

A Hybrid Ensemble-Variational Approach for Coastal Ocean Application

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The potential for combining ensemble and variational methods for coastal ocean application is investigated off the Bonney Coast in southern Australia. The tangent linear and adjoint code developed for the ROMS ocean model is applied to the output of another coastal ocean model to derive an improved initial condition by assimilating satellite SST data. The Assimilation is done using the Advanced Variational Regional Ocean Representer Analyzer (AVRORA) [1,2], a set of stand-alone codes that are dynamically consistent with ROMS.

The results show that the tangent linear and adjoint code from AVRORA could be successfully applied to SHOC (Sparse Hydrodynamic Ocean Code) [3] model output to obtain an initial condition that is closer to the observations and improve forecast. The representer derived from the ensemble OI [4] and AVRORA demonstrate similarities but also differences, with the ensemble OI-derived representer capturing the general patterns of coastal upwelling, and the AVRORA representer capturing the flow-dependent ocean states. One possibility to take advantage of both systems is therefore to initialize the covariances in AVRORA with the covariances derived from ensemble OI. Results from experiments on sensitivity and applicability of such a hybrid system will be presented.

References:

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