The brokering framework empowering WMO Hydrological Observing System (WHOS)

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The WMO Commission of Hydrology (CHy) is realizing the WMO Hydrological Observing System (WHOS), a software (and human) framework with the aim of improving sharing of hydrological data and knowledge worldwide.

National Hydrological Services (NHS) are already sharing on the web (both archived and near real time) data collected in each country, using disparate publication services. WHOS is leveraging the Discovery and Access Broker (DAB) technology developed and operated in its cloud infrastructure by CNR-IIA to realize WHOS-broker, a key component of WHOS architecture. WHOS-broker is in charge of harmonizing the available and heterogeneous metadata, data and services making the already published information more accessible to scientists (e.g. modelers), decision makers and general public worldwide.

WHOS-broker supports many service interfaces and API that hydrological application builders already can leverage, example given OGC SOS, OGC CSW, OGC WMS, ESRI Feature Service, CUAHSI WaterOneFlow, DAB REST API, USGS RDB, OAI-PMH/WIGOS, THREDDS. New API and service protocols are continuously added to support new applications, being WHOS-broker a modular and flexible framework with the aim of enabling interoperability and assuring it as the standards will change/evolve through time.

Three target programmes have already benefited from WHOS:

- La Plata river basin: hydro and meteo data from Argentina, Bolivia, Brazil, Paraguay, Uruguay are harmonized and shared by WHOS-broker to the benefit of different applications, one of them is the Plata Basin Hydrometeorological Forecasting and Early Warning System (PROHMSAT-Plata model, developed by HRC), based on CUAHSI WaterOneFlow and experts from the five countries.
- Arctic-HYCOS: hydro data from Canada, Finland, Greenland, Iceland, Norway, Russia, United States are harmonized and shared by WHOS-broker to the benefit of different applications, one
of them is the WMO HydroHub Arctic portal, based on ESRI technologies.
- Dominican Republic: hydro and meteo data of Dominican Republic published by different originators is being harmonized by WHOS-broker to the benefit of different applications, one of them is the Met data explorer application developed by BYU based on THREDDS catalog service.

The three programmes should act as a driving force for more to follow, by demonstrating possible applications that can be built on top of WHOS.

The public launch of WHOS official homepage at WMO is expected by mid 2021, will include:
- A dedicated web portal based on Water Data Explorer application developed by BYU
- Results from the three programs
- Detailed information on how to access WHOS data by using one of the many WHOS-broker service interfaces
- An online training course for data providers interested in WHOS
- The WHOS Hydro Ontology, leveraged by WHOS-broker in order to both semantically augment user queries and harmonize results (e.g. in case of synonyms of the same concept in different languages).