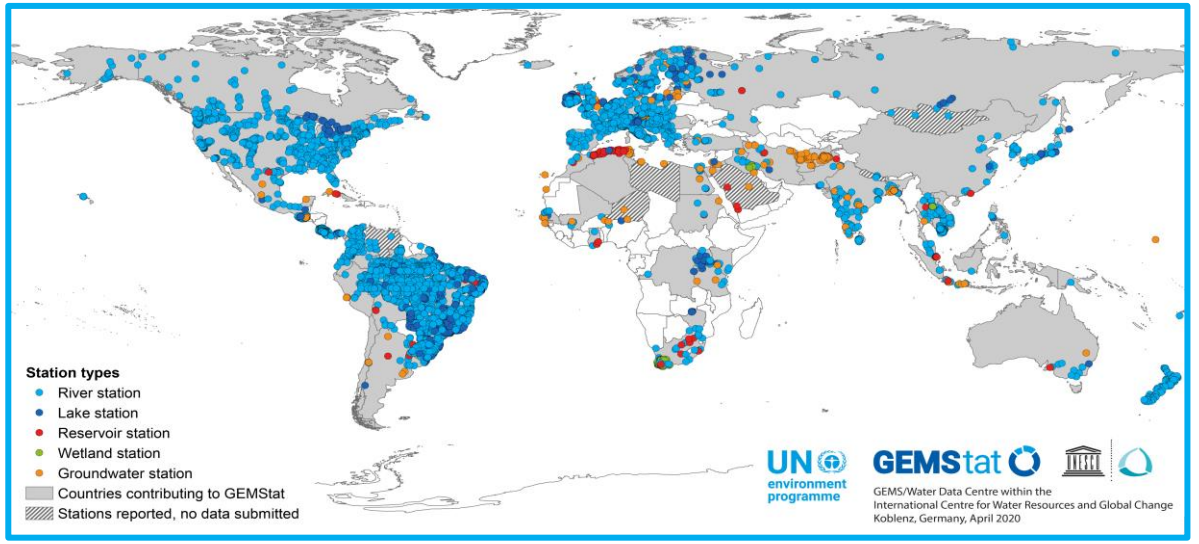
  Limited: Data is shared on request for non-commercial research

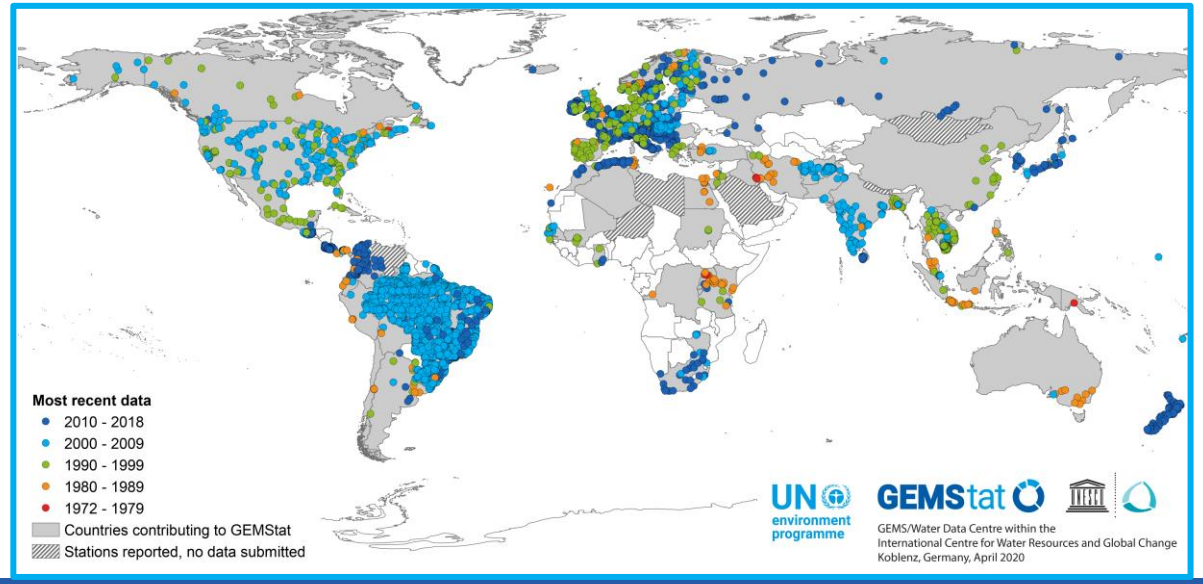
  Restricted: Data is not shared but used for UN assessments and data products

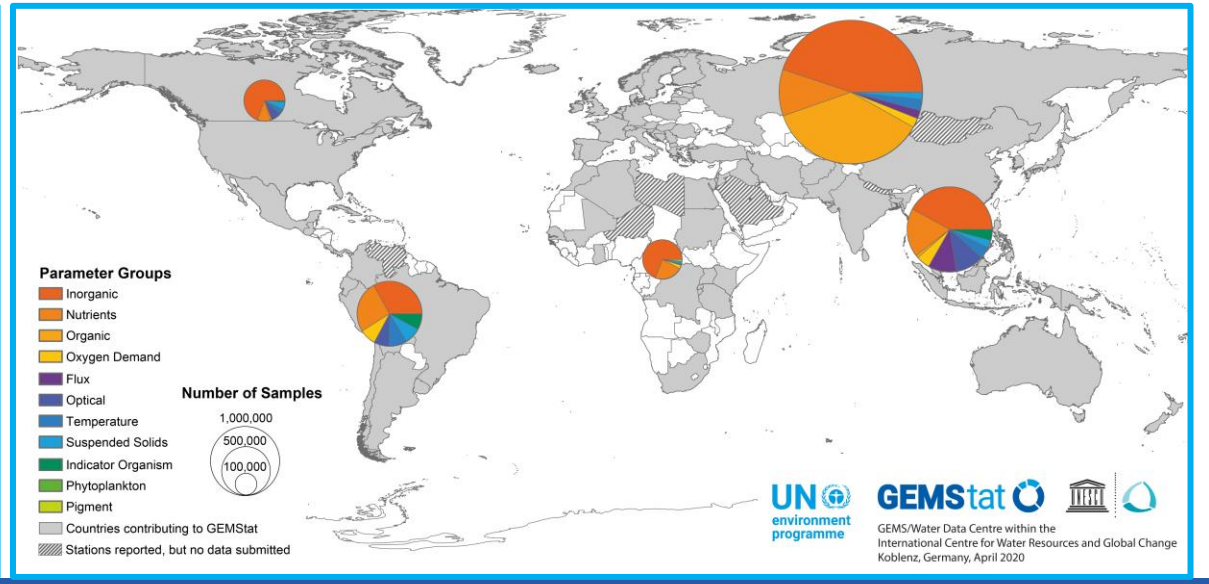


GEMStat data availability

	River	Lake/ Reservoir	Ground-water	Wetland	Total
# Stations	4261	754/187	479	9	5690
	Physical	**Biological**	**Organic**	**Inorganic**	
# Parameters	24	8	145	123	330
# Values	1000672	204578	1572743	3291795	7378215



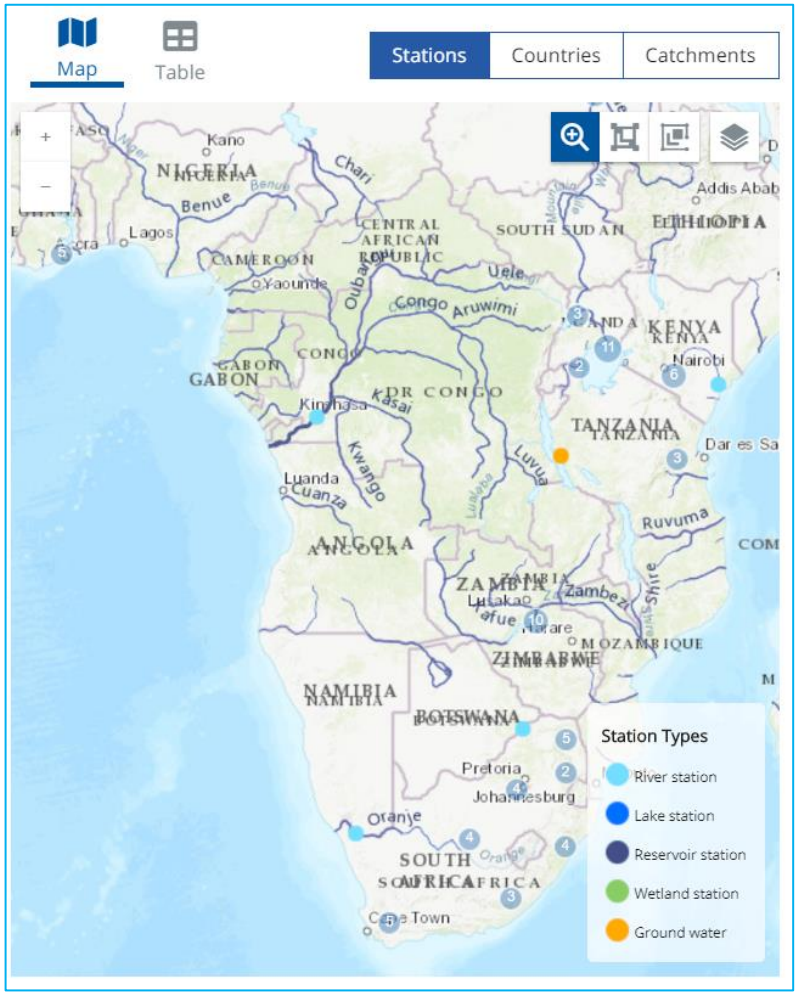




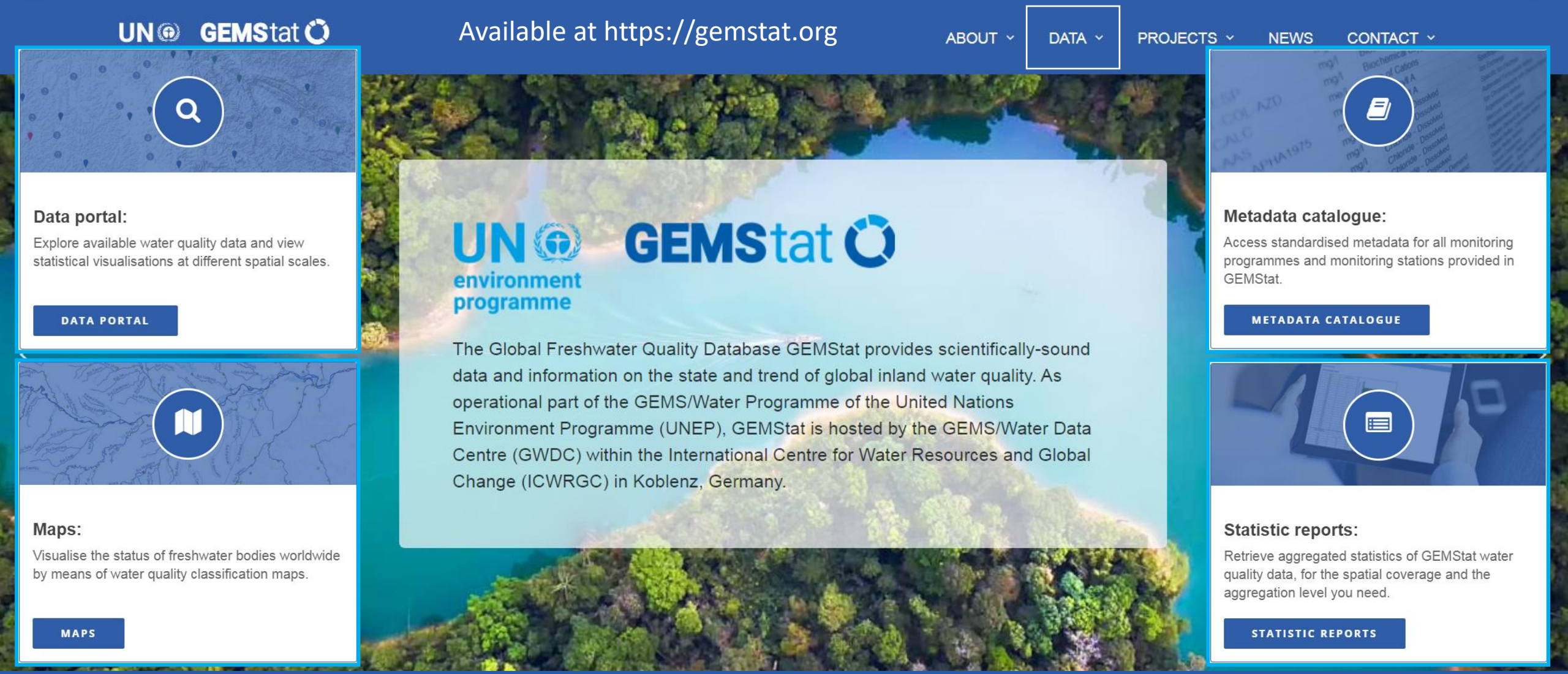
GEMStat data availability – Southern Africa

- In most countries there are NFPs but only three countries have shared data so far:
  - South Africa
  - Tanzania
  - Zimbabwe

Country	Temporal Coverage	# of Years	# of Stations	# of Parameters	# of Values
South Africa	1990-2010	21	29	23	220372
Tanzania, United Republic of	1978-2016	23	33	52	21999
Zimbabwe	2008-2009	2	10	7	280



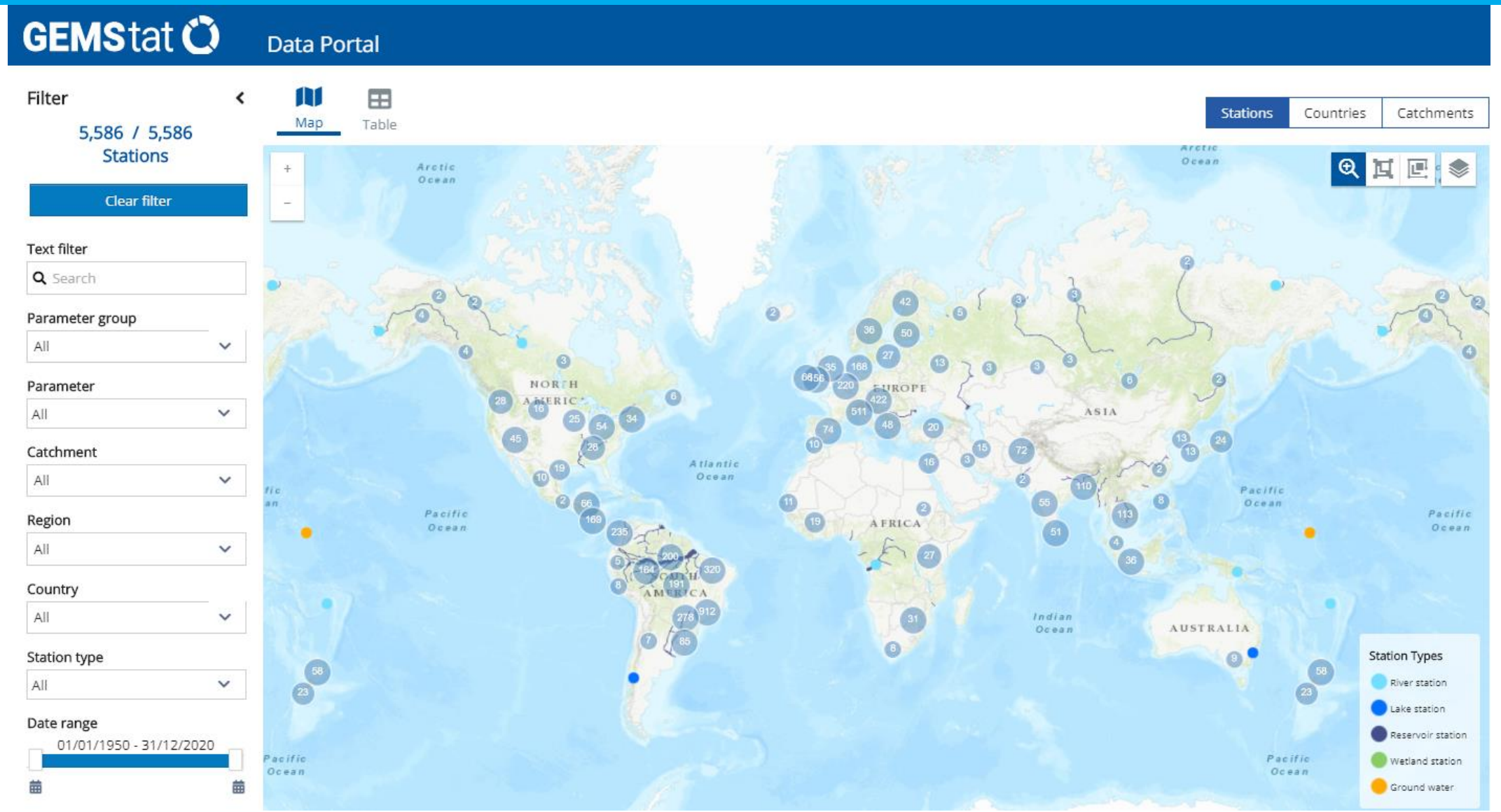
GEMStat data and products



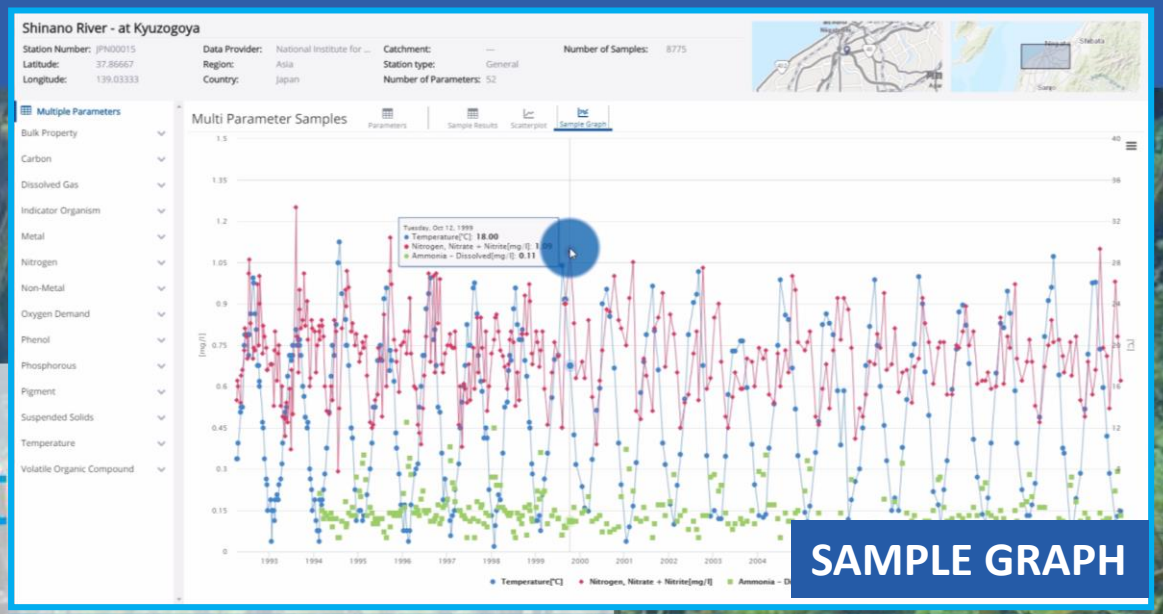
UN environment programme GEMStat

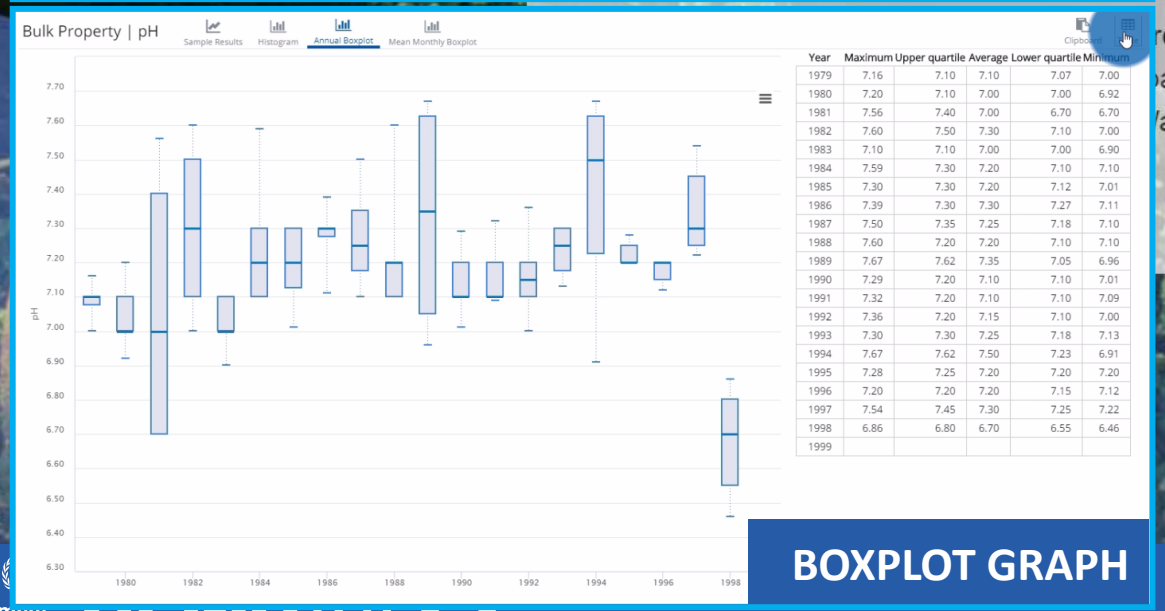
UN environment programme GEMS Water UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh UNESCO bfg Bundesanstalt für Gewässerkunde

GEMStat data portal – data search



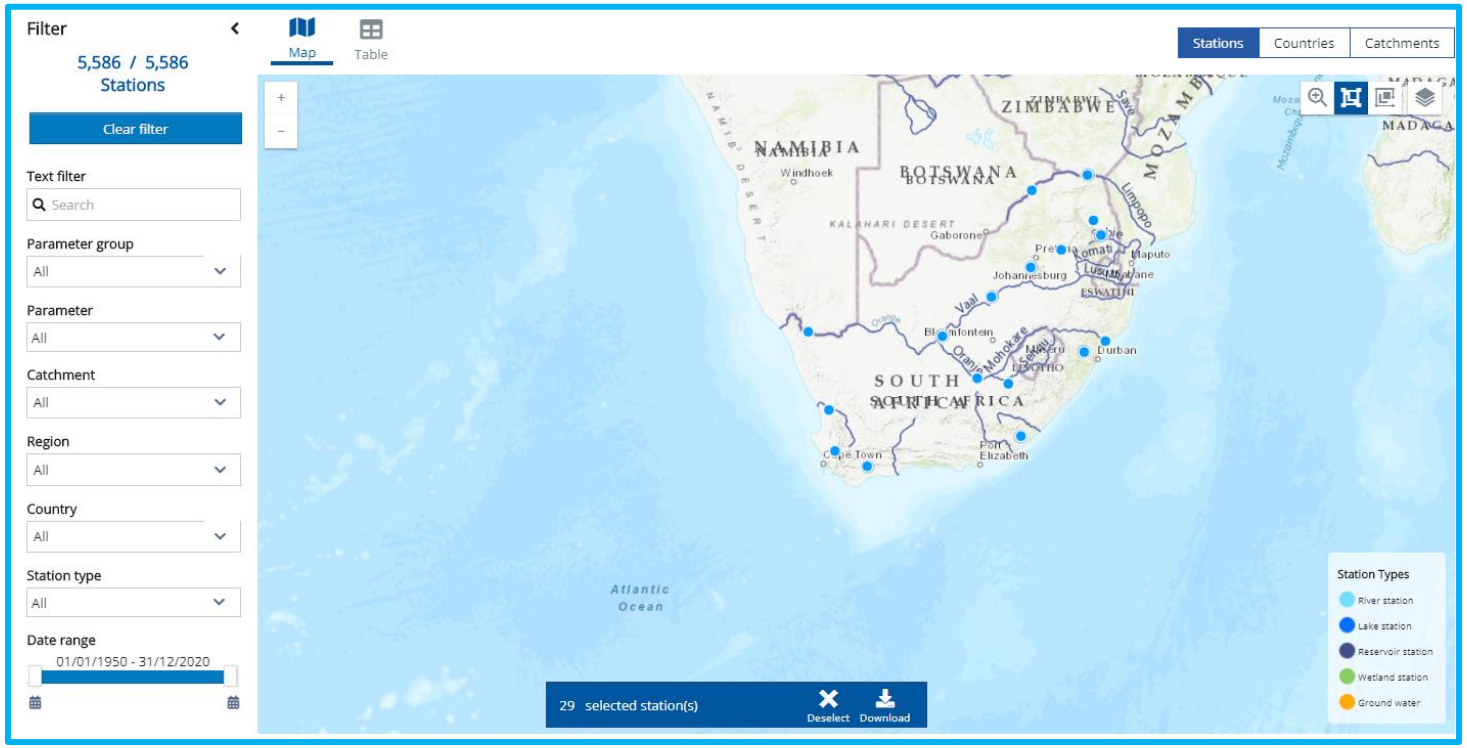
GEMStat data portal – visualizations

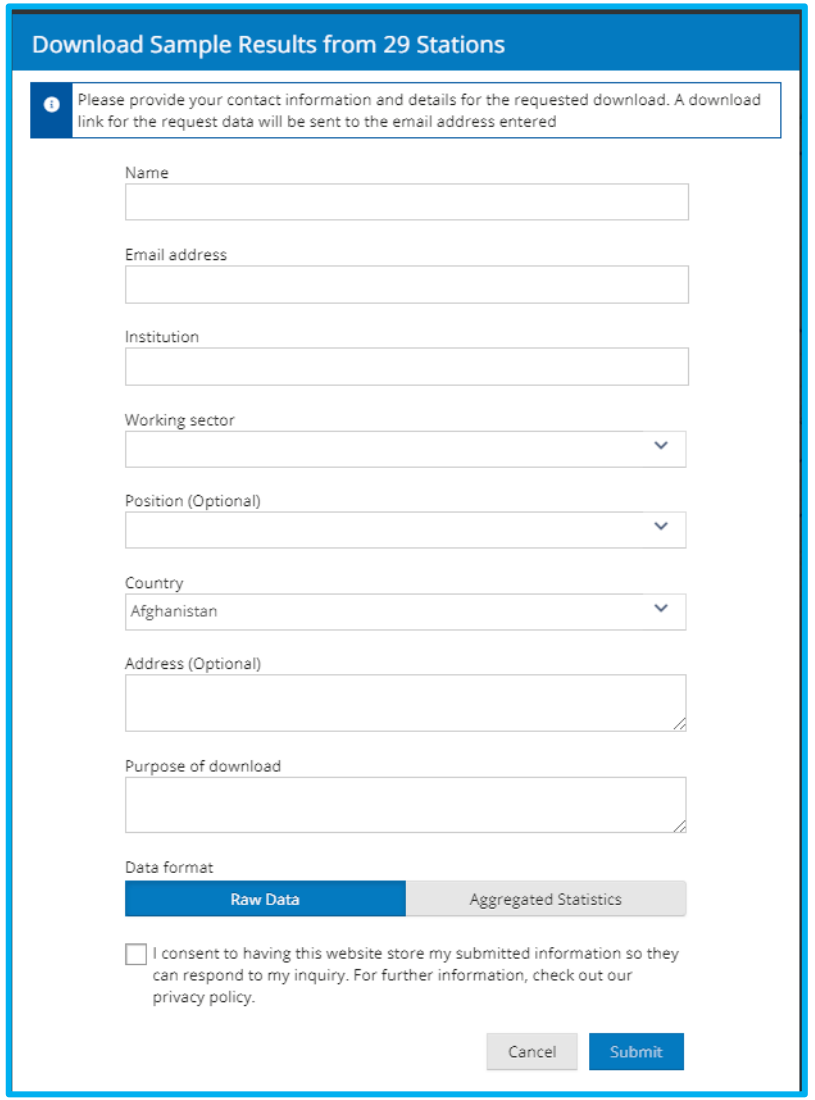




Year	Maximum	Upper quartile	Average	Lower quartile	Minimum
1979	7.16	7.10	7.10	7.07	7.00
1980	7.20	7.10	7.00	7.00	6.92
1981	7.56	7.40	7.00	6.70	6.70
1982	7.60	7.50	7.30	7.10	7.00
1983	7.10	7.10	7.00	7.00	6.90
1984	7.59	7.30	7.20	7.10	7.10
1985	7.30	7.30	7.20	7.12	7.01
1986	7.39	7.30	7.30	7.27	7.11
1987	7.50	7.35	7.25	7.18	7.10
1988	7.60	7.20	7.20	7.10	7.10
1989	7.67	7.62	7.35	7.05	6.96
1990	7.29	7.20	7.10	7.10	7.01
1991	7.32	7.20	7.10	7.10	7.09
1992	7.36	7.20	7.15	7.10	7.00
1993	7.30	7.30	7.25	7.18	7.13
1994	7.67	7.62	7.50	7.23	6.91
1995	7.28	7.25	7.20	7.20	7.20
1996	7.20	7.20	7.20	7.15	7.12
1997	7.54	7.45	7.30	7.25	7.22
1998	6.86	6.80	6.70	6.55	6.46
1999					

GEMStat data portal - download





Thank you for your attention!

GEMS/Water Data Centre

Philipp Saile (Head)
Dmytro Lisniak (Data acquisition & quality control)
Claudia Färber (Public relations & Product development)
Sven-Henrik Kleber (IT coordination)
Marco Ehl & Simon Wagner (IT systems operations)

Email: gwdc@bafg.de
Web: https://gemstat.org