Geophysical Research Abstracts
Vol. 13, EGU2011-8037, 2011
EGU General Assembly 2011

Sensitivity of the Met Office operational ocean forecasting system to atmospheric forcing

Catherine Guiavarc'h, John Siddorn, Dave Storkey, and Patrick Hyder
Ocean Forecasting R&D, Met Office, Exeter,United Kingdom (catherine.guiavarch@metoffice.gov.uk)

In the forthcoming years, a new challenge for the Met Office is to develop a seamless fully coupled ocean-atmosphere model to be used for weather forecasting as well as climate prediction. In this framework, in order to better understand the air-sea interactions and to improve the current Forecasting Ocean Assimilation Model (FOAM) system, experiments have been done to study the sensitivity of our global ocean model to the atmospheric forcing.
The FOAM operational system is running daily analysis and 5-day forecasts at the Met Office. The FOAM system uses the Nucleus for European Modelling of the Ocean (NEMO). Four configurations are running, one $\frac{1}{4}$ degree global model (ORCA025) and three 1/12 degree regional models (Med Sea, North Atlantic and Indian Ocean). Currently, FOAM is forced by 6-hourly atmospheric fields (wind stress, short wave radiation, long wave radiation, evaporation minus precipitation) produced by the Met Office Unified Model (UM).
A set of sensitivity experiments has been done with ORCA025 for August 2009 with different atmospheric forcings. The control experiment using 6-hourly fields from the UM is compared to experiment with 3-hourly fields highlighting the importance of the frequency of the atmospheric forcing to reproduce the diurnal cycle of the surface layers of the ocean, especially in the Pacific warm pool.
An experiment taking into accounts the oceanic surface currents to calculate the wind stress has also been run. Relative wind speed is used instead of direct wind stress from the UM to force ORCA025. As for the 3-hourly experiment, the main resulting change is seen in the tropics. Westward equatorial currents are remarkably weakened, reducing the bias observed in the current system.
Impact of hourly wind speed against 3-hourly wind speed is also assessed. As is a test using CORE bulk formulation with UM air temperature and humidity and ORCA025 SST and surface currents to calculate the air-sea fluxes instead of direct forcing from the UM.