Advancing Data Assimilation
and Observing System Design

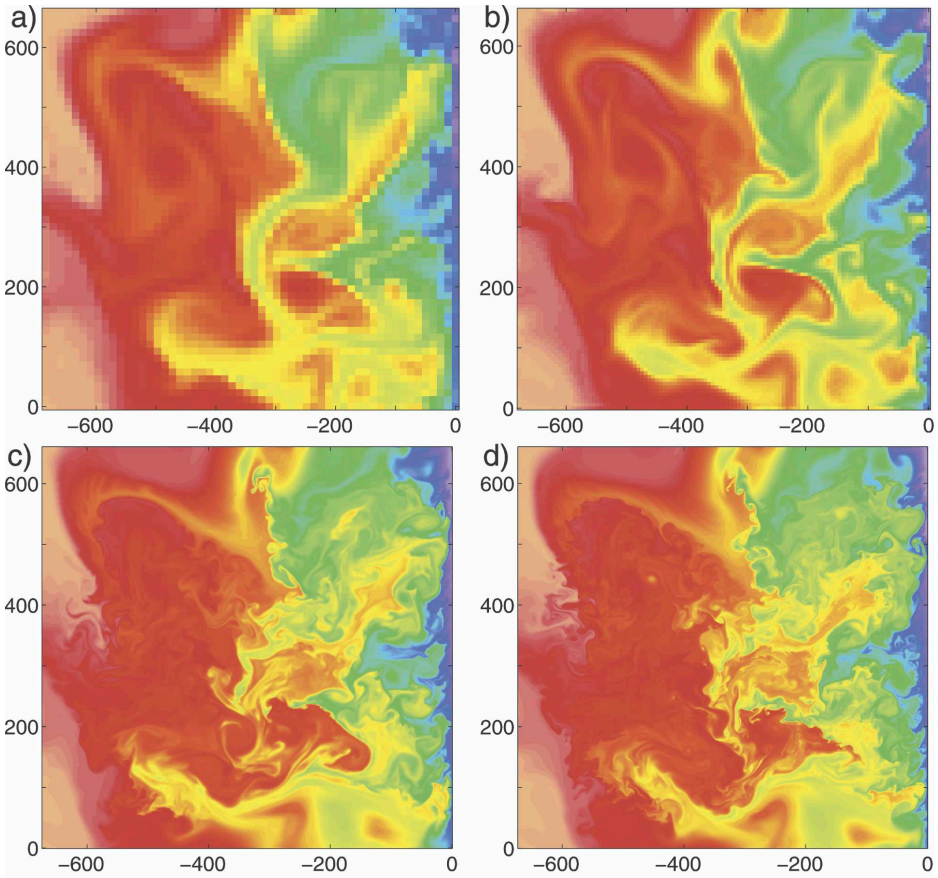
Kayo Ide

- Main topic: Multi-Scale (MS) scheme for EnKF and Hybrid

- Other interests:
  - Balance and constraints for EnKF and Hybrid
  - Space weather
  - Image assimilation
  - Observing system network design for autonomous vehicles (for example, drowns, Lagrangian instruments)

Multi-Scale Scheme for EnKF and Hybrid System

- Motivation



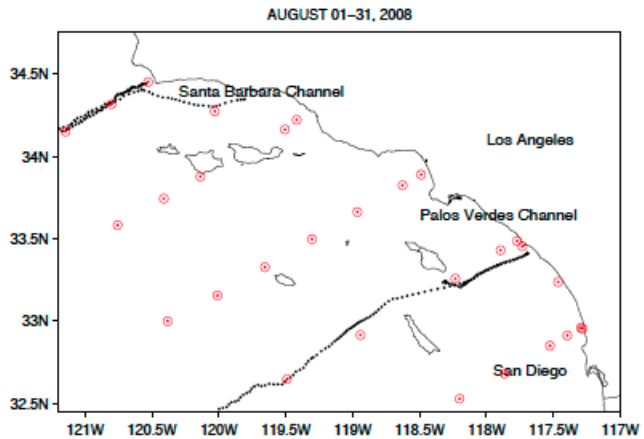
- Idea
  - Static back covariance accommodates MS naturally via localization
  - Ensemble covariance should naturally accommodate M Sin both
    - EnKF
    - Hybrid
- Algorithm
  - MS decomposition of ensemble
  - Implementation Steps
    - Scale separation

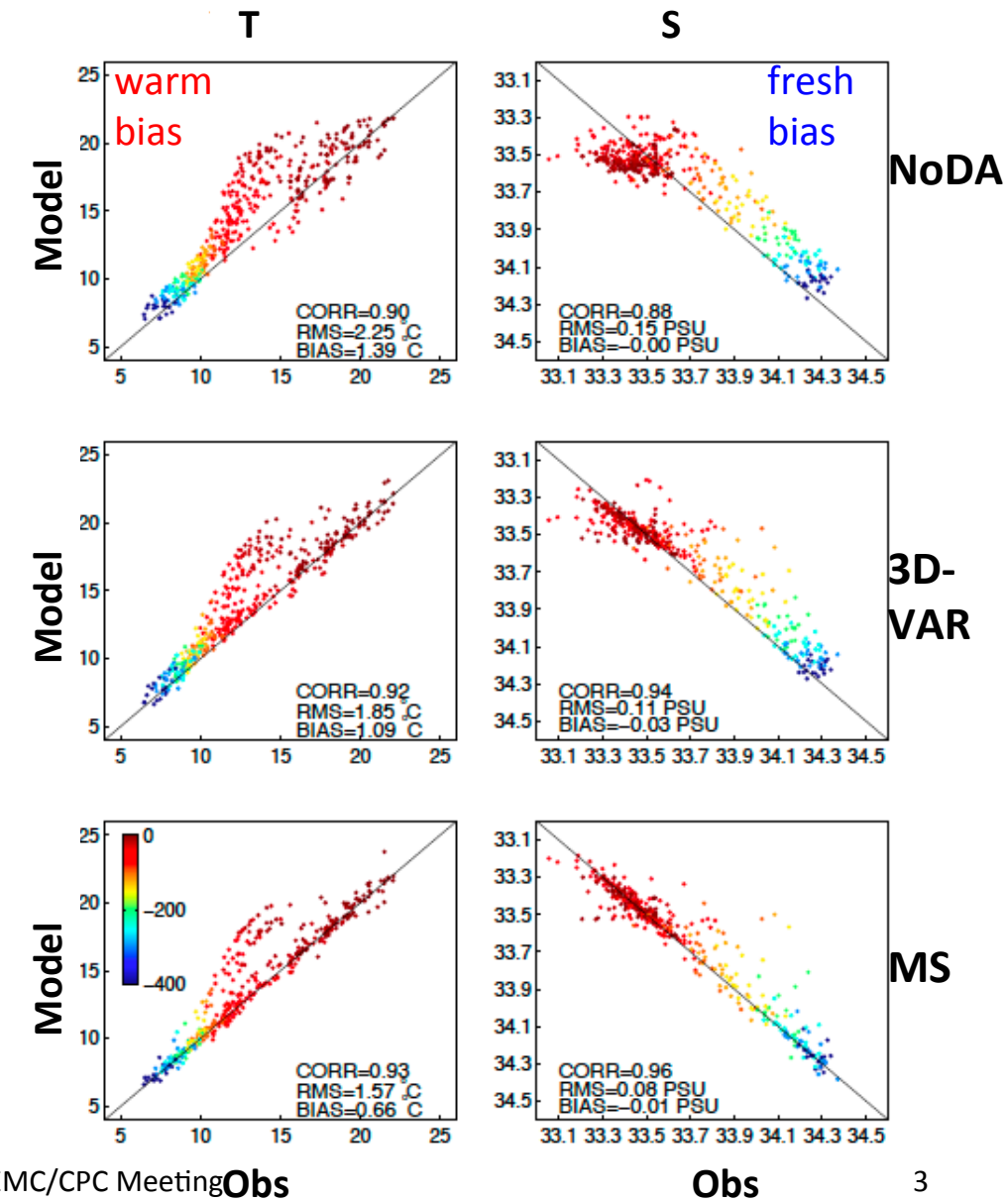
      (Li et al 2015; *Work in Progress*)
    - Correlation between scales

      (Buehner and Shlyaeva, 2015)

Ex: Multi-Scale Data Assimilation for Coastal Ocean Applications

- Comparison with independent data [08/14-29/2008]
  - CalCOFI location (o)





- MS Data Assimilation
  - Reduction of error
  - Reduction of bias