A Model-based Observation-thinning Scheme for Assimilation of High Resolution SST in the Shelf and Coastal Seas around China

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The use of high density remote-sensing, buoy and ship-based observation is playing an increasingly crucial role in operational assimilation and forecast of oceans. With the recent release of several high resolution observation datasets such as the GODAE High Resolution SST (GHRSST) datasets, the development of observation-thinning schemes becomes important in the process of data assimilation. Because the huge quantity and dense spatial/temporal distributions of these data sets might make it expensive to assimilate the full dataset into ocean models, or even decay the assimilation result. In this study, a model simulation ensemble-based observation-thinning scheme is proposed and applied to a Chinese Shelf/Coastal Seas eddy-resolving model. A successful thinning scheme should select a subset of observations that can yield the analysis error variance (AEV) small enough while have the number of observations as less as possible. In this study we estimated the background error covariance (BEC) using the historical ensemble, and then selected the subset of observations to minimize the AEV, which is estimated from the Kalman theory. We used this method in a GHRSST product cover the shelf and coastal seas around China, and then verified the result with estimation function and assimilation/forecast results. This paper is in press^[1].

References

[1] Li Xichen, Jiang Zhu, Yiguo Xiao and Ruiwen Wang,: J. Atmos. and Ocean. Tech. In press (2010).