Sea level and current validation for an early warning coastal system on the Catalan coast (NW Mediterranean Sea)

Laura Ràfols (1,2), Sairouni abdelmalik (2), Manel Bravo (2), Manuel Espino (1), and Manel Grifoll (1)

(1) Univeristat Politècnica de Catalunya, Barcelona, Spain (laura.rafols@upc.edu), (2) Servei Meteorològic de Catalunya (SMC) (asairouni@meteo.cat)

An early warning coastal system is being implemented on the Catalan coast (North-western Mediterranean Sea) in order to provide high resolution forecast of sea levels, current velocities and wave conditions. The present investigation is focused on the oceanic model, which provides information about sea level and currents.

The aim of this study is to validate the sea level and current forecasts obtained with the help of the Regional Ocean Model System (ROMS; Shchepetkin and McWilliams, 2005) in a high resolution domain (350 metres). In an attempt to reduce the high computational cost required for such a small grid, the Catalan coast has been divided into a few separate domains, which are run independently of each other. For the initial and boundary conditions, data from the MyOcean-IBI products have been used and the atmospheric forcing fields have been obtained from the Catalan Meteorological Service (SMC) and the Spanish Meteorological Agency (AEMET). For a validation purpose, different study periods have been taken into account. Then, the validation of the model has been done using the available in-situ tide-gauge and buoy measurements and HF satellite data.

During energetic events, the interaction between currents and waves is expected to be relevant in the shallower areas. For this reason, a coupled wave-ocean system has been implemented to investigate the improvements in the forecasts when faced with the results of separated simulations. In this case, the ROMS model and the SWAN model (Simulating WAves Nearshore; Booij et al., 1999) have been run as part of the Coupled Ocean-Atmosphere-Wave-Sediment Transport (COAWST) Modeling System (Warner et al., 2010), which uses the Model Coupling Toolkit to exchange data fields between the models.