

Dependable data-based coastal observatories as supporting tools for water quality management in estuaries

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Abstract

Coastal margin observatories are fundamental tools to support estuarine management, by offering capabilities for both early-warning and long-term planning, and providing access to large volumes of different types of data. The Tagus estuary circulation and water quality coastal observatory is presented herein. This observatory has a web-based portal that comprises several complementary layers of information, including historical and real-time observations, and short-term forecasts and scenarios from numerical simulations, which cover different spatial and temporal scales. Monitoring data are of the utmost importance in this context, not only to characterize the estuarine dynamics, but also to provide confidence on the model predictions through continuous validation. Likewise, the results from the numerical model can be used to support the reliability analysis of the monitoring network. Within the Tagus estuary observatory, 3D circulation and water quality forecasts (water levels, velocities, salinity, temperature, dissolved oxygen, ammonium, nitrate, phosphate, silicate, chlorophyll a) are produced daily using the Water Information Forecast Framework (WIFF) to operate the SCHISM model. Several online sensors were also deployed in the Seixal Bay, located in the inner Tagus estuary, measuring water levels, salinity, water temperature and other water quality variables (e.g., dissolved oxygen and chlorophyll a). The importance of extending these systems towards the use of dependable data is also demonstrated in the Seixal Bay. A reliable data layer is demonstrated, using fault-tolerance strategies through sensor data fusion procedures, exploiting the availability of redundant measurements from the available sensors and from “virtual sensors” data – extracted from the model predictions at strategically chosen locations. Overall, this information provides important knowledge to support the establishment of protection measures to human-induced or climate-driven threats, and fosters better-informed decision-making.

Session Type and categories

Special sessions

General session categories

The human dimension: impact, management, governance: Decision support tools and approaches for sustainable marine and coastal spatial planning

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The human dimension: impact, management, governance: 0031 Using existing knowledge to adaptively manage estuaries for the long-term future

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