



Data assimilation in a coupled sea ice-ocean model: comparison between variational and ensemble approaches

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With the goal of producing accurate analyses and forecasts of sea-ice conditions, a three-dimensional variational (3D-Var) data assimilation system and ensemble Kalman filter (EnKF) are developed for a coupled ice-ocean model. Specification of the background-error covariance between the sea ice and ocean variables is particularly important because the lack of direct measurements of the three-dimensional ocean state under sea ice. The EnKF is used to estimate background-error covariances for the 3D-Var data assimilation system with the approximation of horizontal homogeneity. Results from assimilating sea-ice data using the 3D-Var and EnKF are compared. Also, a new approach for modelling the horizontal background-error correlations for the highly discontinuous sea-ice variables is discussed.