



Ensemble variational data assimilation with a shallow-water model : preliminary results

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The objective of ensemble data assimilation is to produce an ensemble of analysis from observations and a numerical model which is representative of the uncertainty of the system. In a bayesian framework, the ensemble represents a sampling of the state vector probability distribution conditioned to the available knowledge of the system, denoted the a-posteriori probability distribution.

Ensemble variational data assimilation (EnsVar) consists in producing such an ensemble by perturbing N times the observations according to their error law, and run a standard variational assimilation for each perturbation. An ensemble of N members is then produced. In the case of linear models, there is a theoretical guarantee that this ensemble is a sampling of the a-posteriori probability. But there is no theoretical result in the non-linear case.

Numerical experiments using non-linear numerical models suggest that the conclusion reached for linear models still stands for non linear toy models.

The objective of the present work is to show preliminary results of EnsVar applied to a more realistic model : a shallow-water model. Some statistical properties of the ensemble are presented, and the sensitivity to the main features of the assimilation system (number, distribution of observations, size of the assimilation window, ...) are also studied.