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Generating on-demand coastal forecasts using EOSC resources: the OPENCoastS service

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The OPENCoastS service, developed within the EOSC-hub project, enables the creation of on-demand operational coastal circulation forecast systems through a user-friendly web site, only requiring the computational grid for the selected area. Deploying a new forecast is straightforward, following seven simple guided steps. Several modeling options are available, depending on the relevant physics of the coastal system. The user may choose to simulate 2D tide and river hydrodynamics, 3D baroclinic circulation or 2D wave and current interaction hydrodynamics. The web site is a one-stop-shop portal for the whole modeling procedure, providing forecast deployment setup, management and visualization components, including a detailed viewer where the daily outputs are available for probing and data comparison.
The worldwide usage of OPENCoastS requires the availability of considerable and reliable computational resources and core services to guarantee the timely delivery of modeling products. As the simulations in the OPENCoastS service are performed with an MPI-based model (SCHISM, Zhang et al., 2016), it is possible to scale their performance (and the computational time) by taking advantage of several nodes in the EGI Cloud and High-Throughput computing services, through the INCD and IFCA cloud infrastructure. Besides the access to computing power, OPENCoastS is also integrated with the following EOSC core services:

- EGI Check-in: the authentication and authorization infrastructure (AAI).
- EGI Workload Manager (DIRAC4EGI): the workload management system. This paper presents the integration procedure with all services and the development required to achieve the very stringent conditions of OPENCoastS real-time operation. In particular, the work developed to integrate OPENCoastS with the DIRAC4EGI workload management service is detailed. The choices undertaken proved vital to support more than 200 international users and applications to coastal systems in the 5 continents. Zhang, Y., Ye, F., Stanev, E.V., Grashorn, S. (2016) Seamless cross-scale modeling with SCHISM, Ocean Modelling, 102, 64-81.

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