



A deterministic storm surge forecast model focused on the Adriatic Italian coast

Marco Bajo (1), Elisa Coraci (1), Marco Cordella (2), Georg Umgiesser (1), and Maurizio Ferla (2)

(1) CNR, ISMAR, Venezia, Italy, (2) ISPRA, Venezia, Italy

A new storm surge forecast system for the Mediterranean Sea is running operationally, from mid 2011, at the Italian Institute for Environmental Protection and Research, ISPRA, in Venice. The system is based on a finite element hydrodynamic model, named SHYFEM, developed at the Institute of Marine Sciences, ISMAR, in Venice. Simulations are forced with wind and MSL pressure forecast fields, provided by ECMWF Centre. Open boundary conditions are prescribed in the Atlantic Ocean, about three hundred kilometres West of the Gibraltar Strait, with the water level set to a zero and free normal fluxes.

As the model is focused on the Adriatic Sea, results are validated over nine stations along the Italian Adriatic coast. In these stations the astronomical tide, computed using the harmonic components, is added to the modelled surge and the mean sea level is corrected with levels observed one day before the simulation. The final forecast is a good estimate of the total sea level in the selected stations.

In order to give an accurate forecast even for the Venice lagoon, a second simulation is run inside the lagoon, using, as boundary conditions, the results of the first one.

Results are extracted for the whole year 2012, and show good forecast skills along all the Adriatic coast. Moreover an exceptional storm surge event, happened in Venice on November 11, 2012, was very well predicted, obtaining a higher accuracy than statistical models, more commonly used for tide forecasts in Venice.

Finally a data assimilation system, based on the 4D-PSAS technique, has been recently developed and the results of this version will be available soon.