WWRP/THORPEX WORKSHOP on 4D-VAR and
ENSEMBLE KALMAN FILTER INTER-COMPARISONS
BUENOS AIRES - ARGENTINA, 10-13 NOVEMBER 2008

Discussion on "Issues of nonlinearity and non-gaussianity"

To what extent are the *predictable* processes in our systems significantly non-linear or non-Gaussian? How to diagnose deviations from gaussianity ?

a) To what extent are the dynamics of perturbations on these predictable scales significantly non-linear or non-Gaussian ? (M. Fisher)

b) With increasing computing power, will *non-perturbative* methods (based on fully non-Gaussian schemes, not necessarily particles filters or ambitious methods that aim solving the Bayesian filter) be useful in a near future ? (M. Bocquet)

c) How do we measure deviations from gaussianity to improve our *perturbative* schemes ? Should one measure non-gaussianity from characteristics of the flow or should one use measures of uncertainty (or of information) ? (M. Bocquet)

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How does non-gaussianity/ nonlinearity handling transfer from 4D-Var to EnKF and vice-versa ?

a) Linear analysis with non-linear propagation, or non-linear analysis with linear propagation ? Which is the more important: non-linear propagation of perturbations, or a non-Gaussian analysis step ? Can we achieve both ? (M. Fisher)

b) Adapt the outer-loop idea from 4D-Var for EnKF. (S.-C. Yang)

c) Improve the EnKF spin-up. Perform a "running in place" method to accelerate the EnKF's spin-up and to improve the ensemble mean and perturbations simultaneously, Similar to the outer-loop EnKF, the no-cost smoother is applied to improve the analysis ensemble at earlier time. The process is repeatedly done until the ensemble catches up the dynamics of the flow and extract the maximum of the observation information. (S.-C. Yang)