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

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ABSTRACT

The Met Office has recently upgraded its operational Forecasting Ocean Assimilation Model system (FOAM) 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.

FOAM currently uses NEMOv3.6 coupled to CICEvGSI8.1 as physical engine for the ocean and sea-ice, respectively. At the surface, the system is forced by boundary conditions provided by the Met Office Unified Model. FOAM ingests observations of sea surface temperature, temperature and salinity profiles, altimeter (SLA) and sea ice concentration, via NEMOVAR which is a multivariate incremental variational scheme. This ocean-only system runs the data assimilation over a 1-day time window (analysis) followed by 7 days of forecasts.

We will present an overview of the FOAM-ORCA12 system, alongside some initial results. Qualitatively, FOAM-ORCA12 seems to represent better the details of mesoscale features in SST and surface currents. Overall, traditional statistical verification methods suggest that the new system performs similarly or slightly worse than the previous 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.