

INFORMING WATER RESOURCE MANAGERS IN SARDINIA

SPACE-O services provide satellite data and water quality forecasts like weather data. The case of the Mulargia reservoir shows the added value of developed tools for water resource protection.

The challenge

There is a growing need to monitor and reduce the effects of pollution and climate change on our global water cycle. On the Italian island of Sardinia, the Mulargia dam is one of two pilot cases where the SPACE-O (www.space-o.eu) project demonstrates the value of Earth Observation technology in forecasting water flows and water quality. Mulargia is the most important reservoir in a large and complex network comprising three river basins, serving as a drinking water source for 700,000 people. Ente acque della Sardegna (hereinafter ENAS), the local multisector water network manager, is the public authority responsible for operational monitoring and daily planning –such as informing the local drinking water supplier of any changes in the raw water quantity and quality– as well as strategic planning. A complex system like this is threatened by a wide variety of challenges like droughts, floods, diffuse pollution and deforestation that affect water quality and demand managers to constantly balance levels and swift flows where needed to guarantee local supply. Timely and detailed information is crucial to the efficiency of treatment processes, strategic planning and emergency responses but often challenges local capacities.

The space based solution

In order to address these challenges, the EU funded SPACE-O project combines state-of-the-art satellite technology with hydrological and water quality models, integrating local knowledge and datasets so as to improve the information base used for decision making. Indicators for water quality and quantity that cannot be covered in a spatial scale by ground-based systems are now possible to obtain from Copernicus satellite missions Sentinel-2A/B and Landsat 8.

These indicators include:

- Chlorophyll-a, turbidity and harmful algae blooms
- Water surface temperature and evaporation
- Floating materials (e.g. oil or scum)

Information from satellite images for the above mentioned indicators are combined with existing datasets to improve water forecasts. Models are generally as good as the data used to force those models. Systematic analysis of satellite data was used to fine-tune models by complementing missing measurements. ECMWF forecasting and coupled hydrological, hydrodynamic and ecological modelling together with near real-time data from automated image analysis, allow for forecasting of river flows and critical water quality parameters like algae and turbidity for up to 10 days.



General view of Mulargia reservoir in Sardinia.
Source: Ente acque della Sardegna (ENAS)

Thematic Area



CLIMATE, WATER
AND ENERGY

Region of Application



SARDINIA

Sentinel mission used



S2

Copernicus Service used



-

Usage Maturity Level

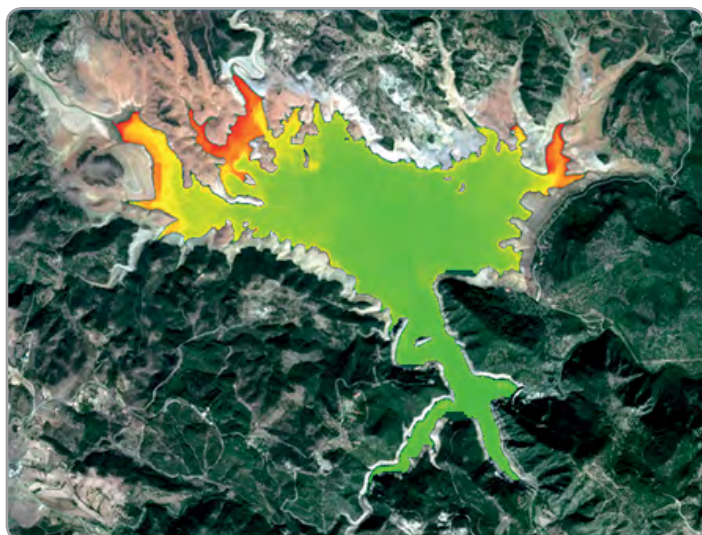


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Benefits to Citizens

Based on the forecasts derived from combining Earth Observation data, a set of end-user driven functionalities have been designed and translated into a Decision Support IT tool, including the modules:

1. Environmental/water information system, supporting reservoir management specifically on short to medium term water quantity and quality forecasts.
2. Early warning system, which uses modelled (forecasted) data to provide early warning of threats to the water sources.
3. Water treatment plant optimisation.



Turbidity concentrations in Mulargia reservoir from S2. Source: EOMAP
Credit: Contains modified Copernicus Sentinel data [2017]

“With SPACE-O water quality forecast service we can now be proactive and mitigate challenging water quality threats to the benefit of our water users.”

*Maria Antonietta Dessena,
Ente acque della Sardegna (ENAS)*

Outlook to the future

SPACE-O is designed to be adaptive to new science allowing a dynamic upgrade of the information fluxes that it receives. It is fully aligned with newly developed Copernicus services and will provide products on a long-term time basis, assuring the future sustainability of the service. As demonstrated in Sardinia, space-based monitoring technology is greatly appreciated by water managers and brings valuable tools to the table. Lessons from Mulargia allow for further fine-tune decision support systems which can be rolled out to a broad range of water operators all over the world. SPACE-O will keep closing the knowledge gap for informed and sustainable water resources governance and optimized water services provision thanks to the open access data from Copernicus.

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Carolina Patricia Latorre Aravena; Hanno Fuhren; Apostolos Tzimas and Evangelos Romas
IWA, London, United Kingdom
Email: Carolina.Latorre@iwahq.org

ABOUT COPERNICUS4REGIONS

This Copernicus User Story is extracted from the publication “**The Ever Growing use of Copernicus across Europe's Regions: a selection of 99 user stories by local and regional authorities**”, 2018, Edited by NEREUS, the European Space Agency and the European Commission.

The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains. The views expressed in the Copernicus User Stories are those of the Authors and can in no way be taken to reflect the official opinion of the European Space Agency or of the European Commission.

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