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The Met Office operational global ocean forecast system FOAM-ORCA12

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The importance of oceans for atmospheric forecasts as well as climate simulations is being increasingly recognised with the advent of coupled ocean / atmosphere forecast models. Having comparable resolutions in both domains maximises the benefits for a given computational cost. The Met Office has recently upgraded its operational global ocean-only model from an eddy permitting 1/4 degree tripolar grid (ORCA025) to the eddy resolving 1/12 degree ORCA12 configuration while retaining 1/4 degree data assimilation.

We will present a description of the ocean-only ORCA12 system, FOAM-ORCA12, alongside some initial results. Qualitatively, FOAM-ORCA12 seems to represent better (than FOAM-ORCA025) the details of mesoscale features in SST and surface currents. Overall, traditional statistical results suggest that the new FOAM-ORCA12 system performs similarly or slightly worse than the pre-existing FOAM-ORCA025. However, it is known that comparisons of models running at different resolutions suffer from a double penalty effect, whereby higher-resolution models are penalised more than lower-resolution models for features that are offset in time and space. Neighbourhood verification methods seek to make a fairer comparison using a common spatial scale for both models and it can be seen that, as neighbourhood sizes increase, ORCA12 consistently has lower continuous ranked probability scores (CRPS) than ORCA025. CRPS measures the accuracy of the pseudo-ensemble created by the neighbourhood method and generalises the mean absolute error measure for deterministic forecasts.

The focus over the next year will be on diagnosing the performance of both the model and assimilation. A planned development that is expected to enhance the system is the update of the background-error covariances used for data assimilation.