

WEATHER CLIMATE WATER

TEMPS CLIMAT EAU



WMO OMM

World Meteorological Organization

Organisation météorologique mondiale

WMO Hydrological Status and Outlook System (HydroSOS)

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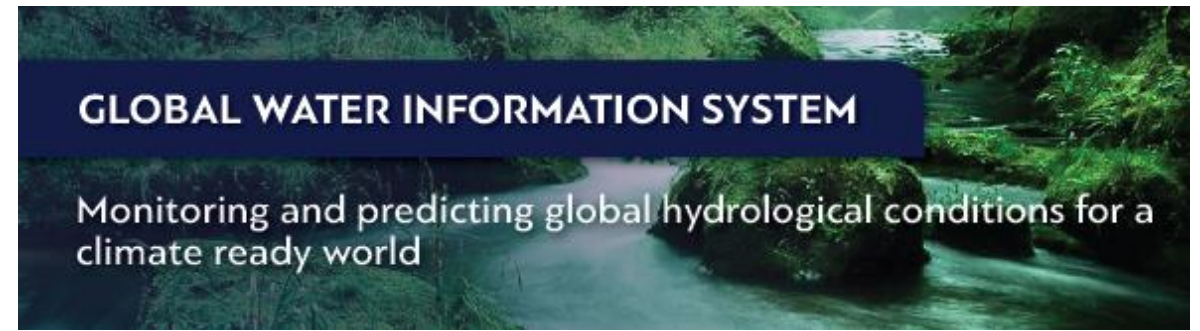
**United Nations/GHANA/PSIPW – 5th International
Conference on the Use of Space Technology for
Water Management**

10th to 13th May, 2022

Agenda

- HydroSOS Initiative and overview
- Use of Satellite products to assess hydrological status and Outlook
- Global Water Report and the use of satellite products
- Contributions from the satellite community

Global Water Information System

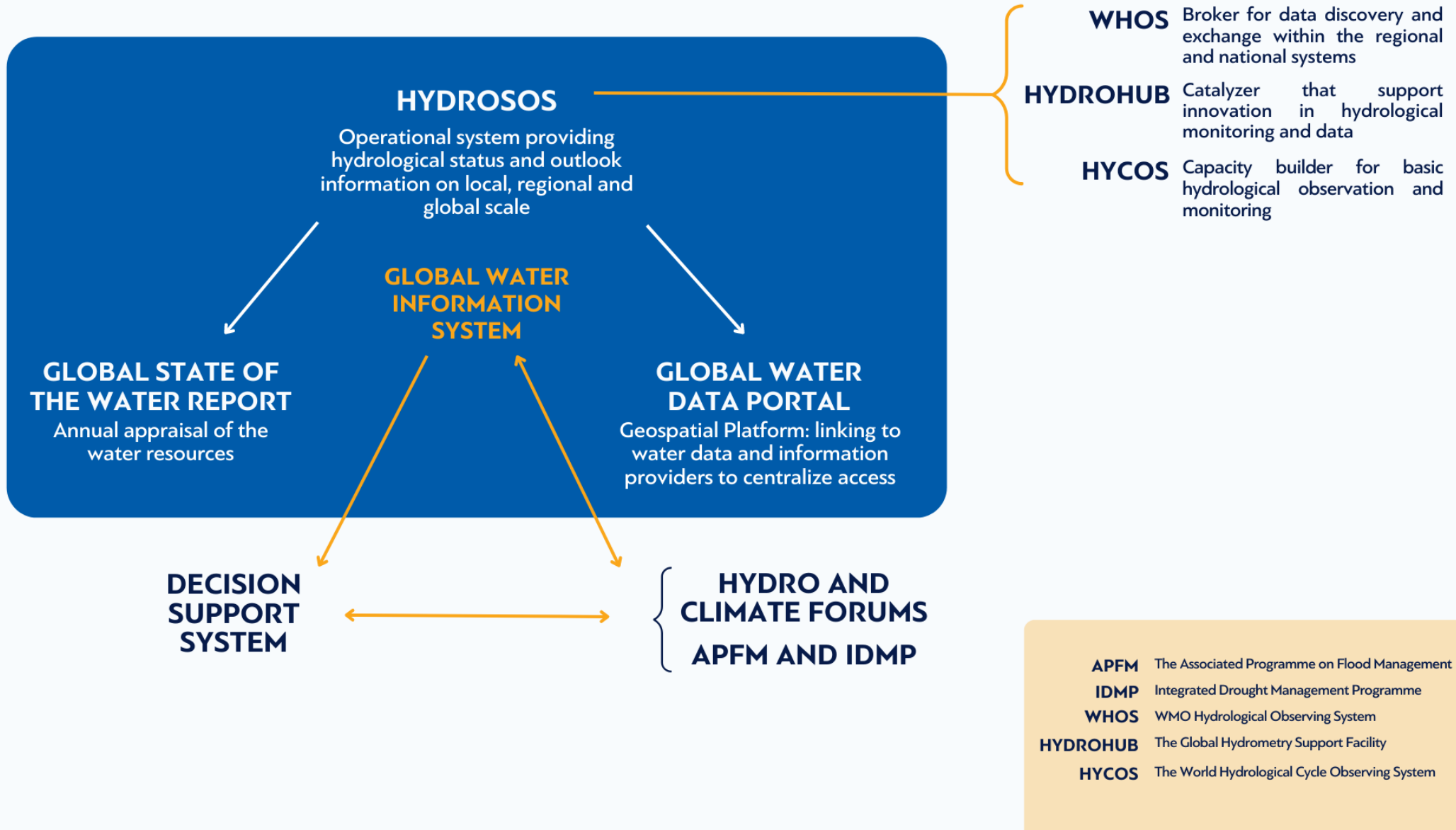


- A global system that is interconnected and helps us and future generations to better understand how global hydrological systems change with changing climate and through human management of water systems and land surfaces.
- For monitoring and managing the water resources
- For providing water resources assessments and outlooks

3 components:

- I. The Global Hydrological Status and Outlook System
- II. Annual Global State of the Water Report
- III. Global Water Data Portal

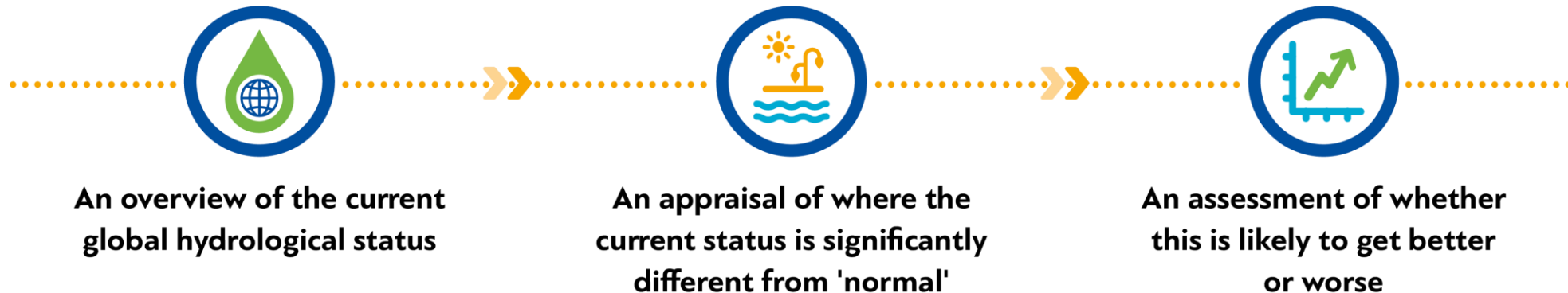
Connection between GWIS and other WMO activities



HydroSOS

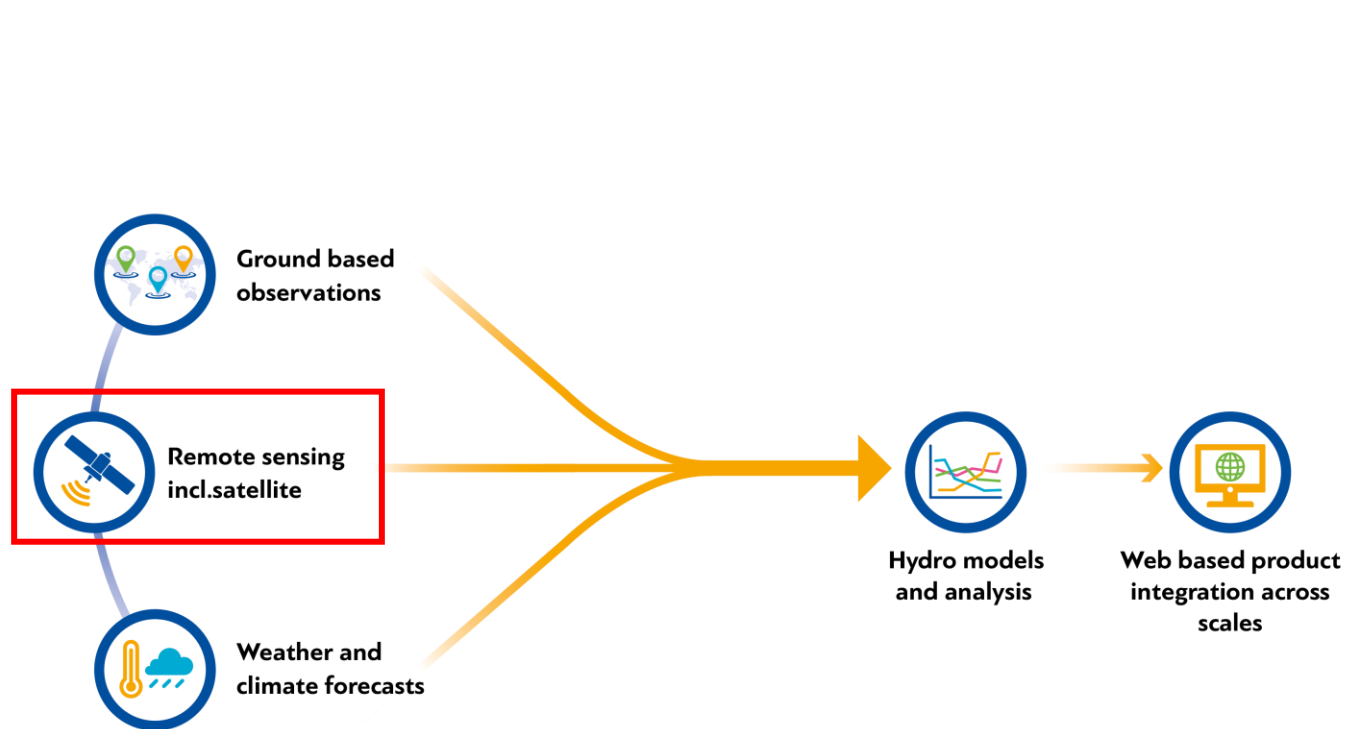
When fully operational, HydroSOS will be the first global operational mechanism for **integrating hydrological status assessments** and **outlooks** from and for NMHSs, in collaboration with transboundary basin organisations, modelling centres, and other partners.

It will aid the decision-making process of Members by providing:

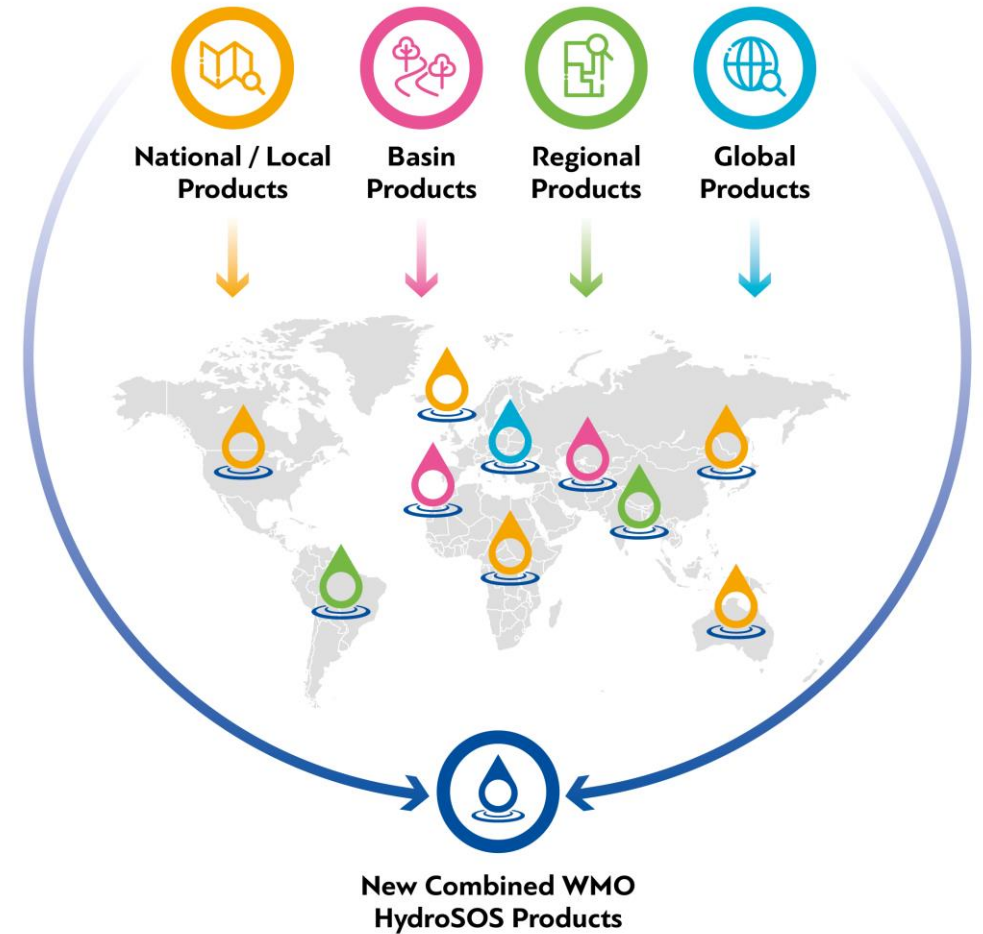


It is one of the water-related WMO Strategic Plan goals and operating plan objectives. It is also one of the main contributions of WMO to the Water and Climate Coalition.

INITIATIVE



HydroSOS successfully ended its pilot phase and is now entering an implementation phase



PARTNERS

A global collaboration among NMHSs, Global Centres, Research Institutions, and Basin Organizations



Leading organizations:



UK Centre for Ecology & Hydrology



Ministry of Water and Environment
REPUBLIC OF UGANDA



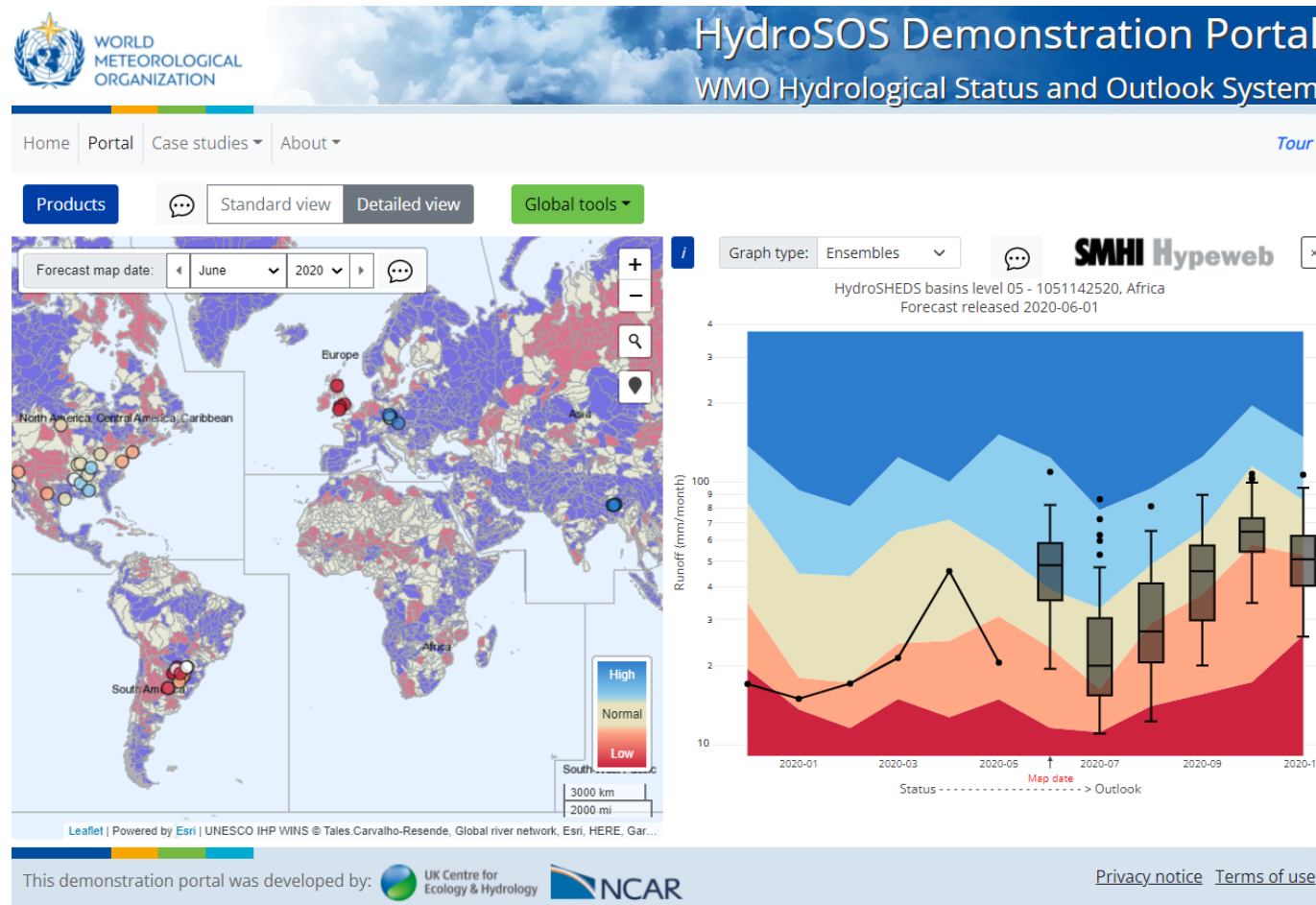
Progress towards initiating HydroSOS

Produced a **demonstration web platform** to visualise the HydroSOS concept with existing status and outlooks products.

Variables

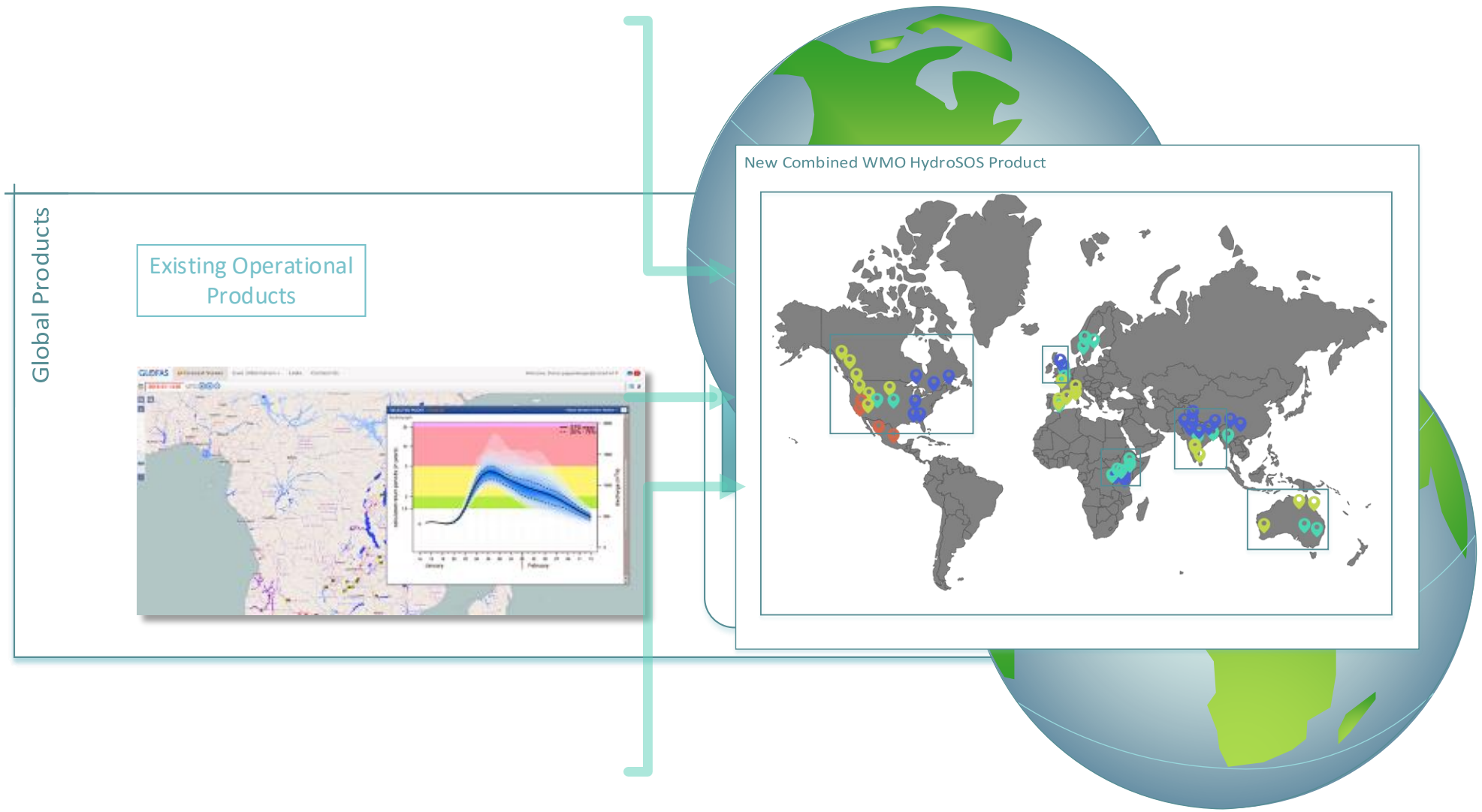
Stream flow

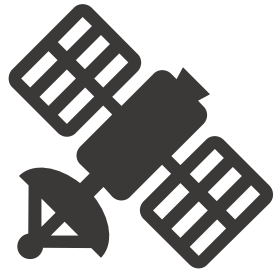
Coming soon: soil moisture, groundwater, cryosphere, water quality



<https://eip.ceh.ac.uk/hydrology/HydroSOS>

A Possible Future?



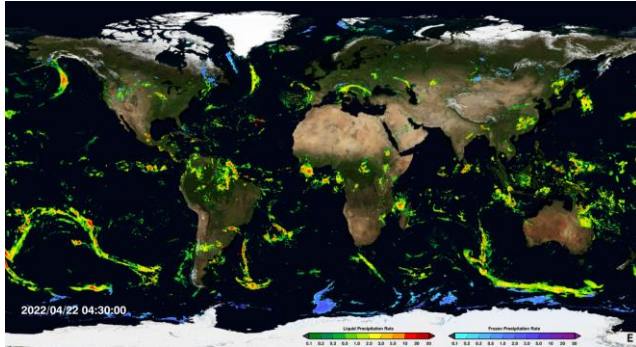


Use of Satellite products to assess hydrological status and outlook

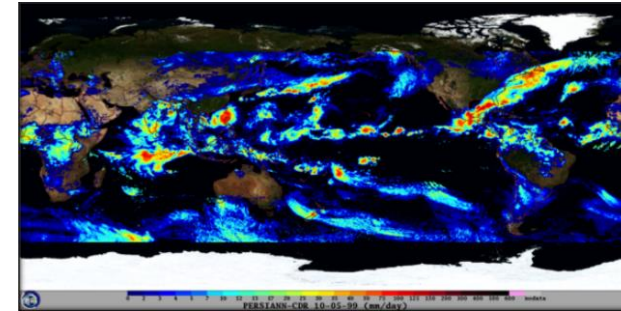
Assessing Global Hydrological Status

- The HydroSOS technical team during its pilot phase, collected datasets used for **assessing the global hydrological status**.
- There was a collection of **more than 100 datasets** including observations and **remotely sensed data**
- Evaluation was performed to **assess the quality** of the datasets using **case studies**

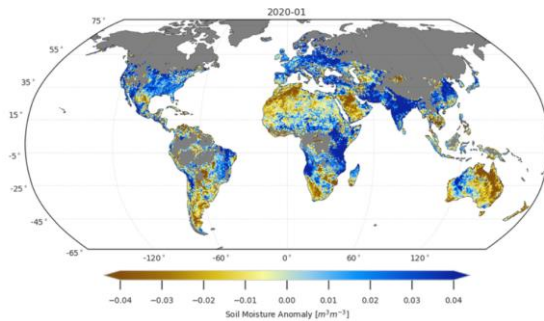
Example satellite-based datasets to assess hydrological status



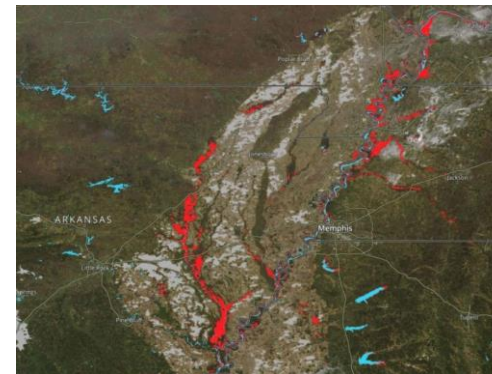
IMERG Precipitation (NASA)



PERSIANN-CDR (NOAA)

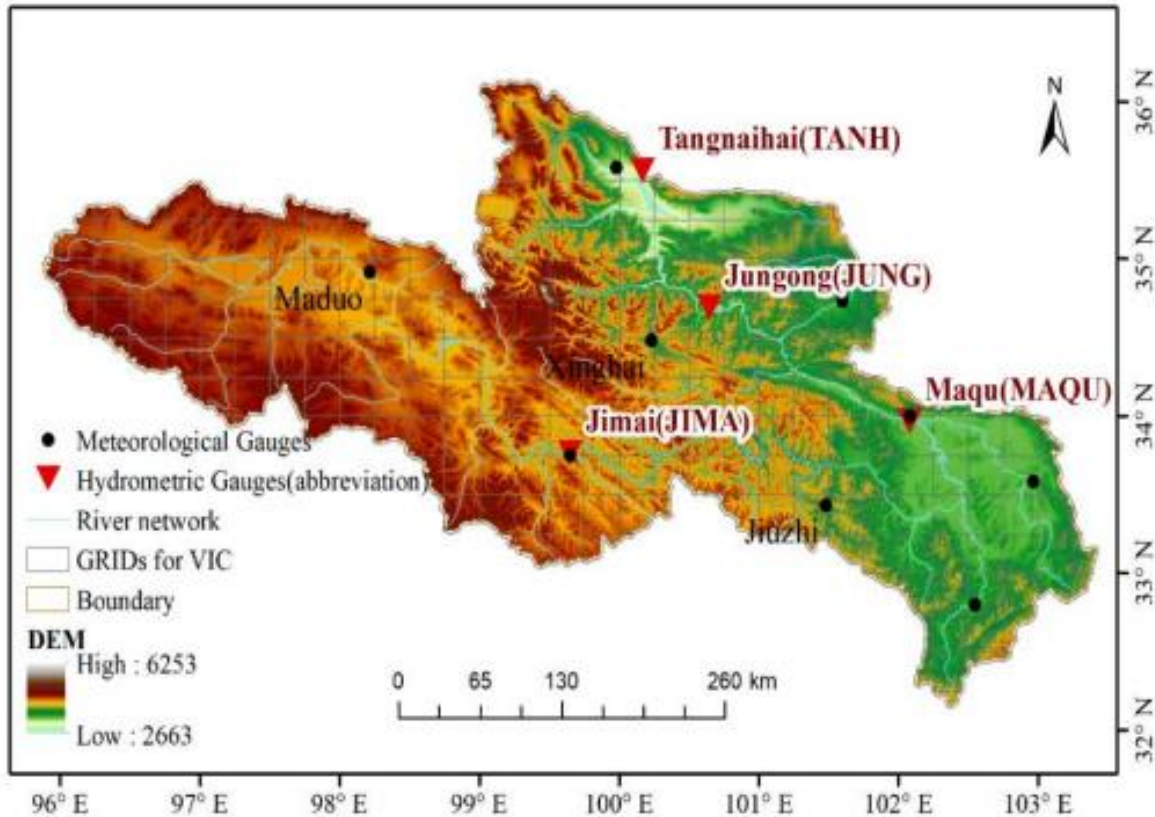


CCI Soil Moisture (ESA)



MODIS Global Flood Mapping for Surface Water (NASA)

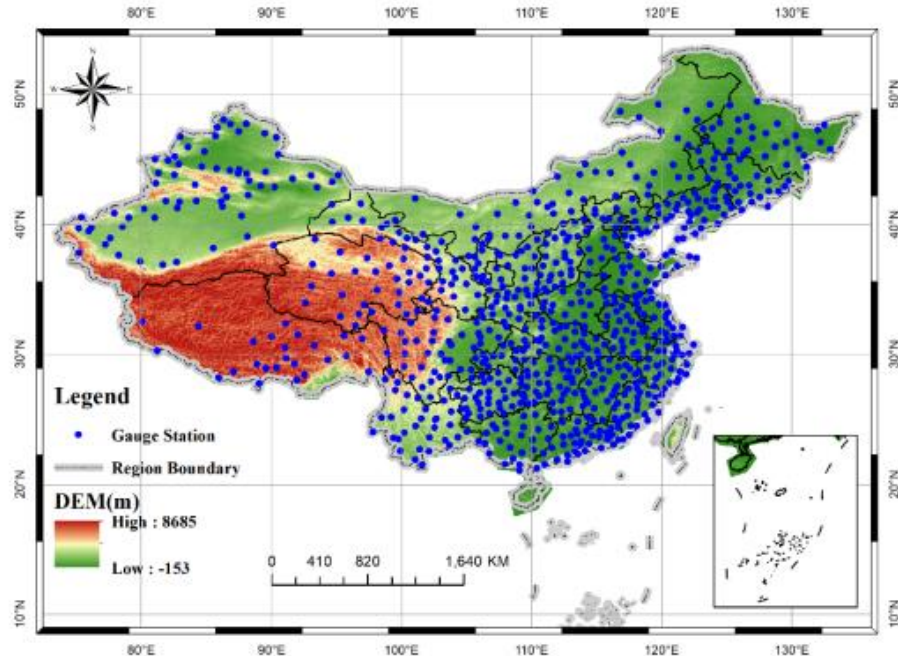
Case Study Upper Yellow River Basin



Precipitation product	Temporal coverage	Spatial coverage	Spatial resolution	Sources
APHRODITE	1951-2015	Monsoon Asian	0.25°	JAXA
CPC_UNI_PRCP	1979-2016	Global	0.5°	NOAA
CN05.1	1961-2015	China	0.25°	National Climate Center of China
PERSIANN-CDR	1983-present	60°S-60°N	0.25°	University of California, Irvine
PGF	1948-2016	Global	0.25°	Princeton University
TMPA	1998-present	50°S-50°N	0.25°	NASA

Reanalysis datasets of precipitation selected for data evaluation in the Upper Yellow River Basin

Case Study: Merging TRMM and gauge precipitation in the mainland of China



The research area and spatial distribution of 796 national met stations in China's mainland

Data set	Resolution	Frequency	Coverage	Period	Producer
TRMM 3B42 V7	0.25°	3h	50°N–50°S	1998- present	NASA GSFC PPS
GridSat-B1	0.07°	3h	70°S-70°N	1980-2014	NOAA
DEM	90m	/	over 80% of the globe	/	USGS/NASA
Rain Gauges	/	12h	796 gauges	1951- present	CMDC

TRMM data and data used for merging task

Outlook Products

Existing satellite-derived outlook products that can be part of HydroSOS

- GLoFAS

Rainfall



Initial 3-day pcp
anomaly

Soil Moisture



Initial 1-day soil
moisture anomaly

Snow Cover

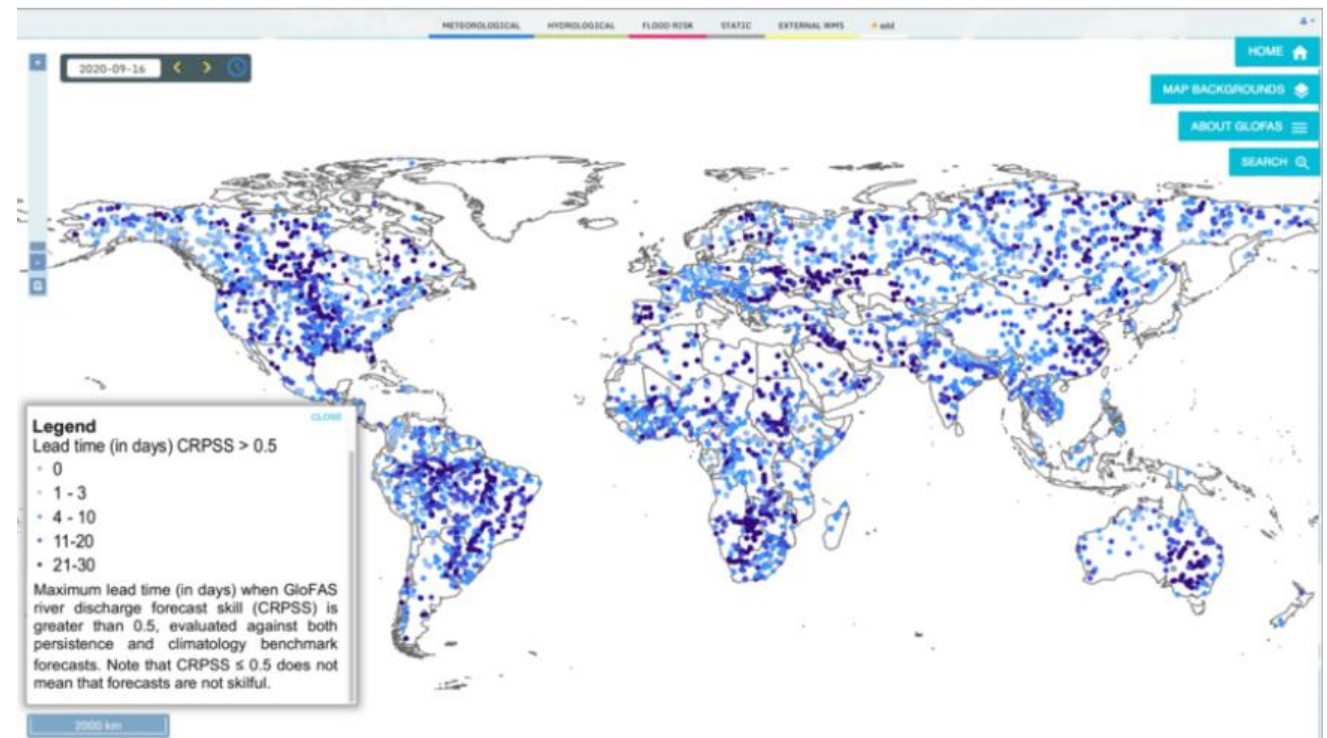


Initial 1-day snow cover
anomaly

Outlooks (7 day sub-seasonal and seasonal time scales)

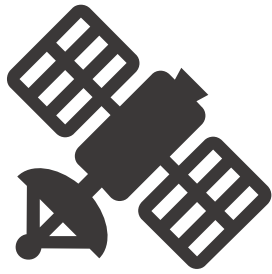
Streamflow

- GloFAS: Daily ensemble hydrological forecasts out to 30-days lead time
- Main Product: Reporting Points



Summary points

- **Satellite –based hydrological related variables** were collected to **assess their quality** including blended products with in-situ observations and reanalysis datasets
- Findings indicate that **most precipitation products** can **achieve acceptable precision**, but different datasets exhibit different precision.
- **Satellite-derived data are essential products** to include in HydroSOS system implementation



Global Water Report and the use of satellite products



Global Water Report

A concise presentation of the previous calendar year's water resources Observed and modelled information

2021 report consists of:

1. Streamflow
2. Soil moisture, Soil moisture index
3. Total Terrestrial water storage

- Providing the physical basis of the status of the global water resources
- Complementary to the World Water Development Report and Global State of the Climate Report
- Provide key indicators of water resources availability, focusing on:
 - Annual Conditions
 - Seasonal Conditions
 - High Impact Events 2021(flooding, hydrological drought)

Global Water Data Portal

- Geospatial Platform, “a Google Earth for Water data and information”
- Unified/centralized access to ALL relevant water data on ONE platform
- Linking existing platforms and information to the Global Water Data Platform
- The portal allows users to easily discover, access and retrieve water related information
- Potential collaboration with FAO to host the portal

Contributions from the Satellite Community

- Be part of HydroSOS as an implementing or technical partner in a river basin
- Contribute to the annual state of the global water report (remotely sensed variables: soil moisture, groundwater, etc)
- Contribute to the [Global Water Data Portal](#)

HydroSOS

Available documents:

[Website of the initiative](#)

[List of available hydromet and geo datasets \(non-exhaustive\) + Methodology for evaluation of datasets](#)

Case studies for hydrological [status](#) and [outlooks](#)

Minimum requirements for hydrological [status](#) and [outlooks](#)

[Methodology for evaluating global outlook products against national outlook products](#) (for 10 and 30-day forecasts)

[Guidelines on Seasonal Hydrological Prediction](#) (WMO-No.1274)

Matrix for evaluation of hydrological capabilities of NMHS (available on demand)

[Comparison of performance of global hydrological models on different large basins](#)

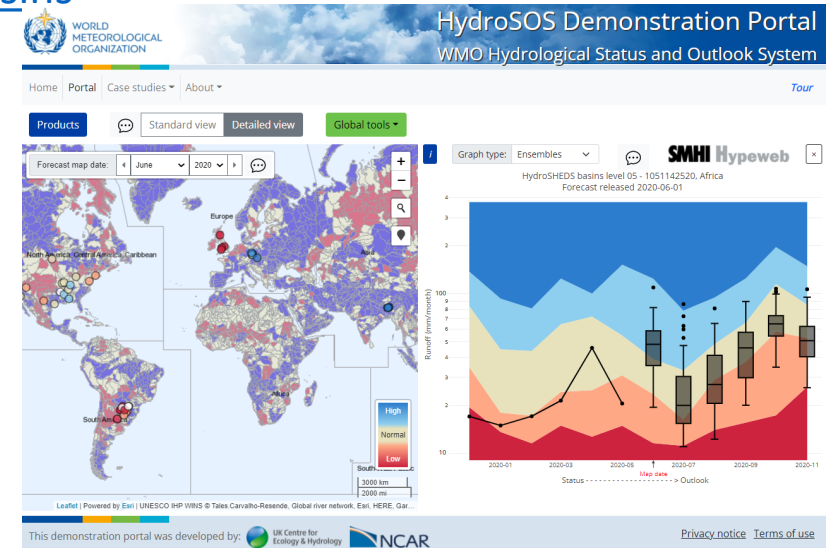
[Methodology for blending global hydrological models](#)

[HydroSOS Demonstration Portal](#) and its [report](#)

[Summary information for regions](#)

Specific for Central America:

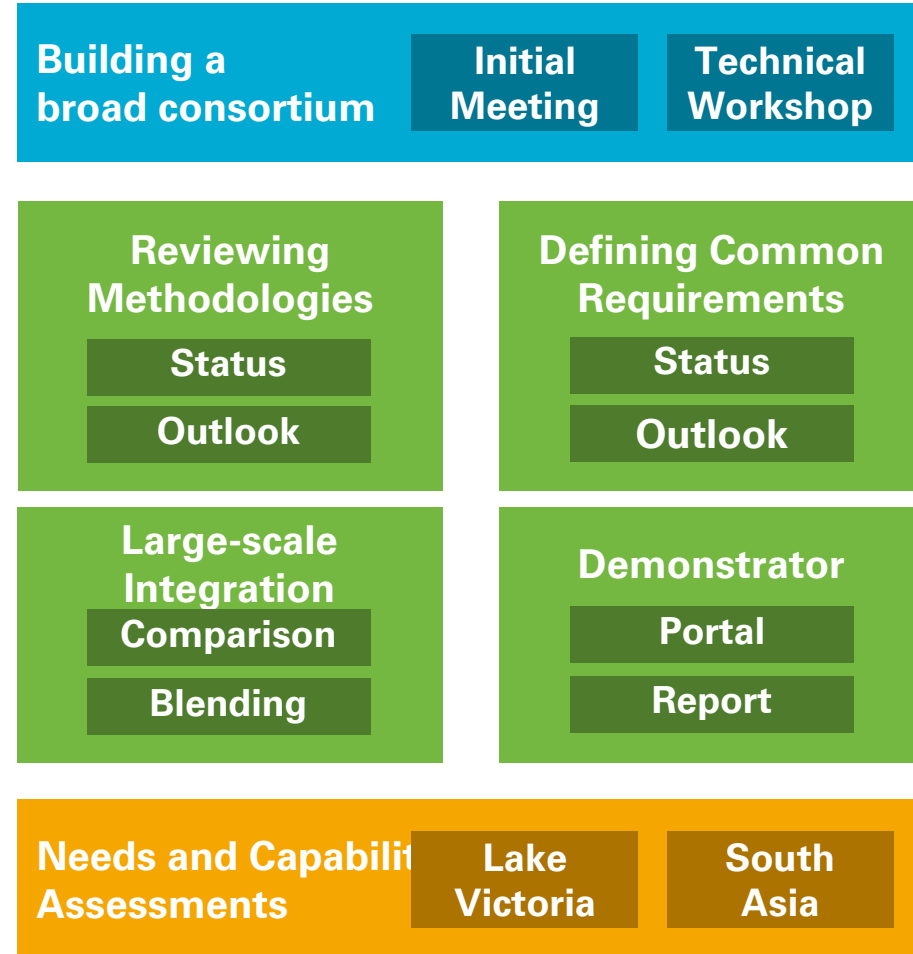
[Strengthening Seasonal Hydrological Forecasting in Central America](#)



ADDITIONAL INFO

Public Website	HydroSOS End-of-pilot-phase Report
Community Website	Guidelines on Seasonal Hydrological Prediction
Video: HydroSOS	HydroSOS in WMO Bulletin 69
Demonstrator	Video: Water Data Peace event

RESULTS FROM PILOT PHASE



Thank you!



For more information, please write to:

HydroSOS@wmo.int

Website:

<https://bit.ly/WMO-HydroSOS2>