



Crash Course on Data Assimilation

Theoretical foundations and advanced applications with focus on ensemble methods

NERSC – Bergen, Norway, 22 – 25 May 2018

Data Assimilation (DA) in geosciences refers to the large class of methods that allow combining data with a model representation of a natural process. It is a common practice in numerical weather prediction but it is becoming widespread in many other areas of climate, atmospheric, ocean and environmental modeling; in all those circumstances where one intends to estimate the state of a large system based on limited information.

While the complexity of Data Assimilation, and of the methods therein, stands on its interdisciplinary nature across statistics, dynamical system and numerical optimization, when applied to geosciences an additional difficulty arises. The huge dimension of the numerical models, the vast amount of Earth observational data at our disposal, and the pressure to deliver timely accurate forecasts, require the development of computationally efficient solutions. Despite data assimilation is nowadays ubiquitous in geosciences, it still remains a topic mostly reserved for experts. The Data Assimilation Crash Course is aimed at students and young scientists that are confronted with the issue of combining data with models, and wish to have a first overview of the conceptual and methodological complexities of Data Assimilation, and a journey into the different domains of its applications.

The team of lectures includes top class experts of data assimilation, senior environmental scientists who have expanded the application of data assimilation to new areas, as well as young researchers:

- **Geir Evensen** (IRIS & NERSC, Norway): Basic principles of inference and theory of variational and sequential Gaussian analysis, EnKF fundamentals
- **Laurent Bertino** (NERSC, Norway): Background statistics, spatial covariances, anamorphosis for non-Gaussian variables
- **Alberto Carrassi** (NERSC, Norway): Data assimilation for chaotic dynamics
- **Yan Chen** (TOTAL, France): Data assimilation for history matching
- **Svetlana Dubinkina** (CWI, Holland): Data assimilation for paleo-climate
- **Colin Grudzien** (NERSC, Norway): Numerical exercises on data assimilation and dynamical systems
- **Remus Hanea** (STATOIL, Norway): Data assimilation for oil reservoirs
- **Harrie-Jan Hendricks Franssen** (IBG-3, Germany): Data assimilation for hydrology
- **Annette Samuelsen** (NERSC, Norway): Data assimilation for the ecosystem
- **Yiguo Wang** (NERSC, Norway): Data assimilation for climate predictions

Scientific and Organizational Committee:

Alberto Carrassi, Laurent Bertino and Geir Evensen

Venue: The lectures will take place at NERSC premises located in Thormøhlens gate 47, N-5006 Bergen