

# Integration of WORSICA's thematic service in EOSC - challenges and achievements

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The thematic service *Water mOnitoRing SentInel Cloud plAtform* (WORSICA) is a one-stop-shop for the detection of water using images from satellites and Unmanned Aerial Vehicles (UAVs), and in-situ data. WORSICA can be used for the detection of coastlines, coastal inundation areas and the limits of inland water bodies. It can also be applied to a range of other purposes, from the determination of flooded areas (from rainfall, storms, hurricanes or tsunamis) to the detection of large water leaks in major water distribution networks. This freely available service enables the user communities to generate maps of water presence and water delimitation lines in coastal and inland regions. In particular, the service helps to promote 1) the preservation of lives during an emergency, supporting emergency rescue operations of people in dangerously inundated areas, and 2) the efficient management of water resources targeting water saving in drought-prone areas.

The WORSICA thematic service builds on several components developed in both national and European projects, such as EOSC-hub and EOSC-Synergy European projects and the nationally-funded INCD, included in the Portuguese infrastructure roadmap. In this work, a brief demonstration of the main challenges found during the integration of the service in the EOSC infrastructure is presented, using IT services from the EOSC marketplace catalog and other ones developed in the scope of the EOSC-Synergy project.

The WORSICA's workflow consists in the processing of large imagery datasets for the detection of water, which includes several processing steps (e.g. download of the images, atmospheric correction, classification and clustering of the observed features), and finally, the presentation of the resulting products in a user-friendly web portal. These inputs are quite large, resulting in substantial computational and time-consuming costs. Therefore, to minimize these costs the usage of different hardware technologies, such as HPC, GPUs and cloud computing, is necessary, as well as robust and efficient IT tools, developed and provided by EOSC and EOSC-Synergy projects.

WORSICA's architecture was developed to connect several components from the backend, locally and remotely, with IT services provided by EOSC partners, such as Dataverse (for the FAIR data principles), EGI Check-In AAI (federated authentication), workload monitoring/resource managers (HPC, GPUs and cloud computing), data storage and EOSC-hub-OPENCoastS. WORSICA uses docker containers to create sub-services and connect them to each other: i) portal (web frontend), where the users specify their options in the workflow, and ii) intermediate (service backend), which connects the required EOSC core services, receives the simulation requests, then generate and submits the jobs to the core services for processing.

As WORSICA is EOSC Synergy's reference thematic service, the software and service quality will be validated using the platform SQAaaS. At the end of the project, Worsica will be certified for the community evaluation assuring high quality standards.

The integration of the WORSICA service in the EOSC infrastructure will boost the usage of the service at an European level, taking advantage of robust, well-designed and efficient IT tools to work with a massive amount of data in this first class computing European infrastructures.

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