Geophysical Research Abstracts, Vol. 9, 04615, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04615

Impact of glider data assimilation on model predictions of surface and subsurface properties.

I.Shulman(1), C. Rowley(1), S. Anderson(1), J. Kindle(1), S. Derada(2), J. Doyle(3), C. Cummings(1)

(1)Oceanography Division, Naval Research Laboratory, Stennis Space Center, MS, 39529, (2) Jacobs Sverdrup, Stennis Space Center, MS 39529, (3) Marine Meteorology Division, Naval Research Laboratory, Monterey, CA 93943, (Contact: igor.shulman@nrlssc.navy.mil)

Glider observations were essential components of the Autonomous Ocean Sampling Network (AOSN), real-time experiments conducted in the Monterey Bay area during Summers of 2003 and 2006. This paper is focused on the impact of the assimilation of glider temperature and salinity observations on the Navy Coastal Ocean Model (NCOM) predictions of surface and subsurface properties. The modeling system consists of an implementation of the NCOM model using a curvilinear, orthogonal grid with 1-4 km resolution, with finer resolution around the bay. The model receives open boundary conditions from a basin-scale NCOM-based the California Current System, and surface fluxes from the Coupled Ocean-Atmosphere Mesoscale Prediction System (COAMPS) atmospheric model at 3 km resolution. The data assimilation component of the system is a version of The Navy Coupled Ocean Data Assimilation (NCODA) system which is used for assimilation of the glider data into the NCOM model of the Monterey Bay area. The NCODA is a fully 3D multivariate optimum interpolation system that produces simultaneous analyses of temperature, salinity, geopotential, and vector velocity. Different error metrics were used for evaluation of the model predictions of surface and subsurface properties. Assimilation of the glider data significantly reduced biases and RMS errors in predictions of surface temperature and salinity at mooring locations. Also, assimilation of the glider data provided a better agreement with observations (for example, with aircraft measured SSTs) of the model predicted and observed spatial distributions of surface properties. Moorings observations of subsurface temperature and salinity show sharp changes in the thermocline and halocline depths during transitions from upwelling to relaxation and vice versa.

The non-assimilative run shows these transitions in subsurface temperature; however, changes are not as defined as in observations. For salinity, the non-assimilative run significantly differs from the observations. However, the glider data assimilating run is able to show comparable results with observations in deepening (shallowing) of thermocline as well as halocline depths during upwelling (relaxation) events.