

Data assimilation in the Met Office's 1.5km model of the North West European shelf

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Abstract

For a number of years the Met Office has been running a high resolution (1.5 km) model of the waters in the North West European shelf; this is the AMM15 system. The latest version of this system (AMM15_CO9) is shortly to go live, and includes an updated equation of state, ocean-wave coupling, and wetting and drying. Assimilating data into the AMM15 poses a number of challenges, foremost of which are the presence of large amplitude tidal dynamics, the use of s-coordinates for model depths, and a sparsity of subsurface observations in shallow waters. Despite these issues, assimilation of sea surface temperature (SST), sea level anomaly (SLA), and temperature and salinity profiles have been found to be beneficial in constraining the model.

Data assimilation in the AMM15 is done using the NEMOVAR framework which includes a suite of balance operators to handle multivariate aspects of the data assimilation. The univariate background error correlations are modelled using an implicit diffusion operator. Updates are applied to temperature, salinity, sea surface height (SSH), and – via the balance operators – horizontal currents. The technical details of the system are described within this presentation, including new developments to NEMOVAR's balance operators to better handle s-coordinates. Results comparing the assimilative model to a free running control are given.