

## Ensemble Data Assimilation in Coupled Ocean-Atmosphere Models: The Role of Ocean-Atmosphere Interaction

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We studied coupled ensemble data assimilation schemes in the perfect model scenario in a hierarchy of coupled ocean-atmosphere models, a simple model, a model of intermediate complexity and a coupled GCM, with the focus on the role of ocean-atmosphere interaction in the assimilation. Preliminary results suggest that the optimal assimilation scheme is the fully coupled data assimilation scheme that assimilates observations in both the atmosphere and ocean and employs the coupled covariance matrix. The assimilation of high frequency synoptic atmospheric variability that captures the temporal fluctuation of the weather noise is important for the estimation of not only atmospheric state, but also oceanic state in certain regions. Atmospheric observation can further improve the oceanic state directly through the coupled dynamics and the covariance between the atmosphere and ocean.