

BIRS DA Workshop

Discussion

Mathematical Issues in Data Assimilation

February 7, 2008

Main Topics

1. Addressing and accounting uncertainties
2. Issues associated with (geo)physical systems
3. Incorporating ideas from mathematics/statistics/dynamical systems

1. Addressing and Accounting Uncertainties

- Non-gaussianity in pdf of the state
 - Representation
 - Consistency check
- Sampling
 - Size
 - Maintenance of balance
- Model errors
 - Representation: pdf or parameterization
 - Flow dependence
 - Dependence on physical parameters
 - Algorithmic issues

2. Issues Associated with Geophysical Systems

- Physical balance
 - Localization on representation of covariance
 - Complexity of the model (high dimension, high resolution)
- Scale interactions in turbulent flows
 - Observability
 - Representativeness errors
- Parameter estimation of the model

3. Incorporating Ideas from Mathematics / Statistics

- Dynamical systems theory
 - Applications of ideas from dynamical systems theory for low-dimensional system to high-dimensional systems
 - Dimension reduction to effective subspace
- Information theory
- Model reduction
-