

Sequential data assimilation techniques and their application

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Data assimilation is an approach to estimate a state of a dynamic system by incorporating observation into a model of the system. Although data assimilation techniques have been principally developed for applications in meteorology, those framework are applicable to various dynamical systems in geophysics. Data assimilation techniques are classified into two types: variational data assimilation and sequential data assimilation. While variational data assimilation is performed by fitting a dynamic model to all of the available observations during a period of interest, sequential data assimilation is an on line approach that updates the estimation of a state at each observation time. We are addressing sequential data assimilation for modeling several geophysical phenomena. In this paper, we will review some sequential data assimilation techniques such as ensemble Kalman filter and particle filter, and show applications to some problems and improvements for applying to each particular problem.