



Use of ensemble forecast meteorological fields to force a storm surge model

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In this work the capability of meteorological ensemble forecast, used as forcing for a storm surge model, is investigated in two significant events for the City of Venice, Italy.

The meteorological fields are provided by ECMWF and, after due objective correction, applied as forcing to an hydrodynamic model, based on the finite element technique.

The two case studies are far in time and have different features. The first case, happened on November 4, 1966, is still the highest event ever registered in the City. No storm surge warning system was present at the time and no meteorological model was operational. The meteorological fields used to force the storm surge model have been created ad hoc, following the procedure of ERA40 project, but using a much higher resolution.

The second case, happened on December 1, 2008, is the highest storm surge event of the last decade. Though the ECMWF's T799 model was already operational, the event was poorly predicted by the local forecasting system, and a much lower flood was expected with all the related consequences.

The hydrodynamic model used in this work runs on the whole Mediterranean Sea with a relatively coarse computational grid on the whole basin, and a higher resolution in the Adriatic Sea. The simulated storm surge level is extracted near the Venice lagoon and compared with the residual level computed from the observations.

The results show that the ensemble method improves the forecast accuracy specially for the 2008 case study. However, its most important feature is to provide an estimate of the expected forecast errors due to the uncertainties on the meteorological forcing.