Assessment of Global Forecast Ocean Assimilation Model (FOAM) using new satellite SST data

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There is an increased demand for accurate ocean weather information for applications in the field of marine safety and navigation, water quality, offshore commercial operations, monitoring of oil spills and pollutants, among others. The Met Office, UK, provides ocean forecasts to customers from governmental, commercial and ecological sectors using the Global Forecast Ocean Assimilation Model (FOAM), an operational modelling system which covers the global ocean and runs daily, using the NEMO (Nucleus for European Modelling of the Ocean) ocean model with horizontal resolution of $1/4°$ and 75 vertical levels. The system assimilates salinity and temperature profiles, sea surface temperature (SST), sea surface height (SSH), and sea ice concentration observations on a daily basis. In this study, the FOAM system is updated to assimilate Advanced Microwave Scanning Radiometer 2 (AMSR2) and the Spinning Enhanced Visible and Infrared Imager (SEVIRI) SST data. Model results from one month trials are assessed against observations using verification tools which provide a quantitative description of model performance and error, based on statistical metrics, including mean error, root mean square error (RMSE), correlation coefficient, and Taylor diagrams. A series of hindcast experiments is used to run the FOAM system with AMSR2 and SEVIRI SST data, using a control run for comparison. Results show that all trials perform well on the global ocean and that largest SST mean errors were found in the Southern hemisphere. The geographic distribution of the model error for SST and temperature profiles are discussed using statistical metrics evaluated over sub-regions of the global ocean.