

Data assimilation using a particle filter in twin and real data experiments with a coupled climate model

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Particle filtering is a relatively new and promising approach for data assimilation in climate models. It is a challenging task to develop a non-degenerative particle filter for a large-scale geophysical model using a relatively small number of particles. Here we implement a particle filter for data-assimilation method in a climate model, focusing on interannual to centennial timescales. Several tests are performed where we investigated various approaches to compute the cost function. These approaches are based on assigning different weights to particles and calculating the likelihood of each ensemble member from different hypotheses. In those tests, we use pseudo-observations obtained from twin experiment using the coupled climate model LOVECLIM, as well as the real data observations obtained over the last century.