



Downscaling CMEMS products at the coastal and harbor scales of Apulia region (South-Eastern of Italy): modeling, forecasting and decision support system

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The work describes a Decision Support System platform derived by the upstream information coming from CMEMS, developed in the framework of START (“Rapid mapping and monitoring system of marine and coastal environment”) project, a research and development initiative funded by the Apulia Region.

The general objective of project is to improve and consolidate the awareness and the knowledge of Apulian coastal environment integrating well-consolidated products (e.g. CMEMS), observing systems - also in real time - and new high-resolution operational forecasting modelling in a Decision Support System for coastal areas and harbors monitoring and management.

In particular, here we focus on the modeling chain nested in new CMEMS hydrodynamic operational forecasting products (1/24 horizontal resolution). The latter provide initial and boundary conditions to the SANIFS hydrodynamic forecasting system (Federico et al., 2017) based on unstructured-grid approach and enhanced in terms of horizontal resolution (up to 100 and 20 m in coastal and harbor areas, respectively).

Furthermore, the CMEMS wave fields have been downscaled in the sub-regional and coastal scale of Apulia region and in the main harbors with specific high-resolution domain in operational mode.

Modeling forecasting outputs and observing data (systematically organized in a catalogue of marine, atmospheric and morphological data) for the entire Apulia region have been combined and further processed to define synthetic indicators of several phenomena both in coastal and harbor environments, such as: coastal erosion, flooding, extreme and storm surge events, climate change scenarios, overtopping in harbors, moored vessel assessment.

All the results, data and indicators have been integrated in an ad hoc Decision Support System based on web and mobile GIS technology that has been designed and developed within the START project. The Decision Support System is under experimentation by intermediate- and end-users (Apulia regional authorities, municipalities, port authorities, protected marine areas, engineering companies).