Geophysical Research Abstracts, Vol. 9, 04022, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04022

Variational assimilation of sea surface temperature data in global ocean general circulation model.

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In this presentation we discuss recent efforts to assimilate sea surface temperature (SST) data in the CERFACS variational assimilation system for a global version of the OPA model. Our first step has been to assimilate global gridded SST maps (weekly OI analyses from Reynolds', interpolated into daily fields and onto the model grid). In our conventional system configuration, these SST maps are "assimilated" via a strong relaxation (nudging) term applied to the surface heat flux. While simple to implement, this approach has serious drawbacks in that it tends to dampen excessively the SST variability in the model and makes no use of error information about the model state or observations. By assimilating the SST maps statistically via the variational cost function, we hope to alleviate these drawbacks.

The direct assimilation of SST maps presents additional difficulties as will be discussed. First, it is currently desirable to keep the SST relaxation in polar regions where direct assimilation is problematic due to the presence of ice. Outside polar regions, the SST relaxation could be weakened or even suppressed altogether. Experimentation is ongoing to determine an acceptable strategy but it is likely that some combination of SST relaxation and SST assimilation will be necessary. Second, the conventional assumption that observation errors are uncorrelated in space and time is clearly inadequate for gridded, time-interpolated SST products. Methods to account for non-diagonal covariances in the SST observation errors using a diffusion operator will be presented.