

The WMO HydroHub : Innovation is the new tradition

Dominique Berod, Florian Teichert, Sophia Sandström, Iwona Piechowiack, Johannes Cullmann (all WMO), Andreas Steiner (Swiss SDC)

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU



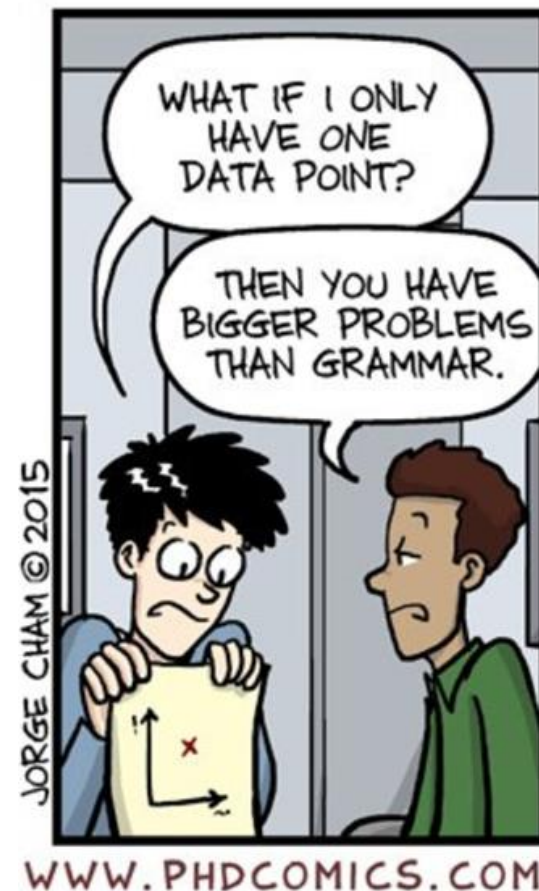
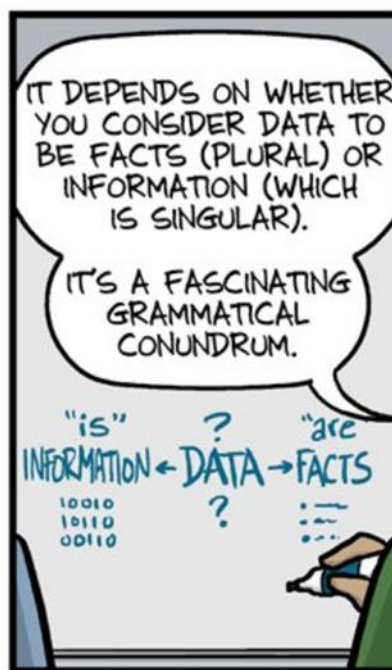
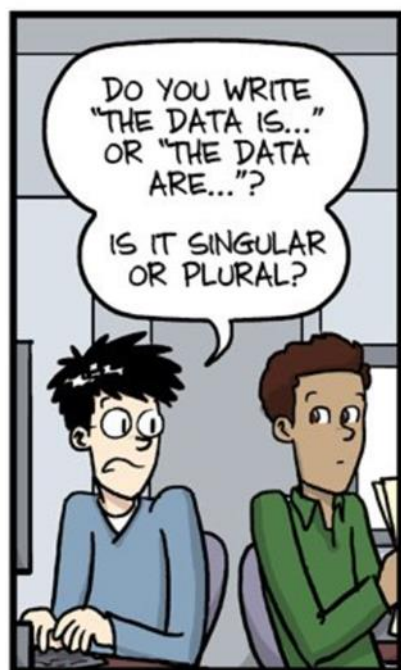
IAHS Scientific Assembly 2017
10–14 July 2017
Port Elizabeth, South Africa



WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

It's about Hydrological Data

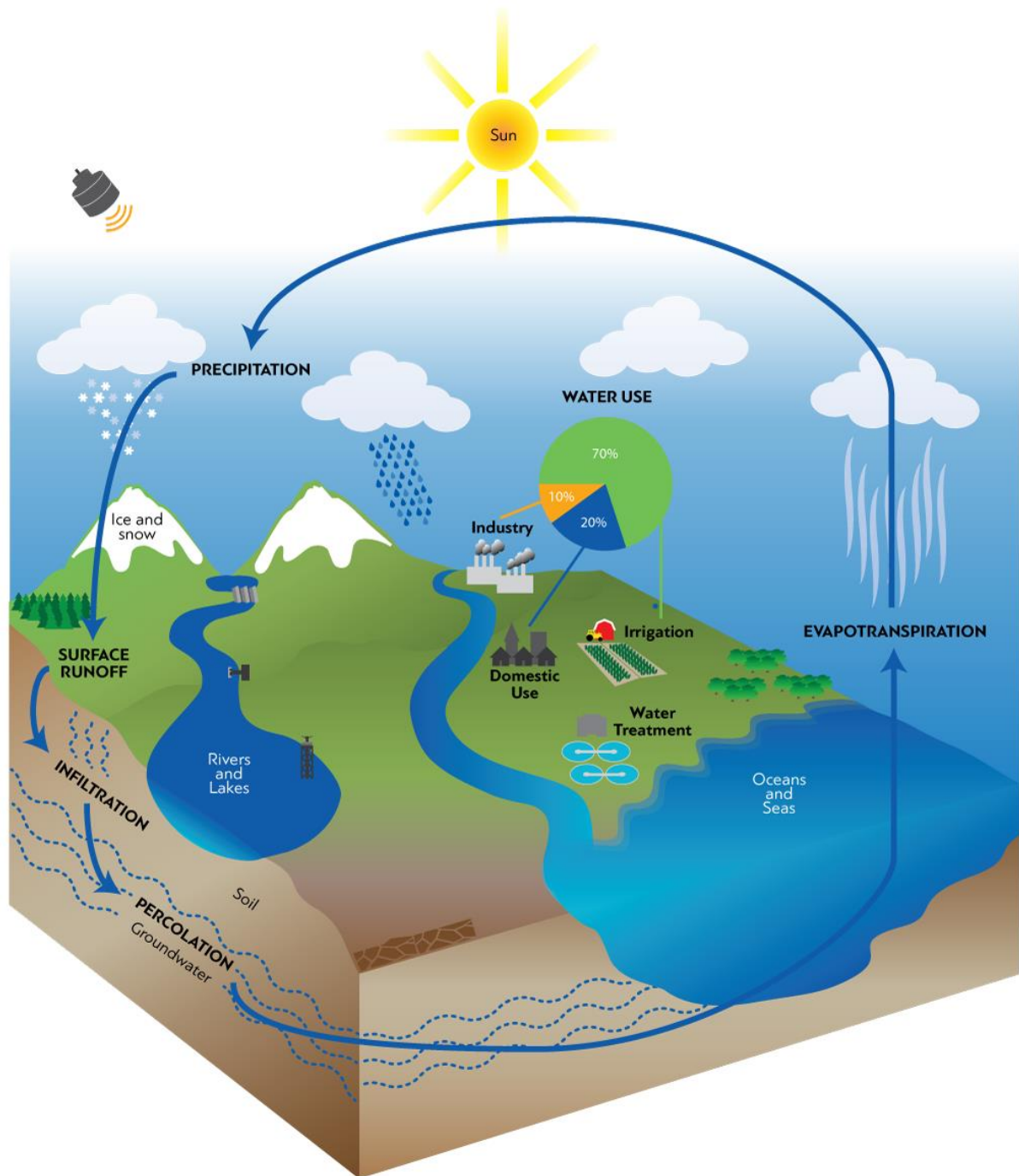


Messages

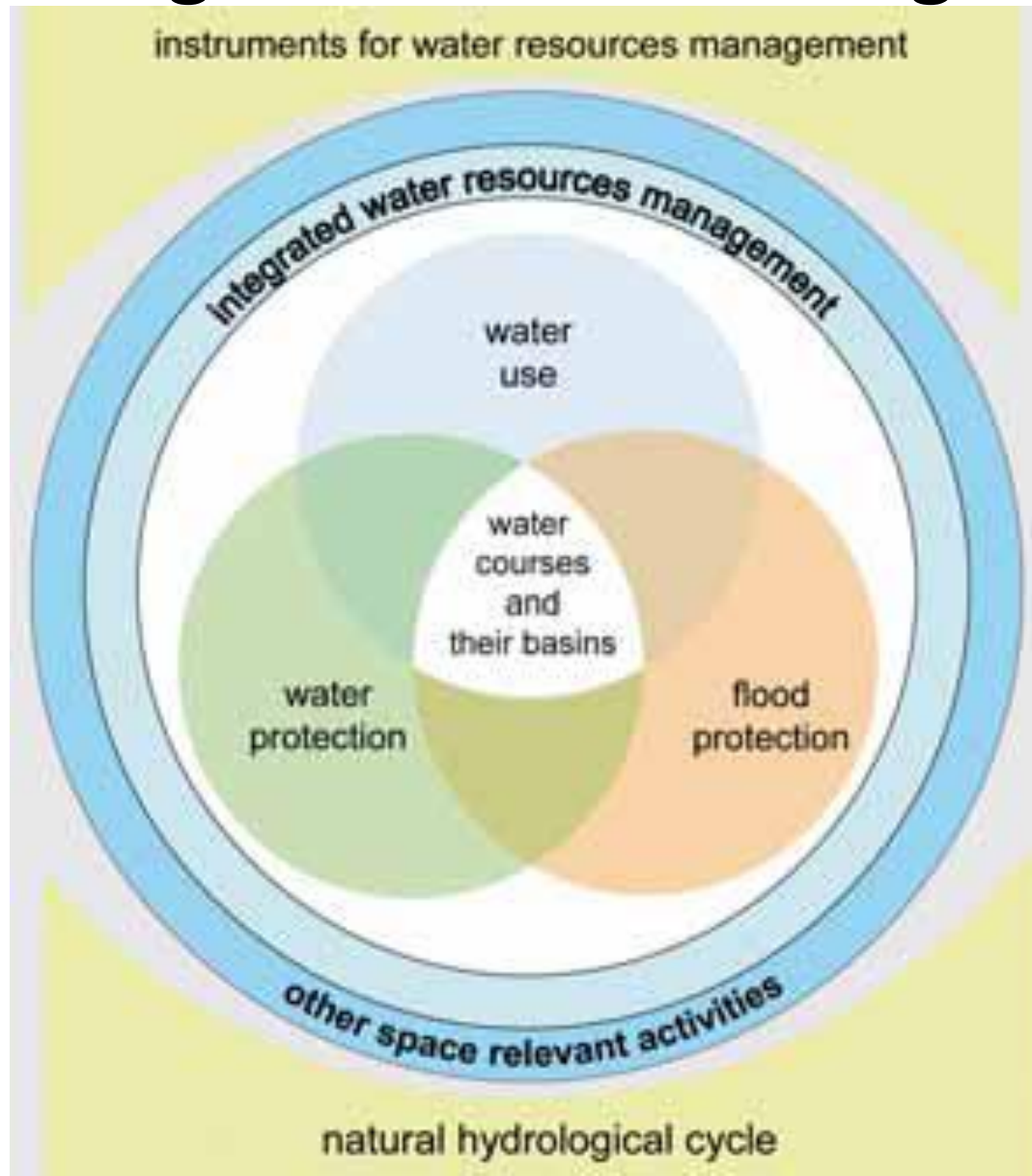
- **Water complexity: sound decisions based on appropriate data: a value chain**
- **Innovation is crucial for the future of Hydrology**
- **Multidisciplinary Cooperation and dialog is a key**
- **WMO as a partner**



Hydrological cycle Complexity

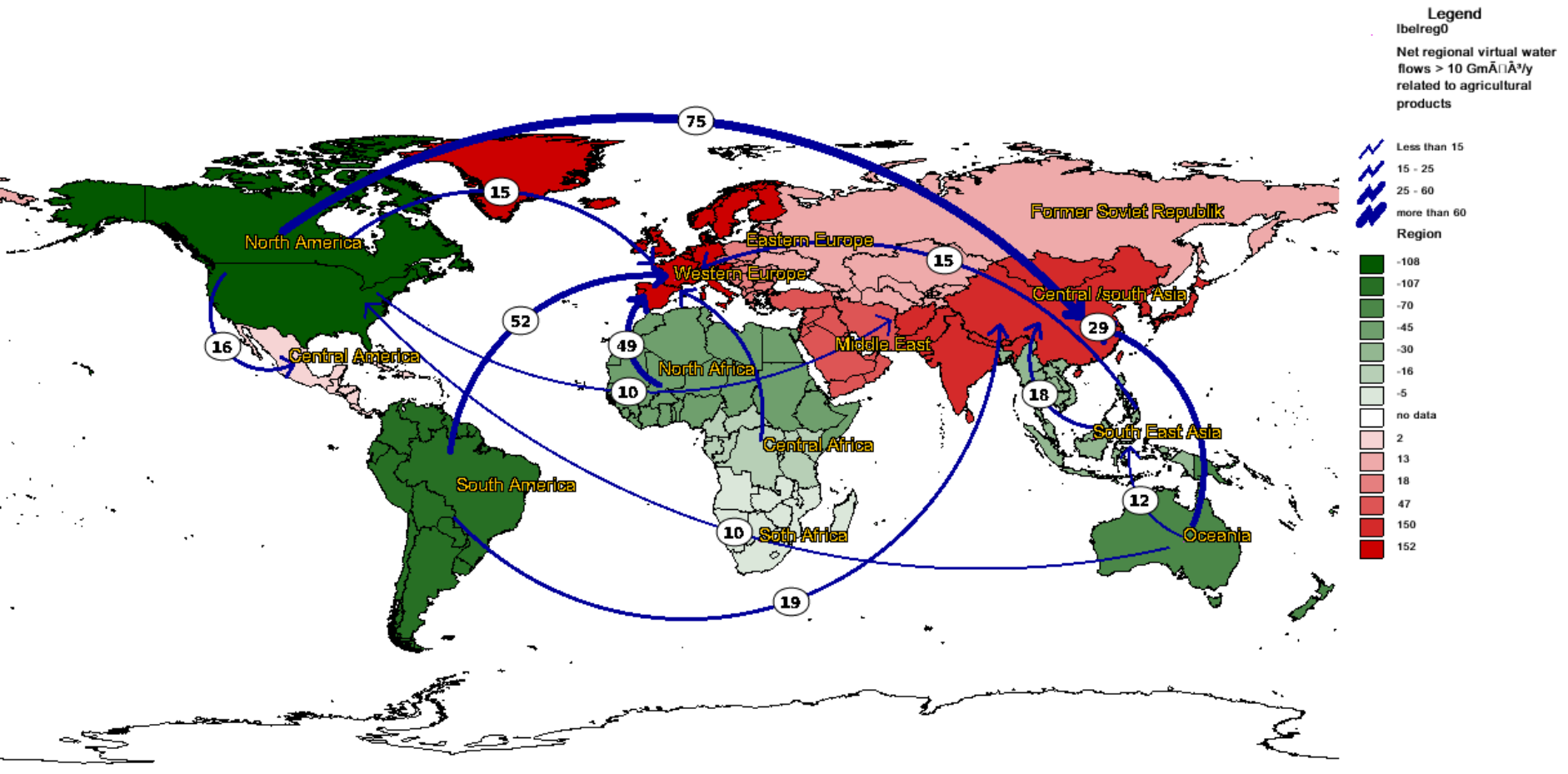


Towards integrated Water management



Swiss Federal Office for the Environment

Virtual water flows balance



Source: GWSP Digital Water Atlas <http://atlas.gwsp.org/>

The World Meteorological Organization

- “As a specialized agency of the United Nations, WMO is dedicated to **international cooperation and coordination** on the state and behaviour of the Earth’s atmosphere, its interaction with the land and oceans, the **weather** and **climate** it produces, and the resulting distribution of **water** resources.”





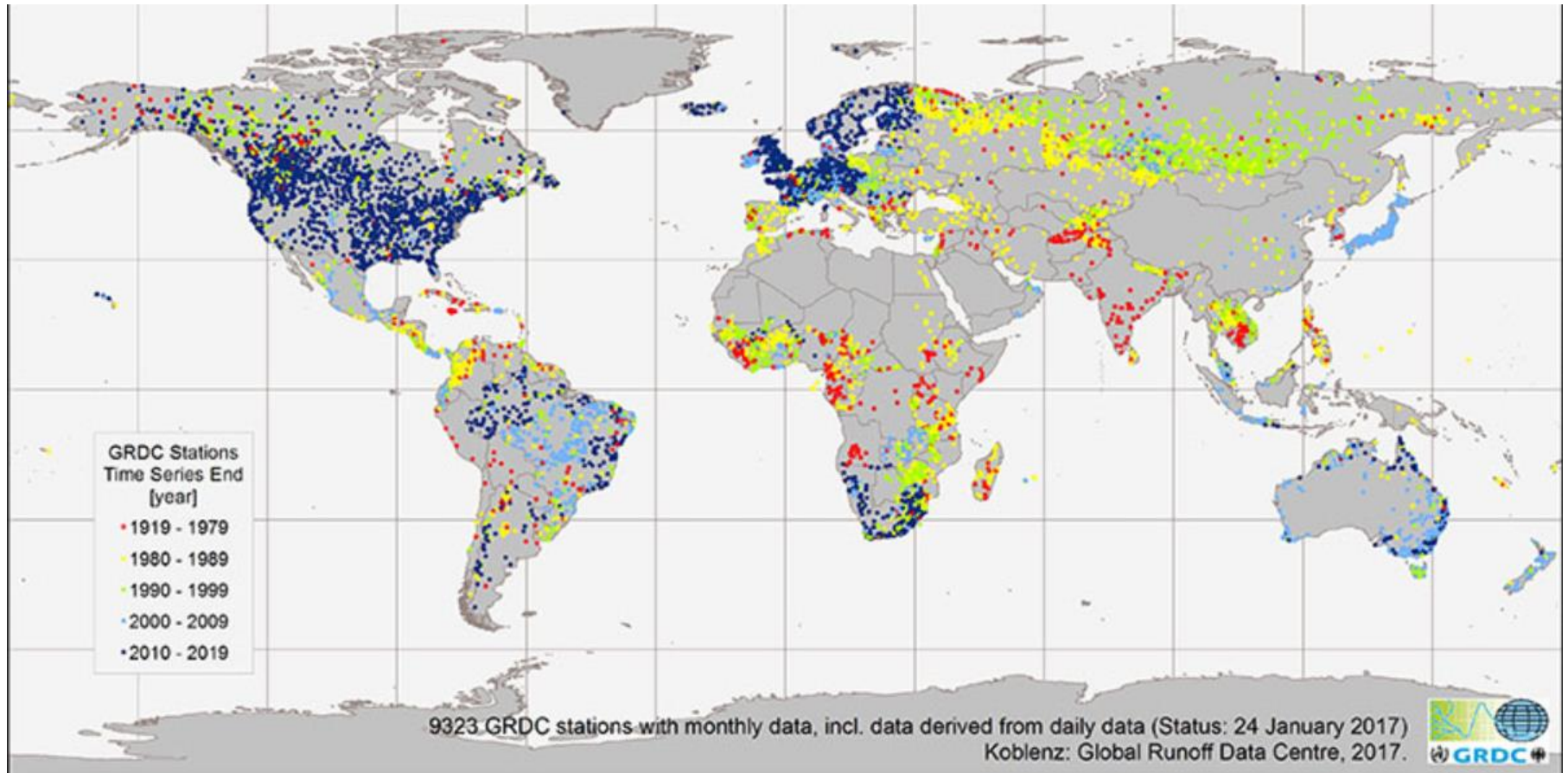
WMO Activities in Basic systems in Hydrology



DATA PRODUCTION & COLLECTION	DATA PROCESSING & STORAGE	DATA VISIBILITY & AVAILABILITY	DATA RESCUE & SERVICES
<p>World Hydrological Cycle Observing System (WHYCOS)</p> <p>Standardisation and quality management QMF</p>	<p>Meteorological, Climatological and Hydrological (MCH) Database Management System</p>	<p>WMO Hydrological Observing System (WHOS)</p> <p>Global Data Centers</p> <p>WaterML 2.0</p>	<p>Global Data Centers:</p> <p>Global Runoff Data Centre (GRDC), International Data Centre On Hydrology Of Lakes And Reservoirs (HYDROLARE) & International Groundwater Resources Assessment Centre (IGRAC)</p>

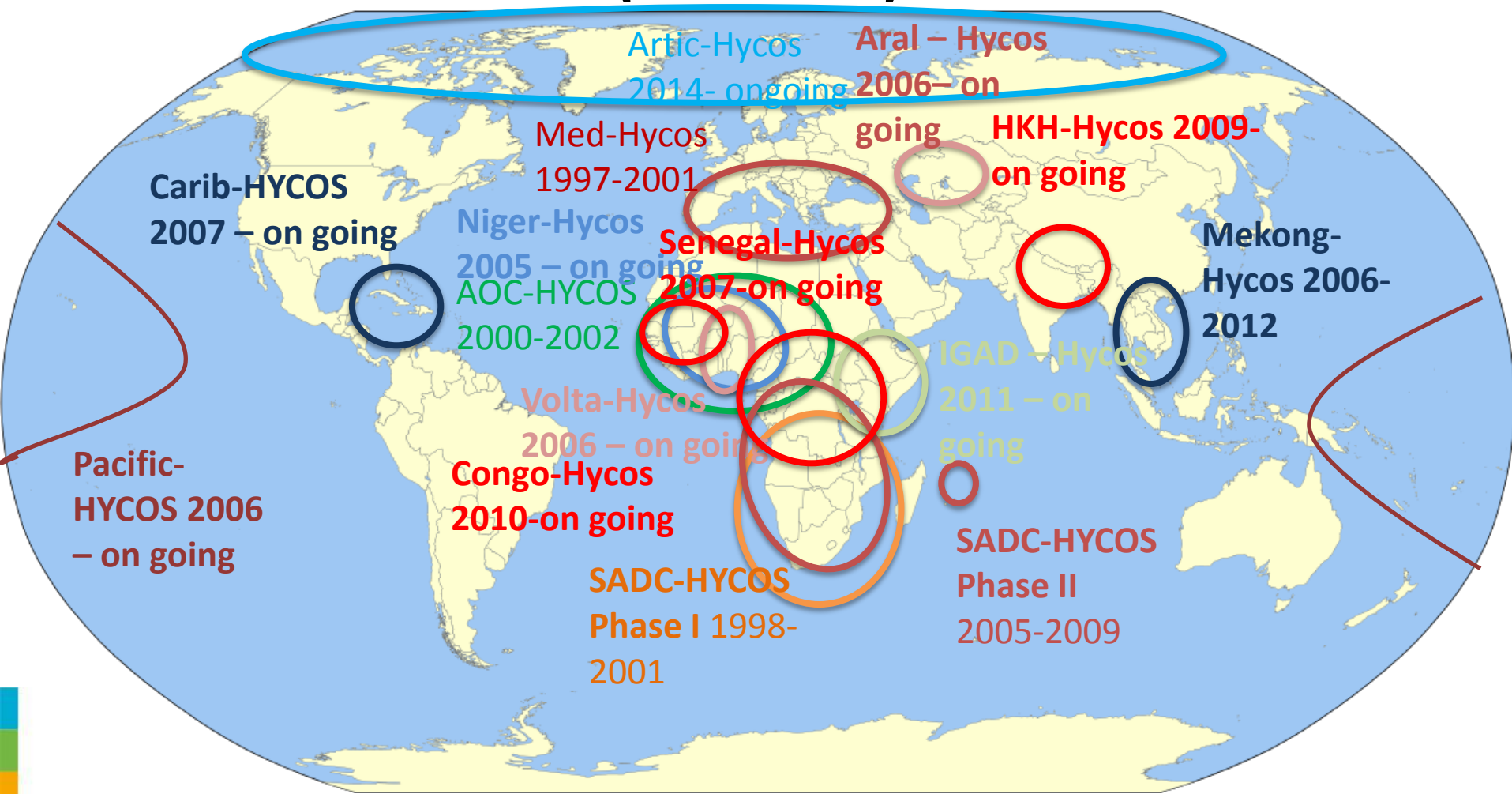
HYDROHUB, the WMO GLOBAL HYDROMETRY SUPPORT FACILITY

National hydrometry networks

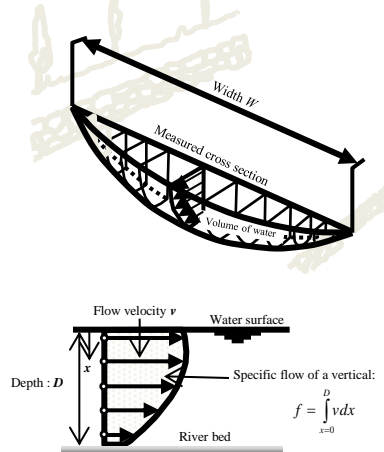


Hydrometry networks are: 1. Essential and 2. Insufficient

The World Hydrological Cycle Observing System (WHYCOS)



EXAMPLE OF FLOW MEASUREMENT

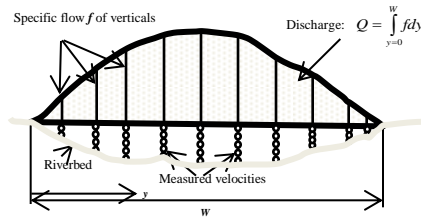


Diameter: 12 cm
 Slope: 0.25 (1 rotation equals 0.25 m)
 Velocity max: Normally calibrated to 5 m / s but higher velocities up to 10 m/s would be feasible.
 Velocity min: about 3 cm / s



Current meter 4 cm diameter mounted on a rode from a tripod.

12 cm diameter rotor mounted on the sinker (55 kg)



Diameter: 8 cm
 Slope: 0.25 (1 rotation equals 0.25 m)
 Velocity max: Calibrated to 4 m / s higher velocities are not feasible.
 Velocity min: About 4 to 5 cm / s



Current meter 8 cm diameter mounted on a bar transported by a cable way.

Current meter 12 cm diameter mounted on a sinker from a bridge.



Diameter: Three 4 cm rotors
 Slope: 0.010, 0.025 and 0.050 for the three different rotors
 Velocity max: Calibrated to 3.5 m / s higher velocities are not recommended.
 Velocity min: About 5 cm / s



EXAMPLE OF MEASURING STATIONS



Hydrometry at WMO - Challenges

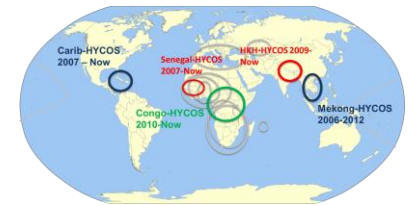
- Low visibility and recognition of Hydrological Services
- Insufficient Capacity of current monitoring networks
- Need for a change in mindset
- Decision-making processes need to be supported by reliable data and information
- Long-term data collection
- Lack of good quality data

Innovation in the last decades

1993



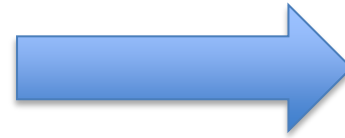
2003



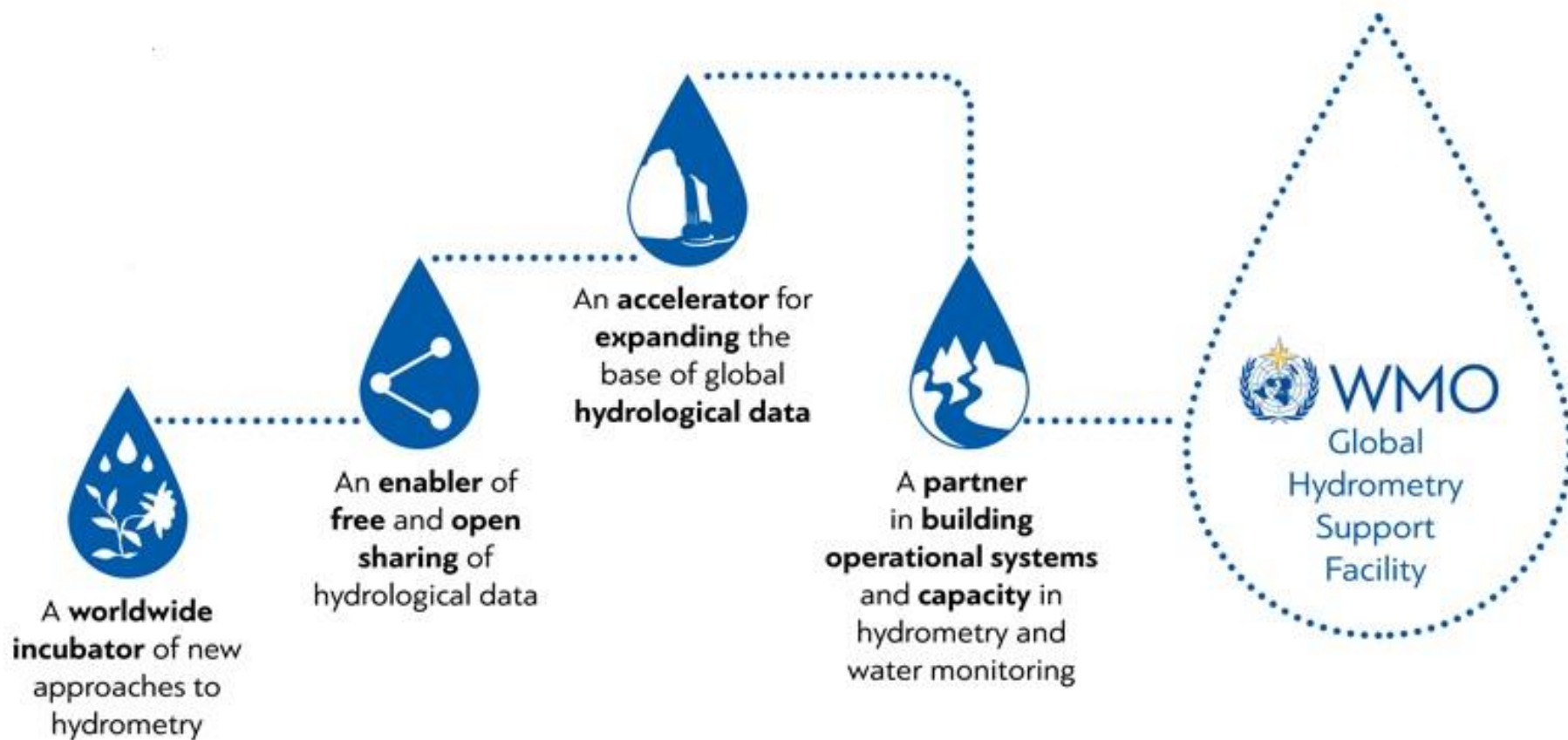
2017



Hydrometry wants to benefit from emerging technologies



New paradigm for Hydrometry



Innovation
scouting, co-design (annual calls),
piloting, proofing

Innovation domains

- Sensors
- Better use of satellite information
- Citizen observatories
- Information systems
- Transforming data and information into knowledge for decision makers
- Open data policy and transboundary data sharing



INNOVATIVE MEASUREMENT

IMOMO



Development of Low-Cost Innovative Technology to Expand Surface Observation Networks in Data-Sparse Regions



Project Team: Paul Kucera and Martin Steinson, UCAR/COMET, Boulder, CO

Goal: Build capacity to reduce hydrometeorology-related risk in data sparse regions by improving observation networks and early warning systems

Technology: Use 3D printers, micro-sensors, and single board computer technology to provide a low-cost, reliable observation platform that is assembled locally;

“Print and replace” components locally as needed

Partnerships: HydroMet Offices, GLOBE, local schools, and Universities

Networks: Kenya, Zambia, Caribbean, USA and Europe

3D-PAWS Platform



Real-time data access:
<http://3d.chordsrt.com>

3D-Printed Automatic
Weather Stations (3D-PAWS)



★ Current Deployment

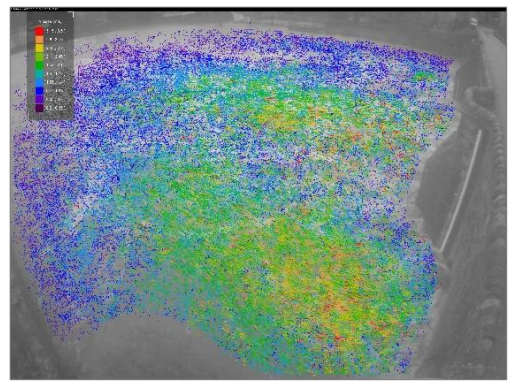
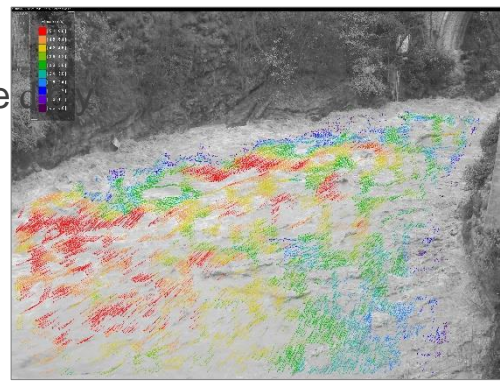
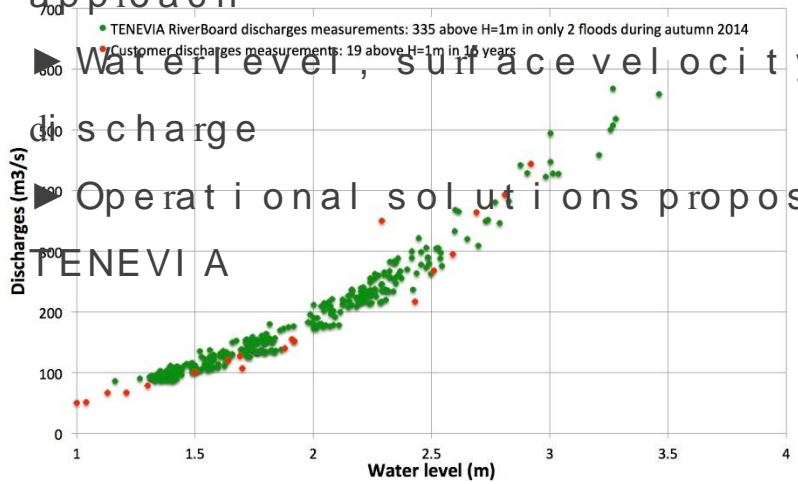
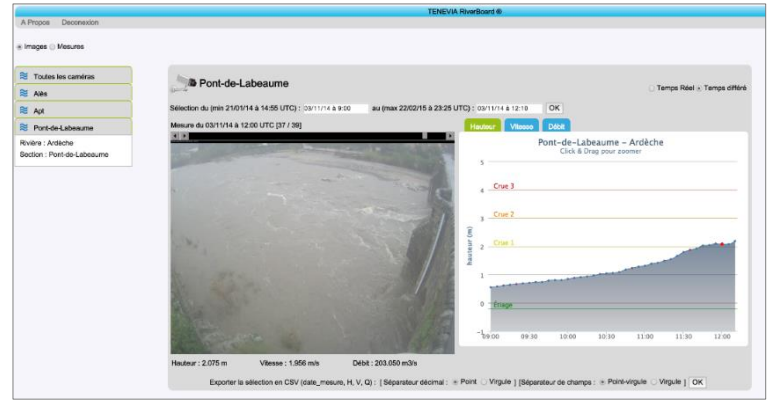
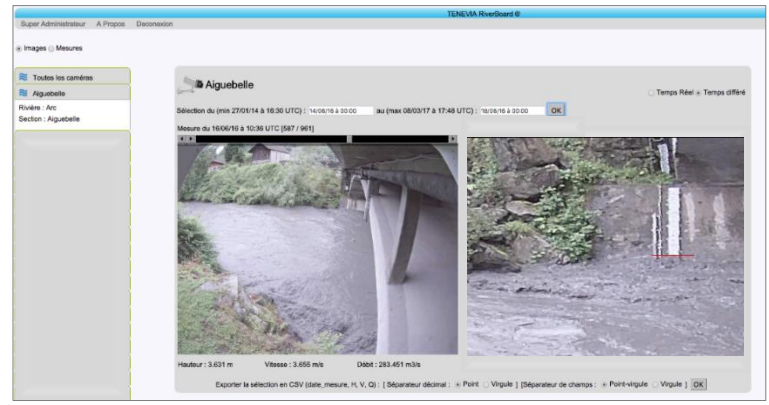


RiverBoard

Awarded from UNO ([UNISDR](#))



- ▶ Continuous with stationary network video surveillance camera
- ▶ Punctual and mobile with any digital camera
- ▶ Non-contact, intuitive and verifiable approach



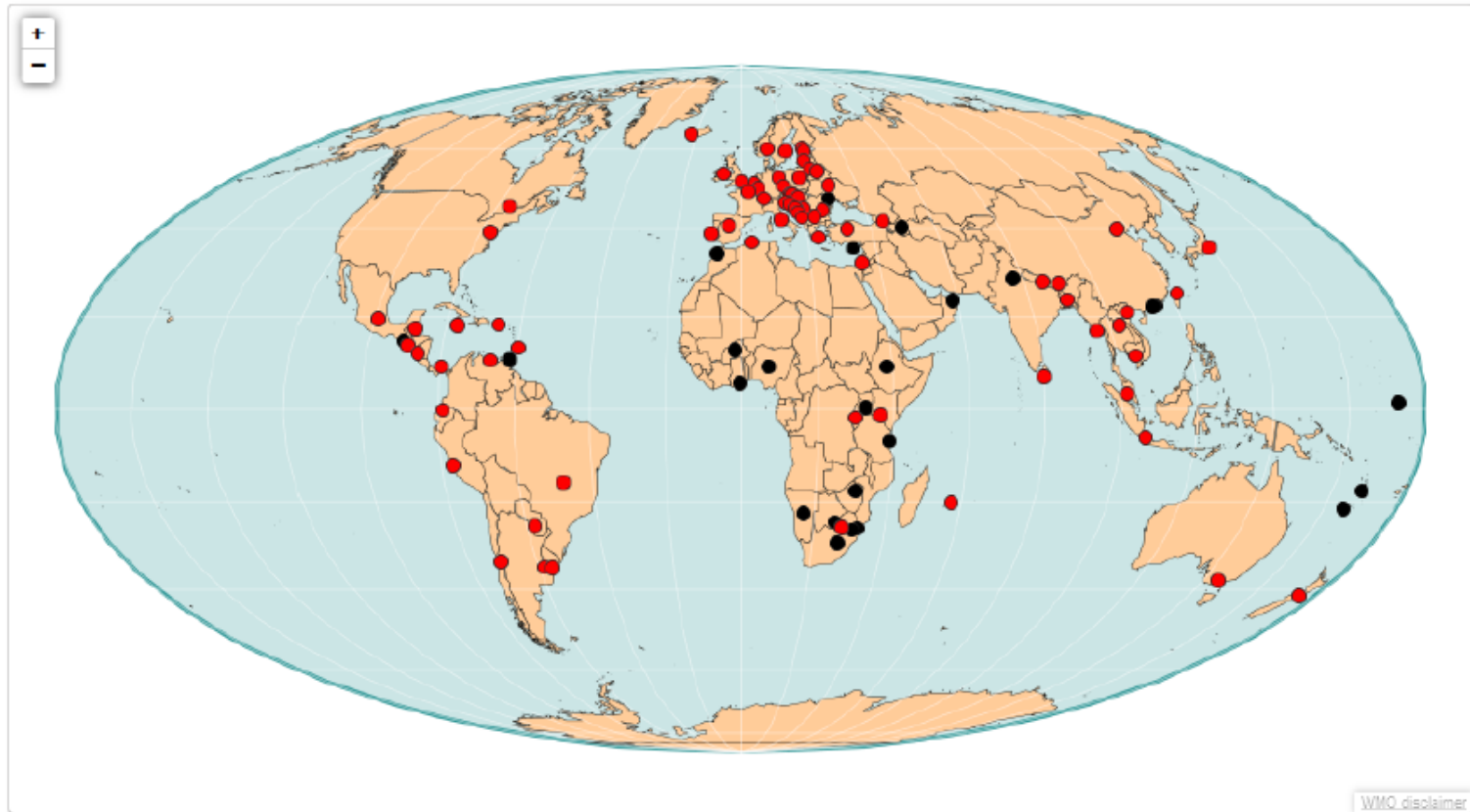
Operational solutions proposed by TENEVIA

WHOS WMO Hydrological Observing System

WHOS is a portal to the online holdings of National Hydrological Services (NHS) around the world that publish their data without restrictions or cost. It represents the hydrological component of the WMO Integrated Global Observing System (WIGOS).

Access to the data comprising WHOS can be obtained via map-based links on the following map. Red dots appear in countries where the National Hydrological Service makes data available from its website. Black dots appear in countries where the National Hydrological Service has a website, but where hydrological data are not available.

Please note that NHS websites appear in the native language of the country, although some NHSS translate parts or all of their websites into English or other languages.



<http://www.wmo.int/pages/prog/hwrp/chy/whos/index.php>

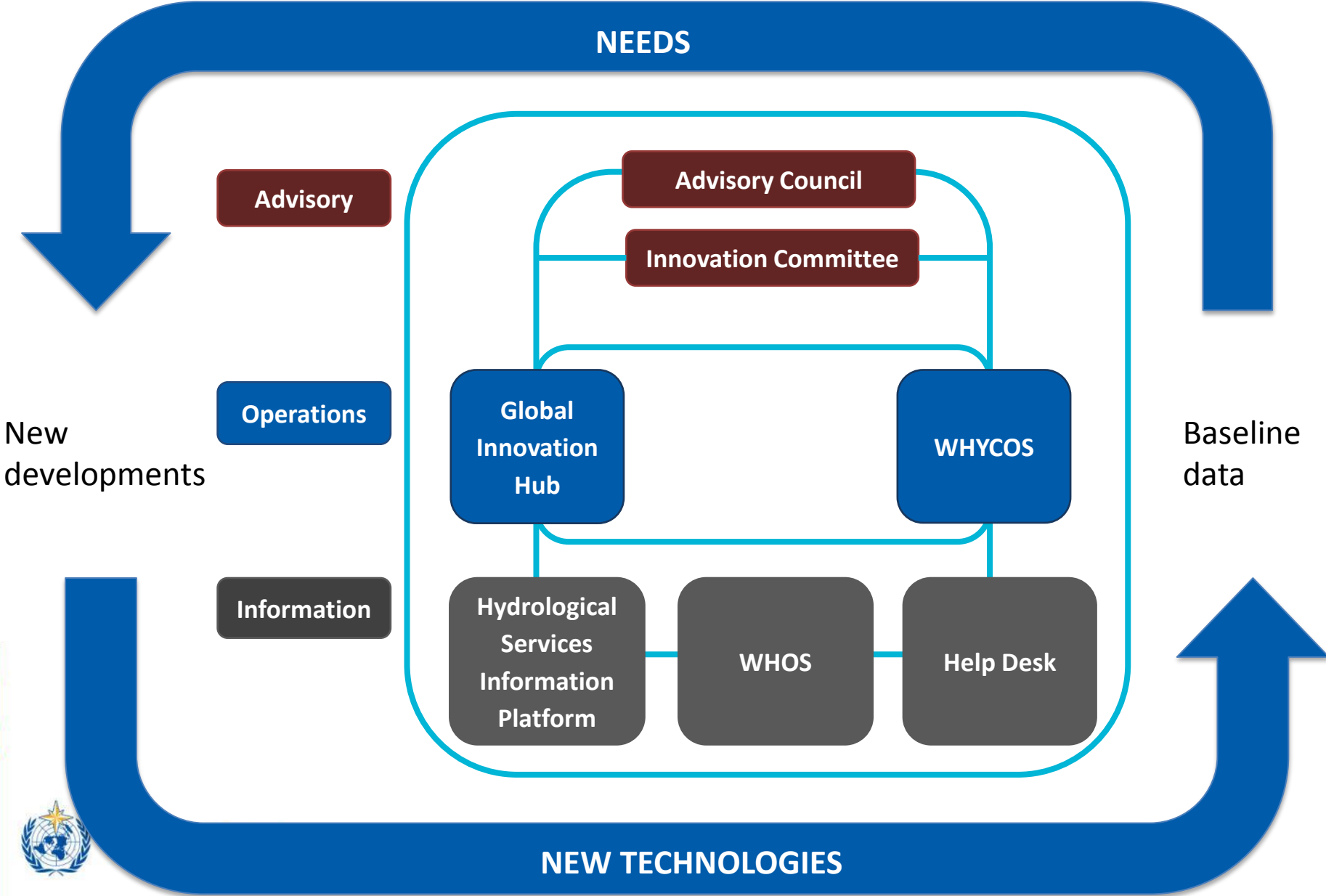


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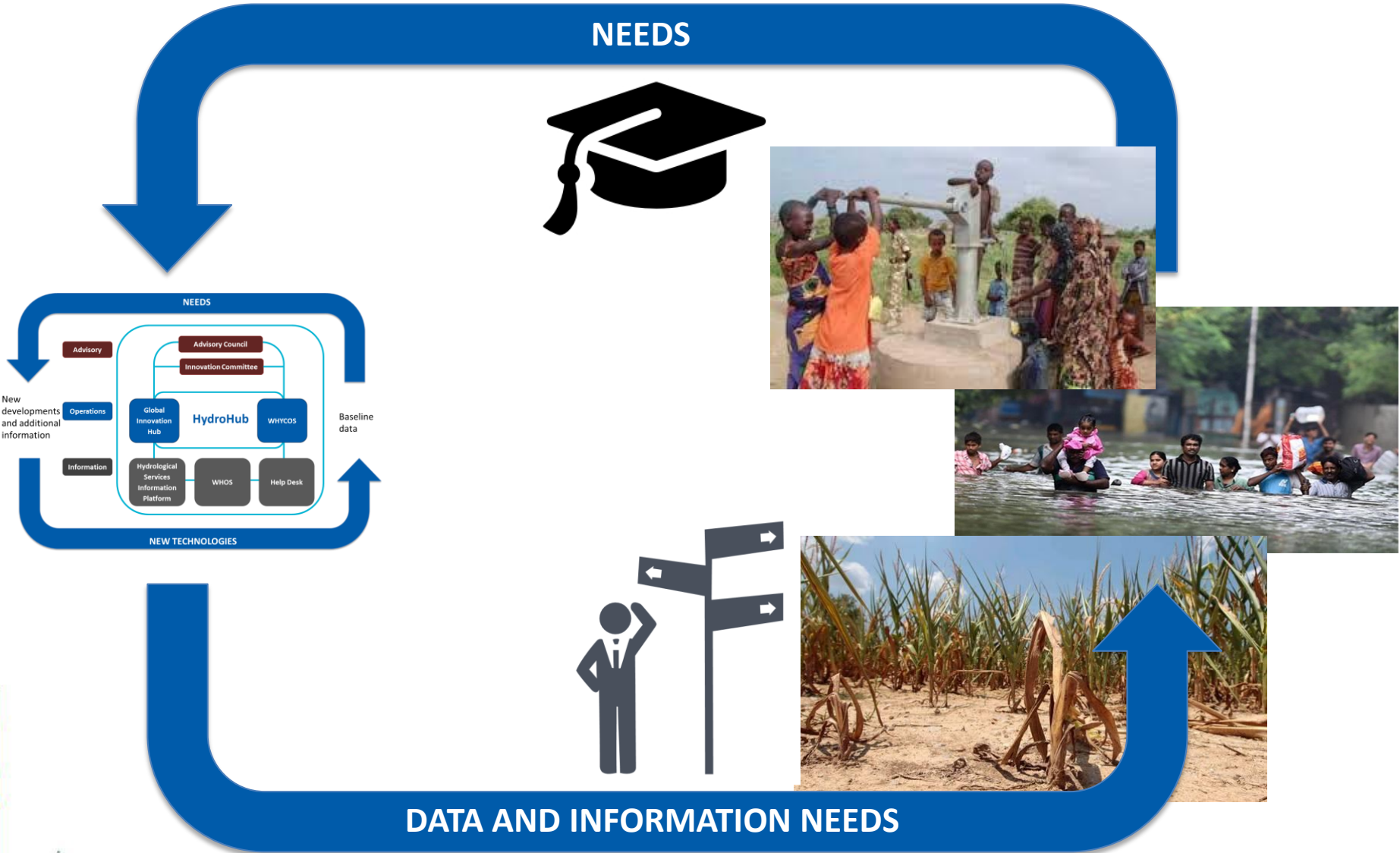
Hydrologic Information System in the Plata basin



HydroHub – Structure



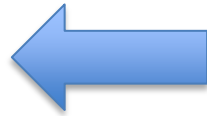
Monitoring as a support for Water Challenges



HydroHub - Activities in 2017

- Preparation of the first innovation call
- Support of H2020 proposals
- New HYCOS projects (e.g., Eastern Africa and Senegal)
- Outreach material
- Preparation of a Innovation workshop with IAHS-MOXXI
- Reaching out to partners

Innovation and creativity



Conclusions

- **Water is a complex system: no good decision without good information: data are central but too scarce**
- **New problems require new solutions: innovation is a must**
- **Different partners and stakeholders, same interest: collaboration and coordination are key**
- **WMO supports global, regional and national efforts in hydrology**



Thank you Merci



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