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An operational coupled wave-ocean system for the Adriatic Sea

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Ocean and wave forecasting models are operational in the Adriatic Sea since the beginning of the century. The environmental peculiarities of the basin, including the high density of anthropic activities (residential, touristic, fishery, transport, extractive) insisting on it, make relevant the availability of reliable assessment and forecast of the marine state. Until few years ago, the operational models in the Adriatic forecasted independently hydrodynamics (currents, sea level, temperature, salinity) and waves. In 2015, the Coupled-Ocean-Atmosphere-Wave-Sediment Transport (COAWST) Modeling System has been implemented operationally on the whole Adriatic Sea. The coupling has been activated between the hydrodynamics (Regional Ocean Modeling System, ROMS) and the wave (Simulating WAves Nearshore, SWAN) components. The COAWST atmospheric component (the Weather Research and Forecasting Model, WRF) is presently not active in our implementation, and interactions with atmosphere are provided by the Numerical Weather Prediction model COSMO-I7 managed by the Hydro-Meteo-Clima Service (SIMC) of the ARPAE Emilia Romagna (Bologna, Italy). The COAWST Adriatic domain has a resolution of 1 km in horizontal, with 27 s-levels (terrain following) in vertical. Conditions at the open boundary (Otranto Strait) are provided by the Mediterranean Forecasting System (MFS, managed by the Euro-Mediterranean Centre on Climate Change – CMCC, Lecce, Italy) for ocean (temperature, salinity, currents, sea level) and by SWAN-Italia (managed by SIMC-ARPAE, Bologna, Italy) for waves. Main diurnal and semidiurnal tidal components are considered, and 48 river sources are included as monthly climatological mean discharges (except for daily Po River flow rate, provided in real time by SIMC-ARPAE).
After the first year of operational forecasts (provided every day for the following 72 hours), a first assessment of results and performances is presented.