Towards nonlinear data assimilation for hazardous weather prediction

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Abstract

Data assimilation for the atmosphere is an important case of the Bayesian state estimation problem, where given a sequence of observations and some knowledge of the dynamics of the system, an estimate of the current state is made. Since the weather forecast model and observations contain errors, and the forecast model depends sensitively on initial conditions, the true state of the system can never be determined precisely.

In this talk, a brief review of the current state of the art in data assimilation for weather forecasting will be presented. Further consideration will be given to whether these algorithms are suited to the next generation of forecast models for convective (storm-scale) forecasting. A new nonlinear data assimilation method, based on the ideas of particle filtering will be described and some preliminary results presented, showing the effectiveness of the method.