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Probabilistic Storm Surge Forecast For Venice

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This study describes an ensemble storm surge prediction procedure for the city of Venice, which is potentially very useful for its management, maintenance and for operating the movable barriers that are presently being built. Ensemble Prediction System (EPS) is meant to complement the existing SL forecast system by providing a probabilistic forecast and information on uncertainty of SL prediction. The procedure is applied to storm surge events in the period 2009-2010 producing for each of them an ensemble of 50 simulations. It is shown that EPS slightly increases the accuracy of SL prediction with respect to the deterministic forecast (DF) and it is more reliable than it. Though results are low biased and forecast uncertainty is underestimated, the probability distribution of maximum sea level produced by the EPS is acceptably realistic. The error of the EPS mean is shown to be correlated with the EPS spread. SL peaks correspond to maxima of uncertainty and uncertainty increases linearly with the forecast range. The quasi linear dynamics of the storm surges produces a modulation of the uncertainty after the SL peak with period corresponding to that of the main Adriatic seiche.