Contribution ID: **15** Type: **Poster presentation**

A hybrid nonlinear-Kalman ensemble transform filter for data assimilation in systems with different degrees of nonlinearity

The second-order exact particle filter NETF (nonlinear ensemble transform filter) is combined with local ensemble transform Kalman filter (LETKF) to build a hybrid filter method (LKNETF). The filter combines the stability of the LETKF with the nonlinear properties of the NETF to obtain improved assimilation results for small ensemble sizes. Both filter components are localized in a consistent way so that the filter can be applied with high-dimensional models. The degree of filter nonlinearity is defined by a hybrid weight, which shifts the analysis between the LETKF and NETF. Since the NETF is more sensitive to sampling errors than the LETKF, the latter filter should be preferred in linear cases. It is discussed how an adaptive hybrid weight can be defined based on the nonlinearity of the system so that the adaptivity yields a good filter performance in linear and nonlinear situations. The filter behavior is exemplified based on experiments with the chaotic Lorenz-96 model, in which the nonlinearity can be controlled by the length of the forecast phase, and an idealized configuration of the ocean model NEMO.

Which theme does your abstract refer to?

Data assimilation methods (algorithmic developments in variational, ensemble and hybrid DA, covariance modelling, etc)

Primary author: Dr NERGER, Lars (Alfred Wegener Institute)

Presenter: Dr NERGER, Lars (Alfred Wegener Institute)

Session Classification: Poster session 2

Track Classification: Data assimilation methods