South-Caucasus EW4All event

WMO activities related to observations and monitoring

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WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

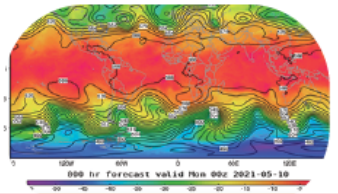
WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

Global Earth System infrastructure value chain

Observations from the entire globe

International exchange of observations



Global Numerical Weather Prediction

Weather, climate and water related infrastructure must be designed and managed globally

Last-mile activities undertaken **primarily at regional, national and local level**

Effective decision-making and action

Delivery of weather, hydrological and climate services

Local data processing, forecast, warning and advisory products

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WMO Integrated Global Observing System

Objective 2.1 Optimize the acquisition of Earth system observation data through the WMO Integrated Global Observing System (WIGOS)

Focus in 2024–2027:

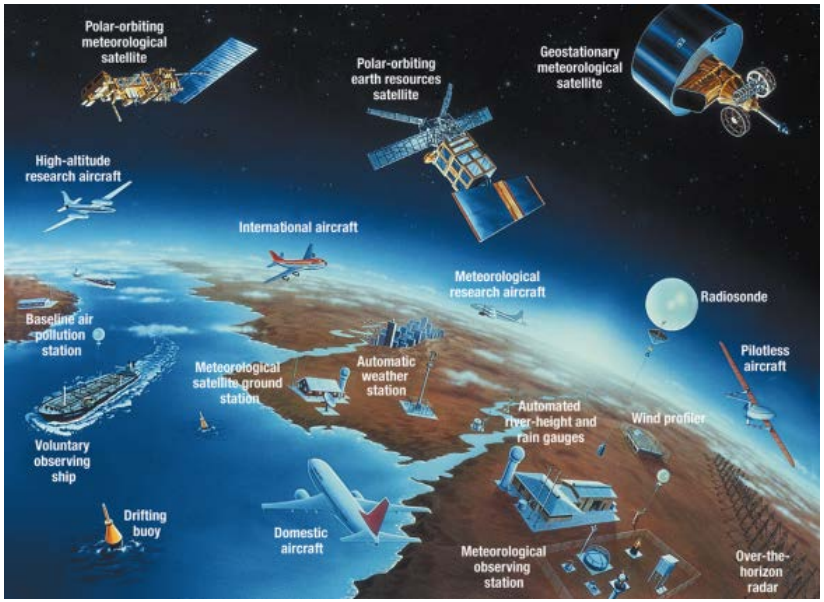
A. The availability and scope of observational data increased

B. Observations across domains into WIGOS integrated

C. Observations to support climate adaptation and mitigation coordinated

D. New technologies brought into operations

E. Environmentally sustainable design of WMO observing programmes ensured



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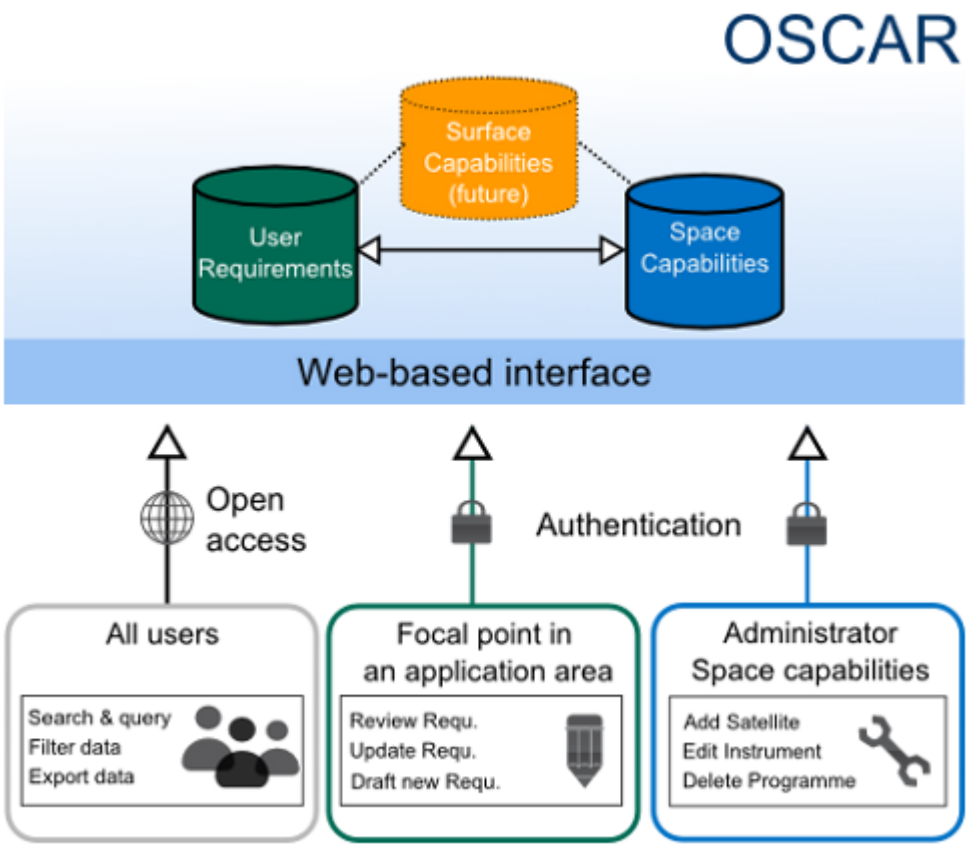
WMO Observing Systems Capability Analysis and Review tool (OSCAR)



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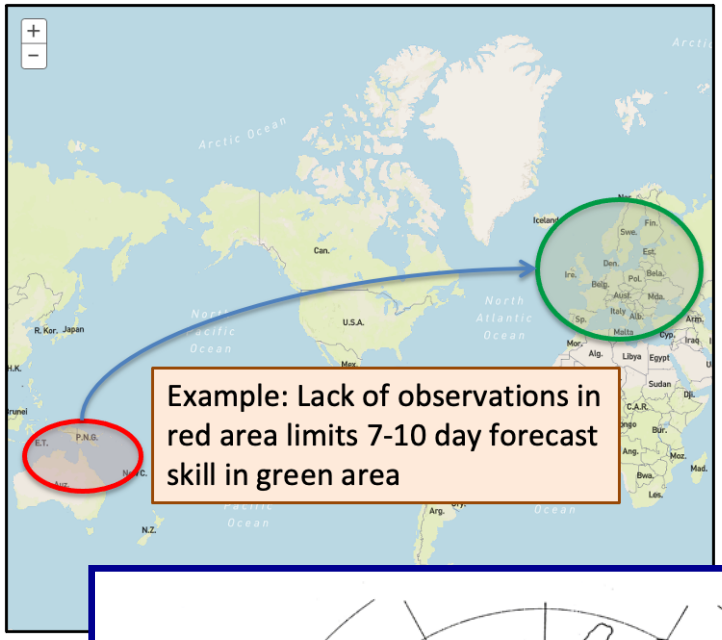
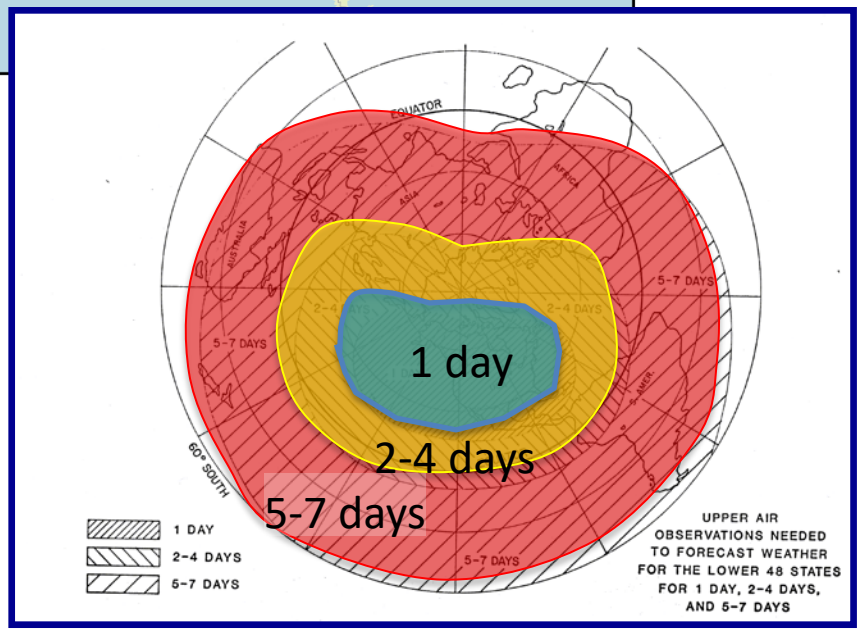
Inherently global nature of NWP has profound implications for observational requirements

- ***Observations are valuable, BUT***
  - Single, isolated observations are not a useful basis for prediction;
  - Jigsaw puzzle analogy: Individual pieces are useless; many pieces together can form a picture;
  - In meteorology the puzzle is global, requiring international data exchange;
- Many extremely important observations are made not for local users, but for the benefit of fellow WMO Members, especially at longer forecast ranges;
- International exchange important even for localized NWP: *Limited Area Models cannot be run effectively inside a global model if the two see different sets of observations;*





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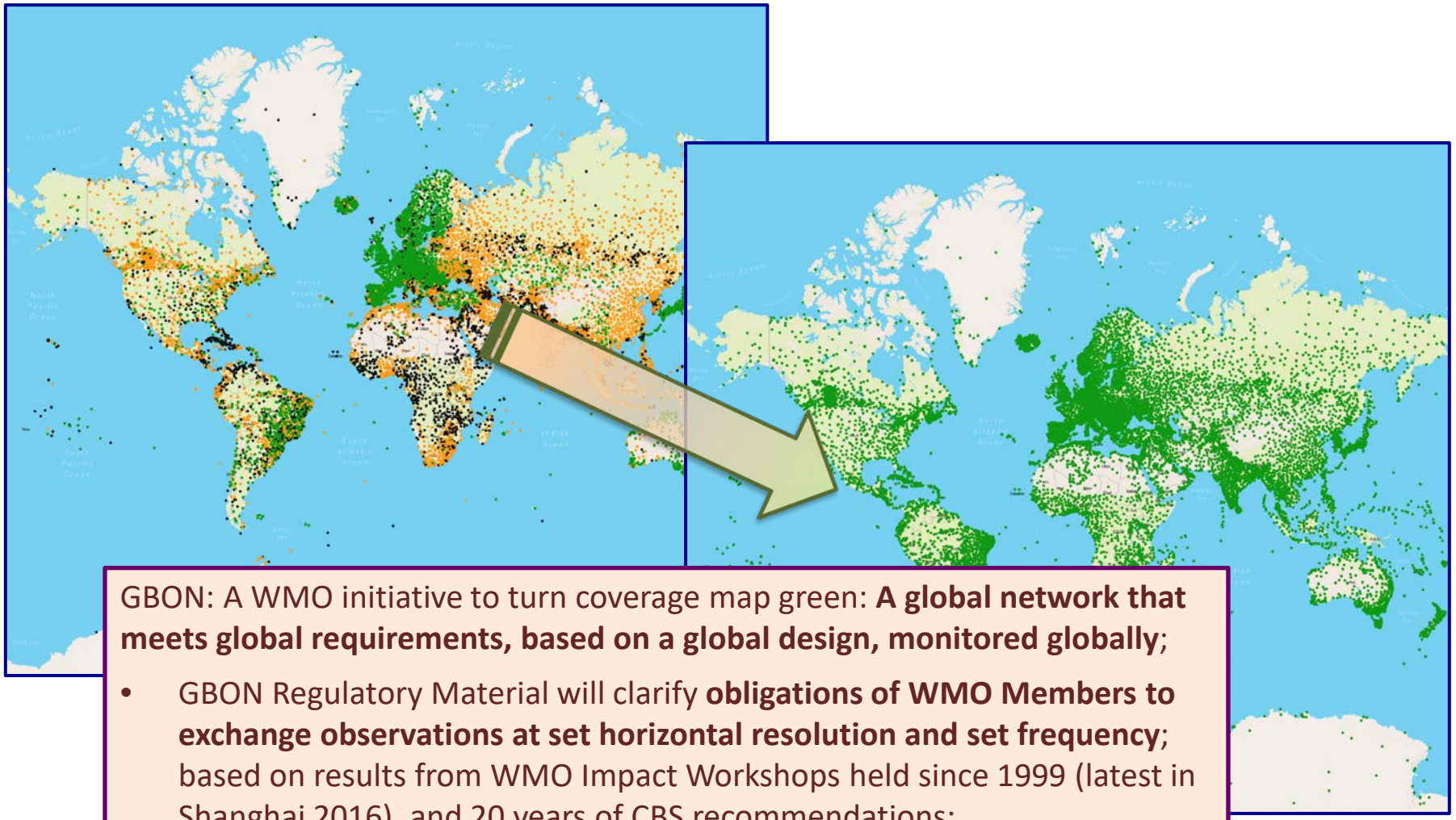
GBON Concept in a nutshell:
"Turn the map green and fill in the missing dots"



GBON: A WMO initiative to turn coverage map green: **A global network that meets global requirements, based on a global design, monitored globally**;

- GBON Regulatory Material will clarify **obligations of WMO Members to exchange observations at set horizontal resolution and set frequency**; based on results from WMO Impact Workshops held since 1999 (latest in Shanghai 2016), and 20 years of CBS recommendations;
- Some Members will need support in order to implement GBON: Systematic Observations Finance Facility (SOFF)

Filling the gap in observational coverage
Role of Regulatory Material

I. **Requirements and gap analysis;**

II. **Outreach and advocacy** – explaining the benefits of observations and data exchange to stakeholders;

III. **Data policy** – affirmation of commitment to exchange data for certain purpose(s), built on existing frameworks e.g. the WMO Convention, Paris Agreement, …

- *WMO Res. 40 (and new draft Res. 42); Res. 34 (Cg-18);*

IV. **Regulatory material** – national governments agreement on specifics of data exchange;

- *GBON provisions in new Manual on WIGOS;*

V. **Financial and technical support**;

- *Systematic Observation Finance Facility;*

WMO Information System (WIS)

Objective 2.2 Improve and increase access to, exchange and management of current and past Earth system observation data and derived products through the WMO Information System

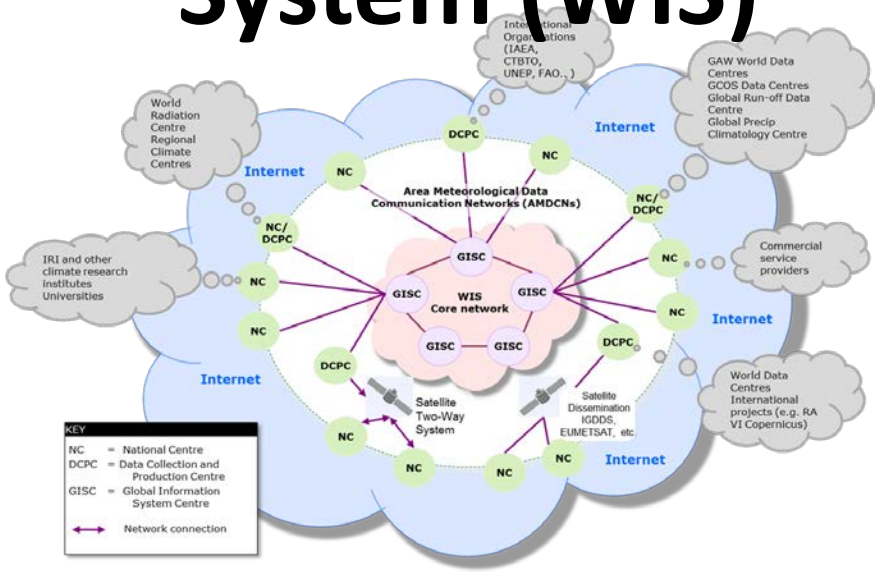
Focus in 2024–2027:

A. Data discovery and accessibility improved

B. Data exchange across the Earth system enabled

C. Long-term stewardship of Earth system data ensured

D. Member-focused software platforms enhanced and sustained



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WMO Integrated Processing and Prediction System (WIPPS)

Objective 2.3 Enable access to and use of numerical analysis and Earth system prediction products at all temporal and spatial scales from the WMO Integrated Processing and Prediction System

Focus in 2024–2027:

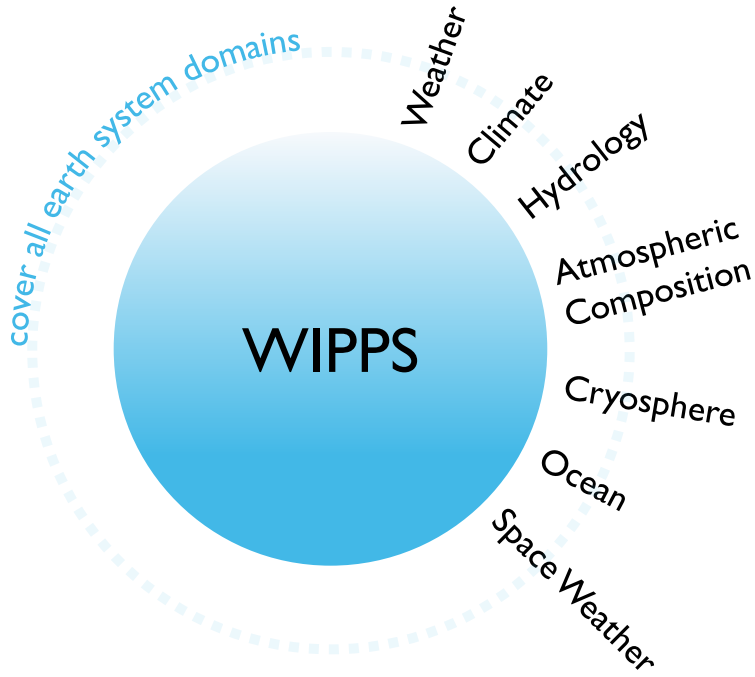
A. The availability of model and analysis products for Members across all Earth system domains increased

B. Interoperability and interconnectedness across the domains of the Earth system built

C. Availability, quality, accessibility, and usage of data products to support adaptation and mitigation enhanced

D. The implementation of new technologies, especially Artificial Intelligence (AI), encouraged

E. Data products are fit-for-purpose and targeted at user needs



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Areas of WIPPS to be improved for EW4All

1. **Accessibility and discoverability of WIPPS products**
2. **Availability of WIPPS products**
3. **Guidance for accessing and utilising WIPPS products**

Early Warnings for All

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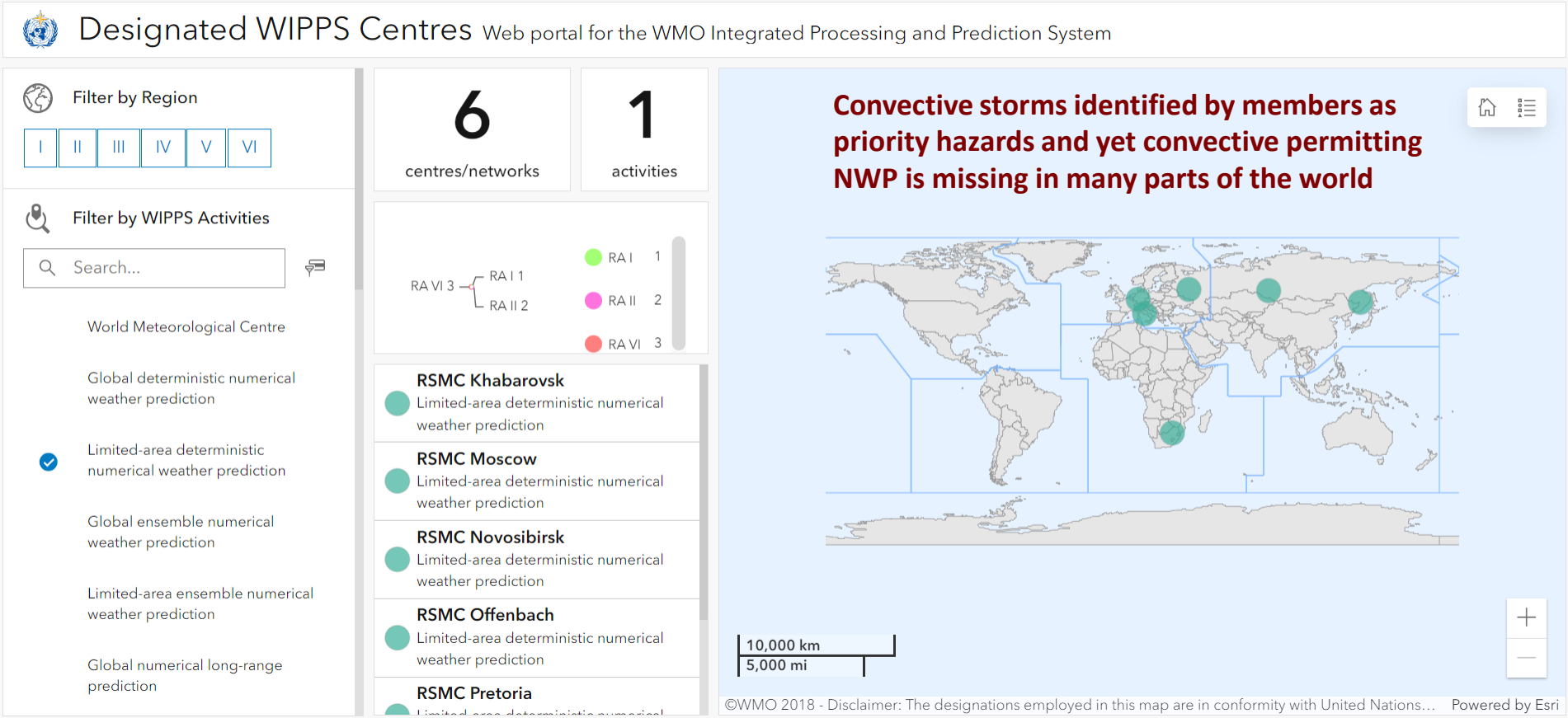
WMO IMO-WMO

WMO Integrated Processing and Prediction System (WIPPS)



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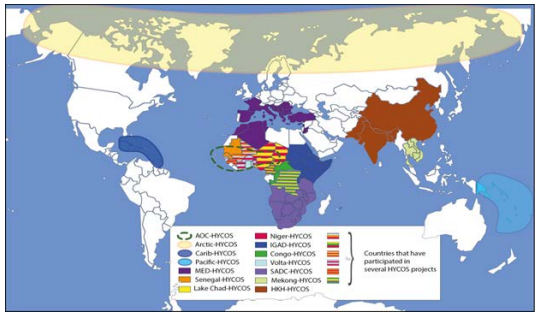
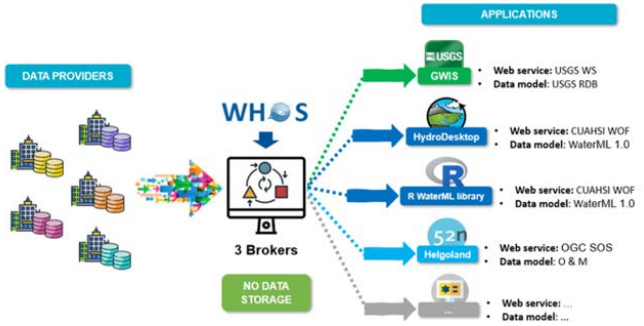
WMO activities on Hydrological observations

Data collection: WHYCOS and HydroHub, Project X

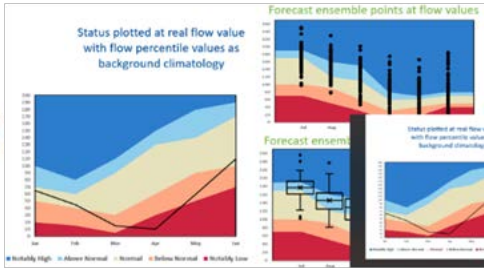


WMO HydroHub

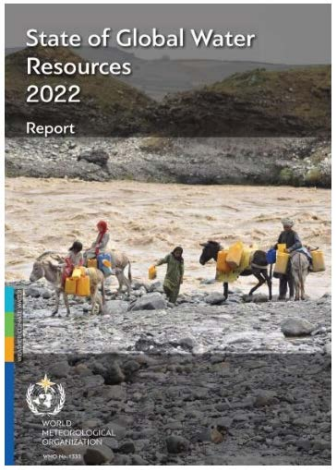
Data access and sharing: WHOS (tech) and WWDI (policy)



Data analysis: HydroSOS



Data products: annual global report



Priority developements

- User requirements approach
- Monitoring network design from global to national
- Data policy implementation, including outreach and communication (with support from World Water Data Initiative)

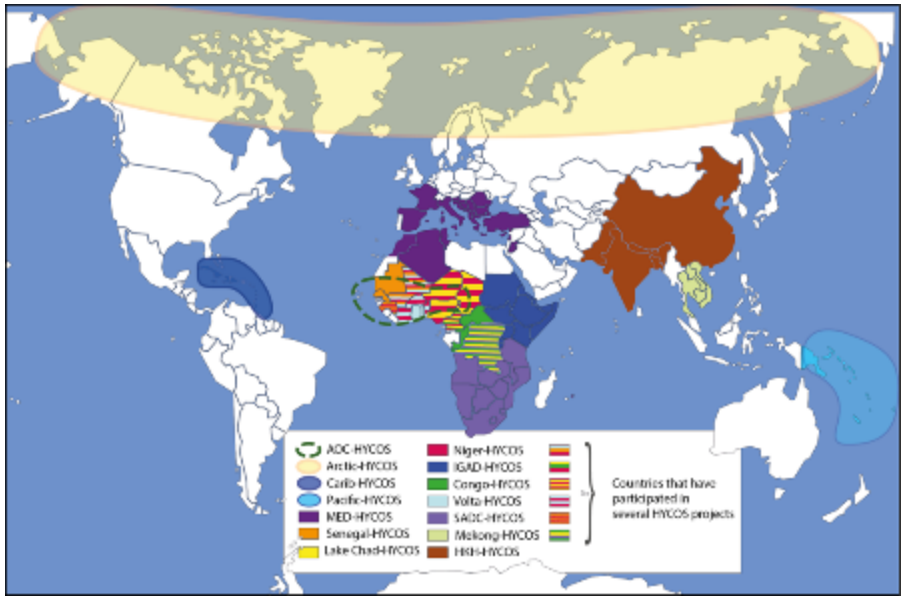
WMO IMO-WMO

WHYCOS World Hydrological Cycle Observing System

WHYCOS concept has been implemented through a two-pronged, fully integrated approach whereby

1) a **global coordination mechanism** provides the framework and general guidance, and

2) a series of HYCOSs, independent but coordinated, provide the implementation at the **river basin** or **regional level** to address the local specific needs.



- WHYCOS focuses on the development and enhancement of **water monitoring** and **information systems** across various segments of the hydrological cycle, including primarily the **quantity and quality** of **surface water** and **groundwater**

- Launched in 1993, over 15 regional components implemented
- Currently, most of the projects have usually broader scope than only HYCOS, also EWS and services and community level engagement

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WMO HydroHub

Overall Goal

Enhanced and sustainable monitoring and information support NMHSs' effective delivery of hydrological services for disaster risk reduction, social and economic development, and environmental protection

- **Happy to discuss implementation!**

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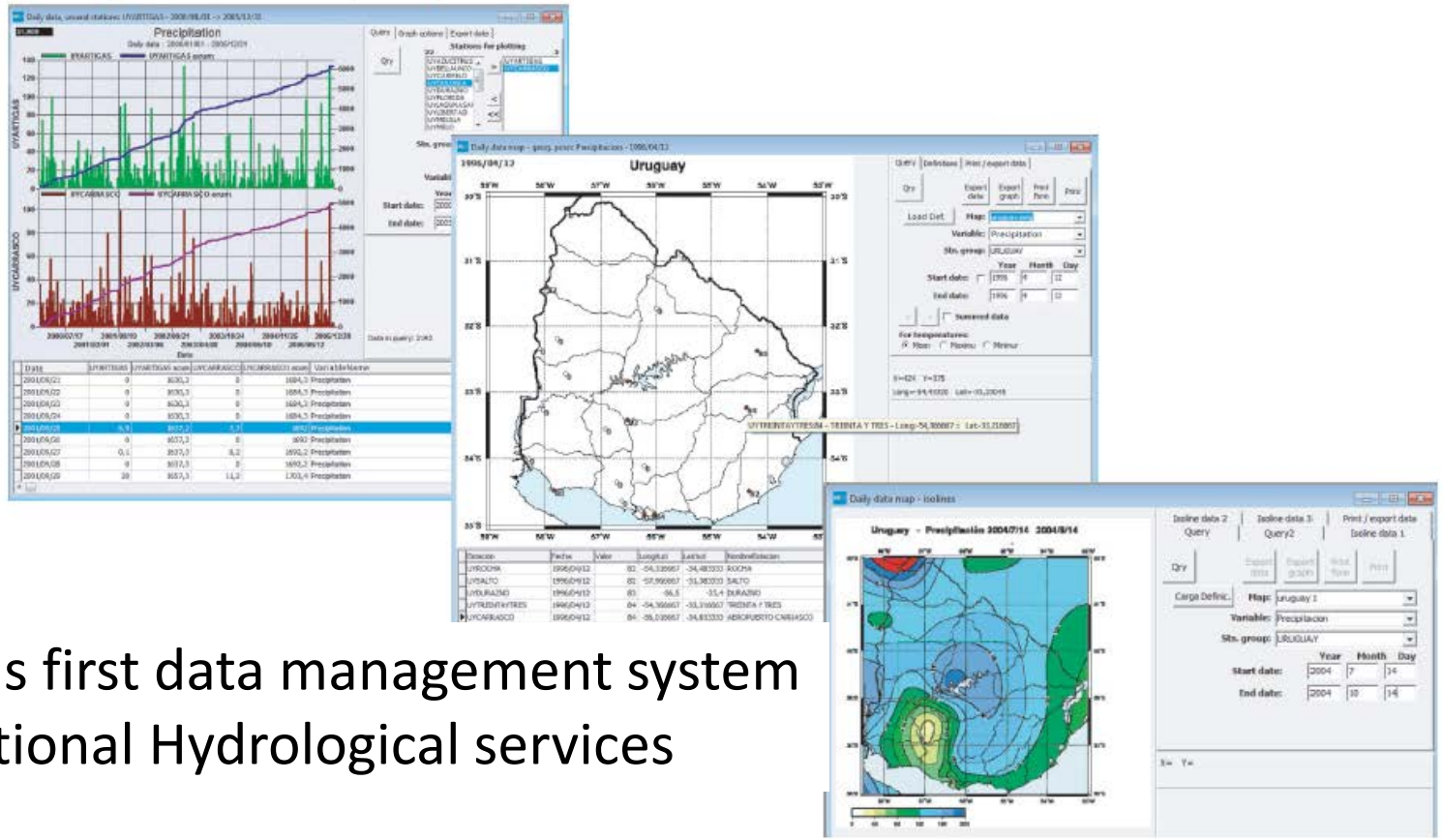
Meteorological, Climatological and Hydrological Database Management System (MCH)

- Graphs, tables, maps



MCH as first data management system for National Hydrological services

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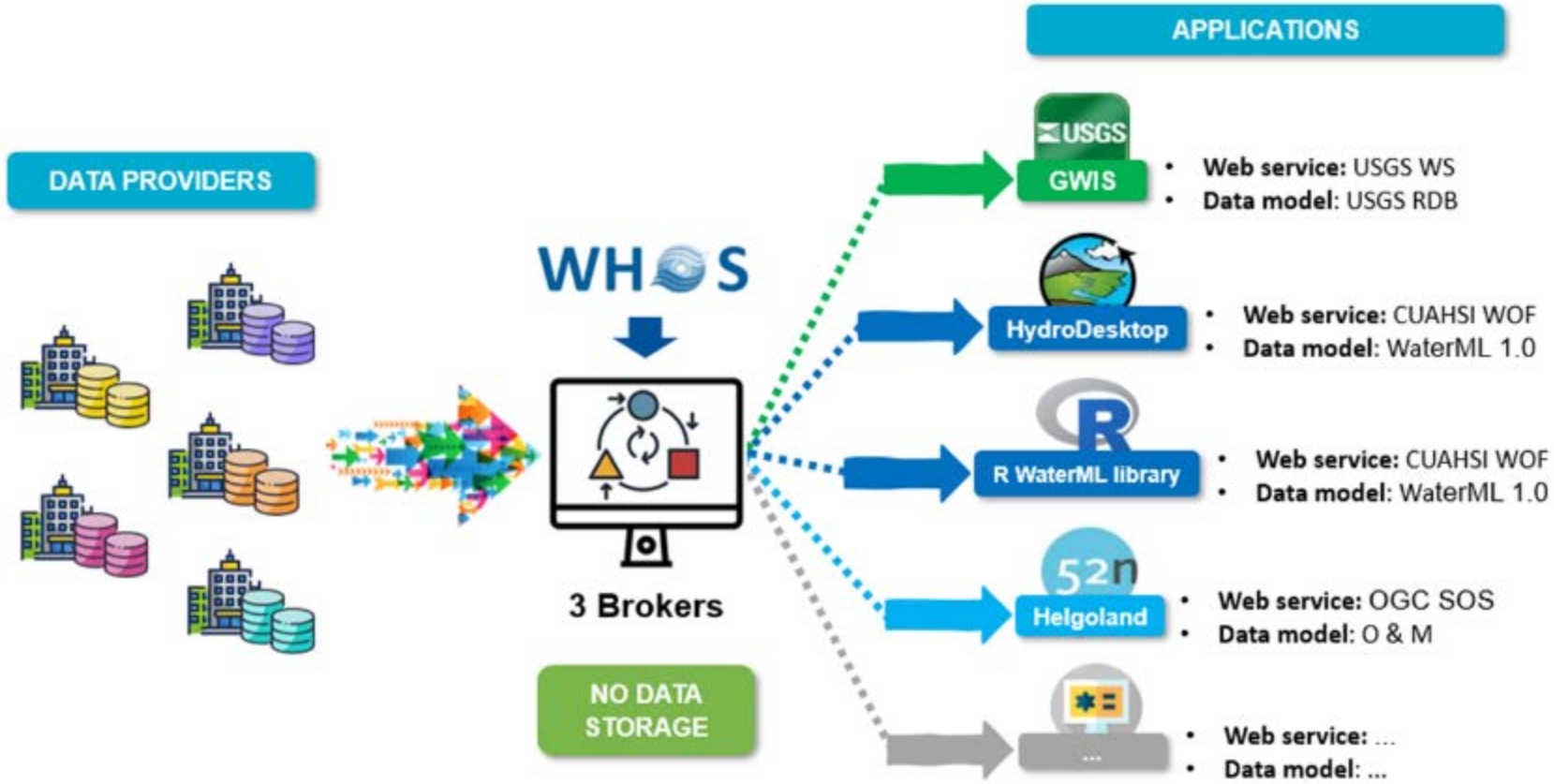
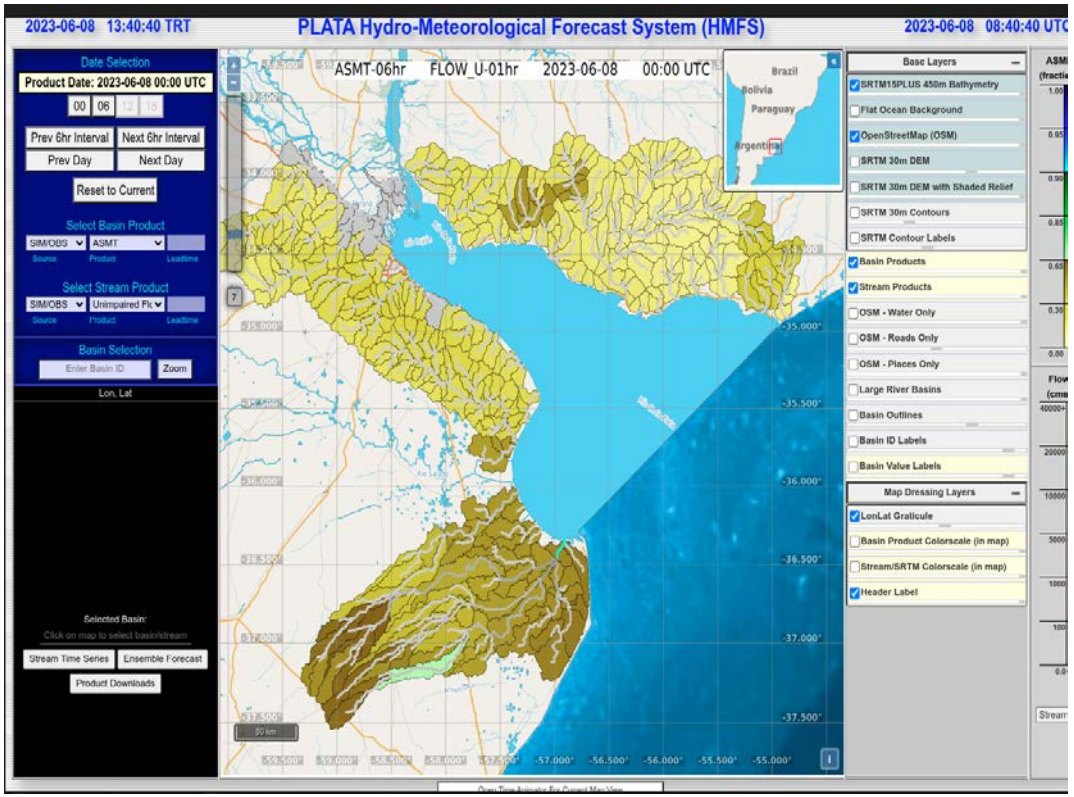
WMO Hydrological Observing System (WHOS)



WHOS Linkage to Forecasting System



- WHOS supports data:
  - PROHMSAT Plata (hydrometeological forecast and Early Warning System
  - Decision Support System of la Plata (DSS) developed by the 5 countries in La Plata Basin and the CIC Plata
  - Uruguay importing hydrometeological data from Argentina and Brazil

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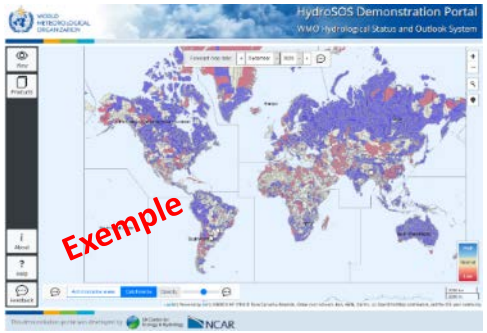
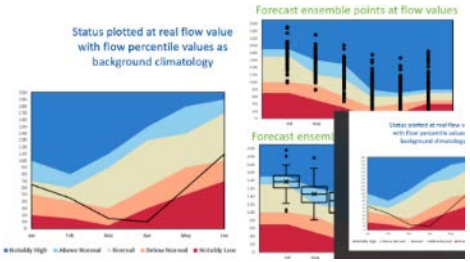
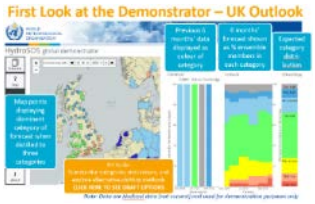
HydroSOS: Assessment of the current and next-future situation of the hydrological cycle at all scales





- For and by national hydrometeorological services
- Data platform: in situ and satellite
- Global and regional models



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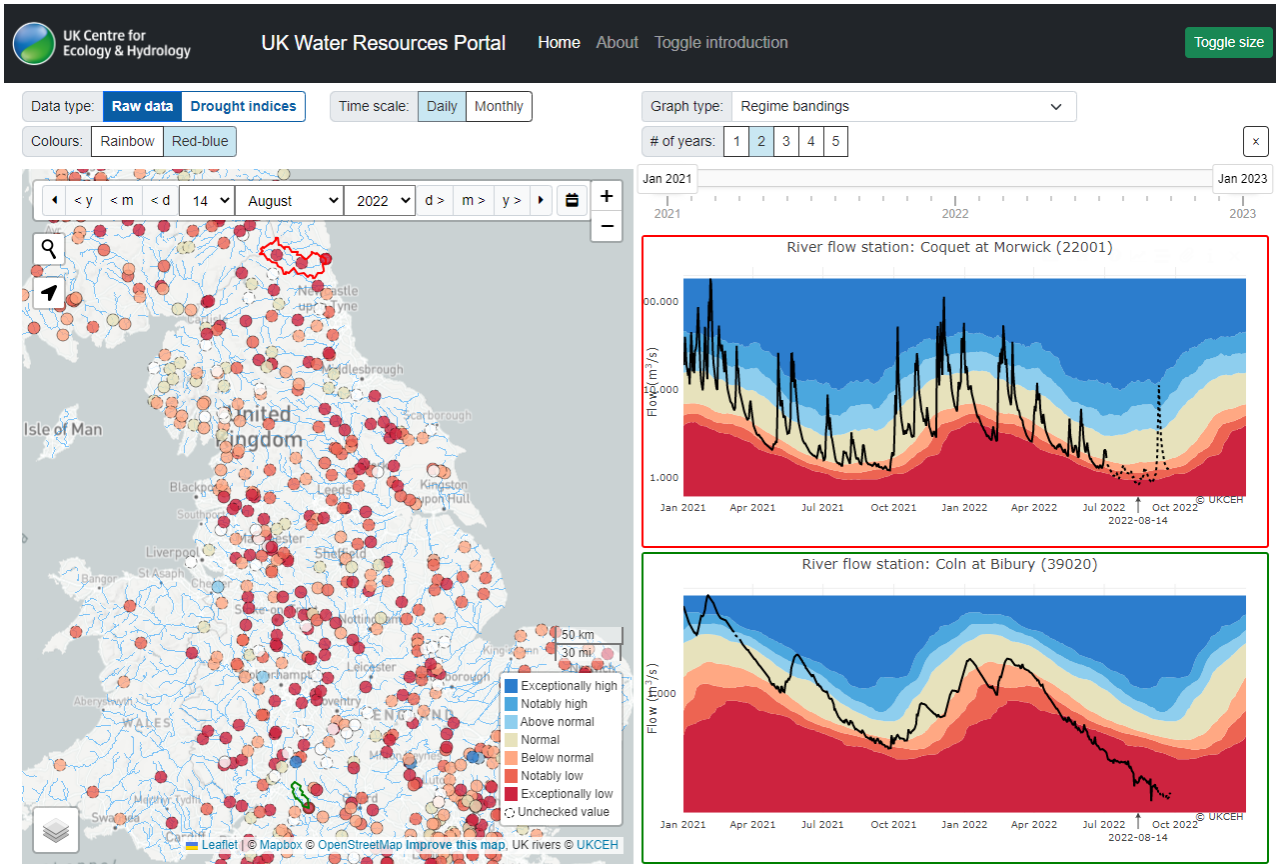
Hydrological Status : Examples - Streamflow



https://eip.ceh.ac.uk/hydrology/water-resources/

Courtesy: Alan Jenkins, CEH, Oct 2022

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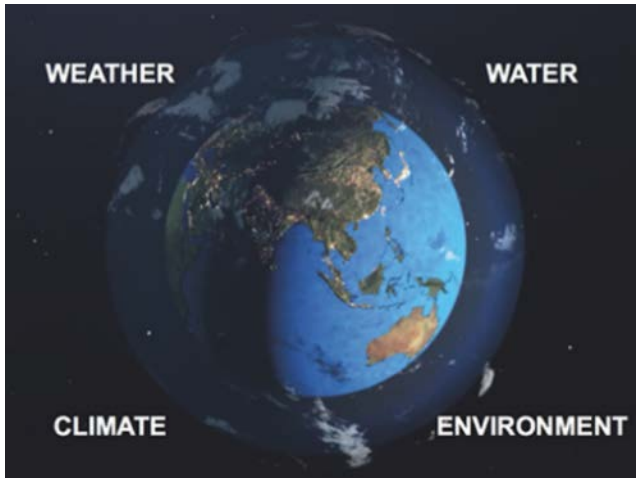
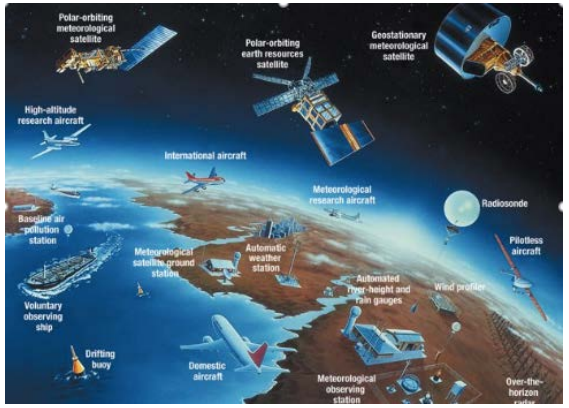
Conclusions: Hydrology as key part of the Earth system monitoring, contributing to EW4A





Practical, interoperable tools and standards across all Earth domains for

- Observing systems
- information systems
- Modeling and forecast
- Across time and space scales
- **All WMO Members and partners**

- **WMO unified data policy**
- **Global observing network**

Thank you
Gracias
Merci

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