

## Abstract

### Authors

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### Title

**Bridging science with water sector needs for hydro-ecological hazards exposure and vulnerability reduction. An overview of PrimeWater collaborative project**

### Description

Freshwater resources are limited and face increasing pressures from drought, flooding, pollution, population growth, and competition from many uses (e.g. ecosystem protection, drinking water, agriculture, energy production, recreation). When it comes to water quality, freshwater HAB toxins can have a broad range of negative impacts on humans, animals and aquatic ecosystems.

As water management operations are growing in importance and complexity, challenges regarding regulatory compliance, risk management and cost optimization limit the sustainability performance of the water services to the environment, businesses and society.

In water operations, adaptive planning is critical in proactively determining and mitigating water hazards since adapting to risks in a planned manner is far more efficient than reacting to a major system failure. At the same time, improved environmental performance is sought while lowering cost. In order to inform complex operational and business decisions, increased situational intelligence extending in space and time is needed.

PrimeWater responds to these water sector challenges aiming to:

- Maximize the potential of the Earth Observation (EO) technologies for the water sector by enhancing and expanding the information base for inland water quality attributes, by integrating 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 further value to EO data and other Copernicus sectoral services through cross-cutting research with Data Assimilation (DA) and Machine Learning (ML) techniques aiming at improving 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, by developing robust, local-scale operational services for Water Quality Hazards exposure and vulnerability reduction, offering advanced descriptive, diagnostic, predictive and prescriptive capabilities.