



A comparison between ocean ensemble forecasts with and without atmospheric forcing ensemble over Monterey Bay

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Numerical forecast errors come from uncertainties in initial and boundary conditions as well as model. For the ocean model forecast, quantifying the uncertainties in atmospheric forcing is very important. However, it is very expensive to generate a high-resolution forcing ensemble by running the high-resolution atmospheric ensemble forecast model. Fortunately, an ensemble technique known as space-time deformation is currently under development and testing at NRL in Monterey. The technique was based on the idea that the model forecast errors are often well described in terms of shifting and timing errors and one can deform the forcing field smoothly in space and time to generate a forcing ensemble. This space-time deformation technique enables us to generate very large and very high resolution ensemble forecasts in an inexpensive way. In this study, the technique is used to generate atmospheric forcing ensemble from a single 3-km resolution forcing forecast field. This forcing ensemble as an addition to the initial perturbation is then applied to the ocean model to generate ocean ensemble forecast. A comparison between ocean ensemble forecasts with and without atmospheric forcing ensemble over Monterey Bay is conducted to evaluate the space-time deformation technique.