

Introduction of kernel methods for ensemble data assimilation

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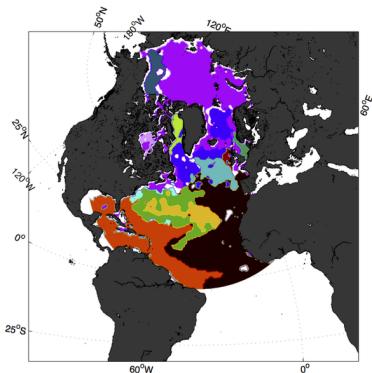
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What's the purpose of data assimilation ?

Data assimilation : Estimating the state of a system based on a imperfect model and incomplete observations

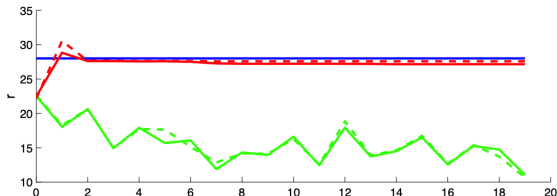


Estimation of phytoplankton population distribution in the North Atlantic and Arctic oceans (data size of the order of 10^9) Data from the HYCOM-NORWECOM model, developed by [NERSC in Norway](#).

Source : [Experiences in multiyear combined state-parameter estimation with an ecosystem model of the North Atlantic and Arctic Oceans using the Ensemble Kalman Filter](#) ; E. Simon, A. Samuelsen, L. Bertino, S. Mouysset ; Journal of Marine Systems, Décembre 2015

Background and key issues

- Interpretation in the Bayesian framework : Gaussian assumptions of the EnKF, 4DVar methods...
- Limits :



Evolution of parameter estimation : particle filter (Bayesian) in red, EnKF (ensemblist) in green, true value in blue.

- Introduction of kernel methods : Data linearisation property

Source : Sequential parameter estimation for stochastic systems ; G. A. Kivman ; Nonlinear Processes in Geophysics, December 2002