



GCM Parameter estimation based on LETKF

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The Local Ensemble Transform Kalman Filter is used for the simultaneous estimation of model state and parameters associated to the convective parametrization of a simplified general circulation model. The impact of parameter estimation upon initial conditions and short range forecasts are estimated using twin experiments. This approach allows the evaluation of the technique under the assumption of perfect knowledge of the true system evolution and its associated parameters.

Two approaches are tested for the inclusion of parameter estimation within a data assimilation cycle, one which uses an ensemble with perturbations in the initial conditions and in the parameters. The other approach uses two separate ensembles, one ensemble based on the perturbations of the initial conditions and the other ensemble based only on the perturbations of the parameters. The second approach produces a less noiser estimation of the parameter, although the reduction of the analysis error is similar to that obtained with the first approach which is also computationally cheaper.

The sensitivity of the analysis error and estimated parameters to the spread of the parameter ensemble and to the parameter initial value is explored.

The Ensemble Transform Kalman Filter successfully estimates the parameters associated with the convective scheme. The method also produces a good synchronization when the true model parameters are time dependent.