Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01167, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01167
EGU General Assembly 2008

Estimation of background-error variances with a small ensemble of forecasts and optimized spatial filtering

L. Raynaud (1), L. Berre (1) and G. Desroziers (1)
Météo-France, CNRM-GAME/GMAP, e-mail : laure.raynaud@meteo.fr

It is common to compute background-error variances from an ensemble of perturbed assimilations, in order to calculate either climatological or flow-dependent estimates. However, the finite size of the ensemble induces a sampling noise, which degrades the accuracy of the variance estimation.

Experimental studies reveal that the spatial structure of sampling noise is relatively small-scale, and is largely connected to the spatial structure of background-error (i.e to its correlation function). More precisely, it will be shown that the noise is even smaller scale than the background-error, which suggests that, for realistic values of correlation length-scale, spatial averaging should be an efficient technique to remove the sampling noise.

Investigations conducted in both an idealized 1D framework and a more realistic 2D framework support the idea that, under come conditions (which will be clarified), a local spatial average of statistics allows the statistical sample size to be strongly increased, and then helps to ensure an accurate representation of variances. In particular, we will show that an optimized averaging of a 6-member estimate is capable of providing a variance map as accurate as the raw map derived from a much bigger ensemble (namely 220 members).

If time permits, we will discuss how to implement the optimal filtering of background-error variances in an operational system.