

Delivering Advanced Predictive Tools from Medium to Seasonal Range for Water Dependent Industries Exploiting the Cross-Cutting Potential of EO and Hydro-Ecological Modelling

Space technology (Earth Observation, EO) can be a catalyst to promote and support technology innovation to protect and ensure the sustainability of our water resources by sustaining an environmental information and intelligent services value chain.

Advances in EO can enhance and support technology innovation in Integrated Water Resources Management (IWRM), disaster resilience, and monitoring the effectiveness of implemented coping strategies.

The water intelligent services delivered by PrimeWater together with the products developed respond to the needs of the water sector in terms of situational intelligence, predictive and early warning capabilities, management of water resources and optimization of operations.

PrimeWater generates information on the effects of upstream changes on future water quality and quantity. Building on advanced EO data products, integration with additional data sources and diagnostic modelling tools, public and private sector decisions for water resources management are provided with better and actionable information.

PrimeWater provides increased situational intelligence, enhanced predictive and early warning capabilities, adaptive management of water resources.

Project goals:

Maximize the potential of the Earth Observation (EO) technologies for the water sector

Enhancing and expanding the information base for inland water quality attributes, through advanced physics-based algorithms that integrate multi- and hyper-spectral imagery from satellite, airborne and ground-based sensors, increasing the situational intelligence of water regulators, emergency planners, water-related industry professionals and local communities.

Add value to EO data and other Copernicus sectoral services through cross-cutting research with Data Assimilation (DA) and Machine Learning (ML) techniques

Improve the skill of hydro-ecological forecasts and their related impact at different spatial scales and time horizons, and hence improve preparedness against water hazards and enhance the capacity of decision-making through uncertainty information.

Establish a complete value chain linking science with the water business sector

Ensure the co-development of products and services through continuous and efficient interaction and communication with water professionals across the globe and in-depth analysis of the intrinsic barriers for the wide market uptake of EO-enabled services in the water sector.



PrimeWater is designed to impact:

- (a) research in the fields of EOs, and hydrological and ecological modelling;
- (b) innovation in the water sector and the downstream sector of the European space market;
- (c) specific societal and environmental challenges;
- (d) policy implementation.

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Case studies:

The case studies challenge the transferability of PrimeWater applications in diverse water catchment systems and sectors. In each case study, different perspectives of the water circle management (water resources management, environmental protection and potable water supply production) are addressed.



Mulargia Dam, Sardinia, IT

Mulargia reservoir is located in south Sardinia island. An earth dam of 99 m height creates an artificial reservoir with volume of 347 hm³ and surface area of 12 km², Mulargia serves as a drinking water source for 700,000 people, as well as for other water uses including agricultural and industrial. Mulargia is part of a system of interconnected reservoirs that function as water sources for domestic uses, agricultural purposes, industrial purposes and hydropower generation.



Lake Harsha, Ohio, US

William H. Harsha Lake is a reservoir managed as a source of drinking water by the Ohio Environmental Protection Agency, the U.S. Army Corp of Engineers-Louisville District for flood control, and the Ohio Department of Natural Resources for water recreation. The East Fork Watershed, in southwestern Ohio, has been a site for watershed management research including a stream network monitoring program and modeling studies.



Lake Hume, New South Wales/Victoria, AU

Lake Hume is a major reservoir on the Murray River (25,000 Km) designed for flood mitigation, hydropower generation, irrigation, water supply and conservation. Algal blooms have become more frequent and persistent, with five mega-blooms occurring in the last 13 years, compared to 4 in the preceding 65 years. Lake Hume has been identified as a source of cyanobacteria in the Murray River from the dam wall to downstream. In the past HABs were associated with a dam capacity at less than 10%. However, the 2016 outbreak occurred when the dam was 37% full.



Melbourne Western Treatment Plant, Victoria, AU

Melbourne's lagoon-based Western Treatment Plant (WTP), the largest wastewater treatment plant in Australia, provides a relatively low cost means of treating wastewater to meet environmental discharge requirements. Additionally, WTP produces significant volumes of recycled water critical to agricultural industries during periods of drought reducing demand on potable water supplies.

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Partners:

