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Towards Coastal Digital Twins for bathing waters protection: predicting water quality with OPENCoastS+

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Digital Twins can support decision-making in bathing waters management by providing virtual representations of physical assets that can be used for real-time forecast, system optimization and monitoring and controlling. Herein, the OPENCoastS+ service is demonstrated in the coastal region of Albufeira (Portugal), as a stepping stone to the implementation of a Digital Twin for bathing waters protection.

Stormwater discharges from the city of Albufeira and its upstream peri-urban area can contaminate the adjacent bathing waters. Real-time tools are thus required to predict the quality of bathing waters and support the assessment of the need to prohibit beach water usage.

OPENCoastS+ (https://opencoasts.ncg.ingrid.pt) is a service that builds on-demand hydrodynamic and water quality forecast systems for user-selected areas and maintains them running operationally. The service generates forecasts of water levels, 2D or 3D velocities, temperature, salinity, waves and water quality variables, including Feacal Indicator Bacteria - FIB (Escherichia coli and enterococcus). The relevant physical, chemical and biological processes are simulated using the modeling suite SCHISM and several forcing options are available for the ocean, river and surface boundaries. The service is provided through the European Open Science Cloud (EOSC) computational resources.

The OPENCoastS+ service was implemented in the coastal area of Albufeira. All the relevant forcings (ocean, streams, urban drainage and atmosphere) are included in the model. The service provides daily forecasts of 3D circulation (water levels, coupled wave-currents, salinity, and temperature), FIB concentrations and associated indicators for the classification of the bathing waters quality.

Other key topic

Key Topic

Digital Twins

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