

# OPENCoastS On-demand Operational Coastal Circulation Forecast Service

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Seas and oceans are important drivers for the European economy and they need to be preserved and developed in a sustainable way. OPENCoastS provides on-demand coastal circulation forecasts systems that are useful in research and in many other areas of human activity. The forecast systems can be setup by the end-users for a given region of interest of the European Atlantic coast. They run daily and predict water levels, 2D velocities and wave parameters for periods between 48 to 72 hours. The service was developed by the Portuguese National Civil Engineering Laboratory (LNEC) in 2010 as WIFF (Water Information Forecast Framework) and uses the SCHISM modeling system.

The deployment of forecast systems requires strong knowledge of coastal processes and IT, along with access to significant computational and storage resources. The OPENCoastS service offers a user friendly web interface and a back-end that takes care of all complexity. This approach reduces the barriers to the adoption and use of coastal circulation forecasts systems making them available to a much broader audience.

The system has been producing 48-hour forecasts on a daily basis for the Portuguese coast and is running on High-Throughput Compute and storage resources provided by the Portuguese National Distributed Computing Infrastructure (INCD). In the context of EOSC-hub, LNEC is working with LIP, INCD, University of Cantabria and University of La Rochelle to open the service to users from other European countries so they can also benefit from this innovative service.

To cope with the internationalisation the system is being enhanced to include federated AAI, resilient scheduling to distributed computing resources, accounting, data management and long-term data storage. The system is now integrated with the EGI-checkin for federated AAI enabling simpler user authentication. The front-end has been split into components that can be instantiated in IaaS cloud systems such as the EGI fedcloud, the use of INDIGO orchestration for cloud services deployment is planned. For increased compute capacity and resilience the simulations can be scheduled to the EGI High Throughput Computing service via a DIRAC scheduling system also provided by EGI within EOSC-hub. To provide independence and encapsulation the application components are encapsulated in Linux containers. The use of EUDAT services for long-term storage and/or data preservation is also being considered.

In this presentation we will describe the details and challenges of adapting and deploying a complex application service that is both compute and data intensive, and exploits multiple computing paradigms such as cloud computing and high throughput computing across multiple locations taking advantage of pan-European services made available by several infrastructures and technology providers.

## Type of abstract

Presentation

## Summary

OPENCoastS is a service that builds on-demand circulation forecast systems for different users along the North Atlantic coast. OPENCoastS generates forecasts of water levels, 2D velocities and wave parameters over the region of interest for periods of up to 72 hours. The system is useful in anticipating natural disasters and accidents in the coast, e.g. floods and chemical spills and can help in search and rescue operations. OPENCoastS is being integrated in the EOSC-hub project as a thematic service.

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