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Assessment of ocean currents in the FOAM system : site-specific vs. feature based analysis

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The FOAM (Forecast Ocean Assimilation Model) system runs daily at the UK Met Office and, amongst other physical quantities, produces analyses and 6 day fore casts of ocean currents. The system uses the NEMO ocean model and consists of a global $1/4^\circ$ (orca025) configuration with three $1/12^\circ$ nested regional configurations in the North Atlantic, the Indian Ocean and the Mediterranean Sea.

The validation of ocean currents is becoming more and more important for FOAM users and there is an increasing commercial requirement to know the quality of FOAM currents with a view to developing site-specific current forecasts.

Using the position of drogued, surface drifting buoys, an initial investigation is carried out into the accuracy of the global FOAM currents. A brief quantitative analysis is performed by comparing daily-mean model currents against daily-mean drifter velocities derived from the buoy positions, initially in equatorial regions but extending to the full globe. An initial comparison suggests that statistics are similar to those obtained from comparisons between FOAM currents and currents observed by equatorial moored buoys.

In order to test the potential for using FOAM to generate site-specific current forecasts and warnings we compare FOAM velocity fields directly with sub-surface current meter moorings. As well as this point-for-point comparison, a qualitative assessment of FOAM currents in the surrounding area is also undertaken to study the potential of using nearby features to predict the likelihood of exceeding certain speed thresholds.

Traditional metrics such as RMS error and correlation tend to penalise models that generate realistic flow patterns only slightly displaced, either spatially or temporally, from those observed. To counter this, and in order to conduct a quantitative analysis, we are developing more feature-based verification methods based around techniques used for atmospheric wind forecast verification.