

Module 3 - EOSC in practice: EOSC Synergy

Case study: Addressing water management issues in Europe

From idea to innovative services

WORSICA, Water Monitoring Sentinel Cloud Platform, is a service for coastline, inland and irrigation leak detection. The idea of WORSICA came to life after the National Laboratory for Civil Engineering in Portugal (LNEC) participated in a European project on the detection of water leaks in irrigation networks using airborne, unmanned aerial vehicle and satellite images.

“We verified that we had the knowledge and the algorithms for water detection that could be applied to different types of areas, such as coastal regions, lakes and dams or even irrigation networks. We therefore decided to combine these services into one web portal to support researchers and clients in Portugal”, explains Alberto Azevedo, a researcher at LNEC.

The first version of WORSICA was developed in response to a call for services promoted by the National Distributed Computing Infrastructure (INCD), taking advantage of the Portuguese computational infrastructure. The project started with a small set of users in national water management and environmental agencies.

Practical benefits

The service now consists of 3 main products covering coastlines, inland and irrigation networks. To give an example, this service can be used to evaluate the volume of water in lakes or dams.

Also, during storm surges, scientists need to see how the coastline evolves before, during, and after the surge. Thanks to the service, the scientists receive valuable information enabling them to deal with coastal erosion and emergency actions by determining the extension of the inundated areas affected by the storm surges.

Furthermore, the service is useful during the building of marinas as one needs to understand ocean dynamics before undertaking such projects. And, last but not least, the service helps solve leak problems in general.

Scaling up the service

“As we deal with satellite and drone images, water and coastlines, we decided to add a European dimension to the project by developing a service for detection of water leaks in irrigation networks (WADI). Thanks to accurate and tailored leak detection, WADI helps save water and reduces energy consumption and carbon dioxide emissions.”

“So far, our service has been implemented in Portugal, and we have plans to do more testing and have more users to reach the full potential of the service.”

Unique features

The most unique aspect of WORSICA is that the user will be able to run all offered services in their computer's browser. Scientists will be saved from acquiring expensive equipment or machines. What

is more, there will be a centralised national cluster taking care of all the computational and management costs required to use this infrastructure.

“Our goal is to have a one-stop-shop, in other words, one web portal covering the services for coastline, inland and irrigation leak detection. Besides satellite images, users will also be able to upload their drone imagery and drone data.”

The algorithm will perform calculations with the data from the user helping detect coastlines. In addition, features enabling production of digital elevation models of coastlines and services for regional ocean forecasting will be offered through the linkage between the WORSICA and the OPENCoastS services.

Boost from EOSC Synergy

Thanks to EOSC Synergy, technical aspects of the service will be improved considerably, using advanced technologies such as high-performance computing and cloud. The service will also be scaled up to a European level to reach all interested research communities. “We will also adapt the service to other European Open Science Cloud services, such as EGI Check-In, and include these in our workflow, such as Dataverse.”

“By the end of the project, we plan to launch a user-friendly portal which will be fully adapted to our user needs. In the future, we also plan to add more functionalities to the web portal such as the upload of Jupyter notebooks. These functionalities will enable the users to implement their own algorithms and methodologies, and facilitate their research using our computational infrastructure.”

To find out more, visit the links below:

- National Laboratory for Civil Engineering, <http://www.lnec.pt/en>
- National Distributed Computing Infrastructure (INCD), www.incd.pt
- OPENCoastS, Coastal circulation on-demand forecast, <https://opencoasts.ncg.ingrid.pt>
- WADI, Innovative Airborne Water Leak Detection Surveillance Service, <http://www.waditech.eu> Dataverse, <https://dataverse.org>
- EGI Check-in, <https://www.egi.eu/services/check-in/>