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High resolution Verification Evaluation (HIVE) - an assessment framework for ocean forecast products

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HiVE is a CMEMS funded collaboration project between the atmospheric Numerical Weather Prediction (NWP) verification community and the ocean community within the Met Office, which aims to demonstrate the use of spatial verification methods originally developed for the evaluation of high-resolution NWP forecasts, to CMEMS ocean model forecast products. Spatial verification methods provide more scale appropriate ways to better assess forecast characteristics and accuracy of km-scale forecasts, where the detail looks realistic but may not be in the right place at the right time. As a result, it can be the case that coarser resolution forecasts verify better (e.g. lower root-mean-square-error) than the higher resolution forecast. In this instance the smoothness of the coarser resolution forecast is rewarded, though the higher-resolution forecast may be better.

This project will, for the first time, apply such spatial verification methods to sub-10 km resolution ocean model forecasts. In the first instance, sea surface temperature (SST) and ocean currents will be assessed at observing locations using the High Resolution Assessment framework (HiRA). This is a single-observation-forecast-neighbourhood-type method which makes use of commonly used ensemble verification metrics such as the Brier Score (BS) and the Continuous Ranked Probability Score (CRPS). In this instance all model grid points within a predefined neighbourhood of the observing location are considered equi-probable outcomes (or pseudo-ensemble members) at the observing location.

Secondly, the skill of CMEMS products for forecasting events or features of interest such as algal blooms will be assessed using an object-based method called MODE (Method for Object-based Diagnostic Evaluation). This method can also evaluate the evolution of events, and how well the events match between the forecast and observation fields.

This poster will present some initial results from the first year of the project. The first year can be seen as a development phase and made use of forecasts from the AMM7 (1/10°) North West Shelf model. An extended assessment of the overlapping domains of the AMM7 (1/10°), IBI (1/36°) and AMM15 (1.5km) models will be completed during the second year of the project.