Prediction performance in ensemble type algorithm of sequential data assimilation

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Varialbles in a simulation model are modified by observations online in sequetial data assimilation. Ensemble Kalman filter is widely used for this purpose. However, it assumes Gaussianity and constructs filter ensembles using linear combination of predictive ensembles. Therefore, inappropriate ensembles may be generated in ensemble Kalman filter. On the other hand, the particle filter does not have this property though it has another problem called degeneracy. We discuss these properties through numerical experiments. In next, we discuss appropriate introduction of smoother information may improve prediction performance in simulation model though only filter ensembles are required in principle.