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A 'structure-oriented' method for forecast assesment: analysis of the forcing winds impact on the Mediterranean Sea structures representation

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A new method is developed which provides a new diagnostic tool for error analysis. Complementary to standard statistical tools, the DOW (Displacement Optimized and Weighting) tries to go beyond the classical comparison of snapshot views. As in meteorological forecast verification where new methods called 'event-based' (or 'object-oriented') are developed, we propose a 'structure-oriented' method for quality assessment of forecasts.

This method aims to evidence spatial shifts of structures and typical front misplacements. An ensemble optimization process provides displacement vectors fields which allow a comparison to other vector fields as wind forcing, current velocity, topography gradients, etc. At the same time a new hindcast, *i.e.* an analysed field which takes into account the displacements is produced. The method allows also to quantify the contribution of the error due to spatial shifts within the total error.

The method is applied to assessing Sea Surface Temperature prediction in the Mediterranean sea in the framework of the MFSTEP[1] project which aims to create an operational forecasting system for the Mediterranean sea. The simulations provided at the basin scale are 10 days forecasting fields in a 3-D ocean where the hydrodynamic model primitive equations are combined with the data assimilation.

A twin experiment is performed, one using the Surface wind fields from analyses of the European Center for Medium-Range Weather Forecasts (ECMWF) and the second one Surface wind fields from NASA QuikSCAT Scatterometer. We then explore the

forcing winds impact on large scale and mesoscale features representation.

(1) *Mediterranean Forecasting System: Toward Environmental Predictions.*

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