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The Met Office operational global ocean forecasting system at 1/12th degree resolution

The Met Office's operational Forecasting Ocean Assimilation Model (FOAM) global system has recently been upgraded from an eddy permitting 1/4 degree resolution (FOAM-ORCA025) to an eddy resolving 1/12th of a degree resolution (FOAM-ORCA12). The increase in resolution allows mesoscale processes to be resolved at a much larger range of latitudes, representation of finer resolution bathymetric features and coastlines and a larger number of resolved islands which can play an important role in ocean circulation.

FOAM uses a multivariate incremental variational data assimilation scheme called NEMOVAR which assimilates SST, temperature and salinity profile, altimeter SLA and satellite sea ice concentration observations with a 1 day assimilation window. The FOAM-ORCA12 configuration maintains the data assimilation at a 1/4 degree resolution while the model is run at the higher 1/12th degree resolution. This approach significantly reduces the computational cost and allows us to make use of the well established 1/4 degree data assimilation configuration.

We will present a description of the new 1/12th degree system alongside some initial results. Qualitatively, the new FOAM system appears to better represent the details of mesoscale features in SST and surface currents. However, traditional statistical verification methods suggest that the new system performs similarly or slightly worse than the pre-existing FOAM configuration. 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 FOAM-ORCA12 appears to perform better than FOAM-ORCA025 when these metrics are used.

Which theme does your abstract refer to?

Development and assessment of data assimilation in forecasting applications (global and regional)

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