



Development of Super-Ensemble techniques for ocean analyses: the Mediterranean Sea case

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Short-term ocean analyses for Sea Surface Temperature SST in the Mediterranean Sea can be improved by a statistical post-processing technique, called super-ensemble. This technique consists in a multi-linear regression algorithm applied to a Multi-Physics Multi-Model Super-Ensemble (MMSE) dataset, a collection of different operational forecasting analyses together with ad-hoc simulations produced by modifying selected numerical model parameterizations.

A new linear regression algorithm based on Empirical Orthogonal Function filtering techniques is capable to prevent overfitting problems, even if best performances are achieved when we add correlation to the super-ensemble structure using a simple spatial filter applied after the linear regression.

Our outcomes show that super-ensemble performances depend on the selection of an unbiased operator and the length of the learning period, but the quality of the generating MMSE dataset has the largest impact on the MMSE analysis Root Mean Square Error (RMSE) evaluated with respect to observed satellite SST. Lower RMSE analysis estimates result from the following choices: 15 days training period, an overconfident MMSE dataset (a subset with the higher quality ensemble members), and the least square algorithm being filtered a posteriori.