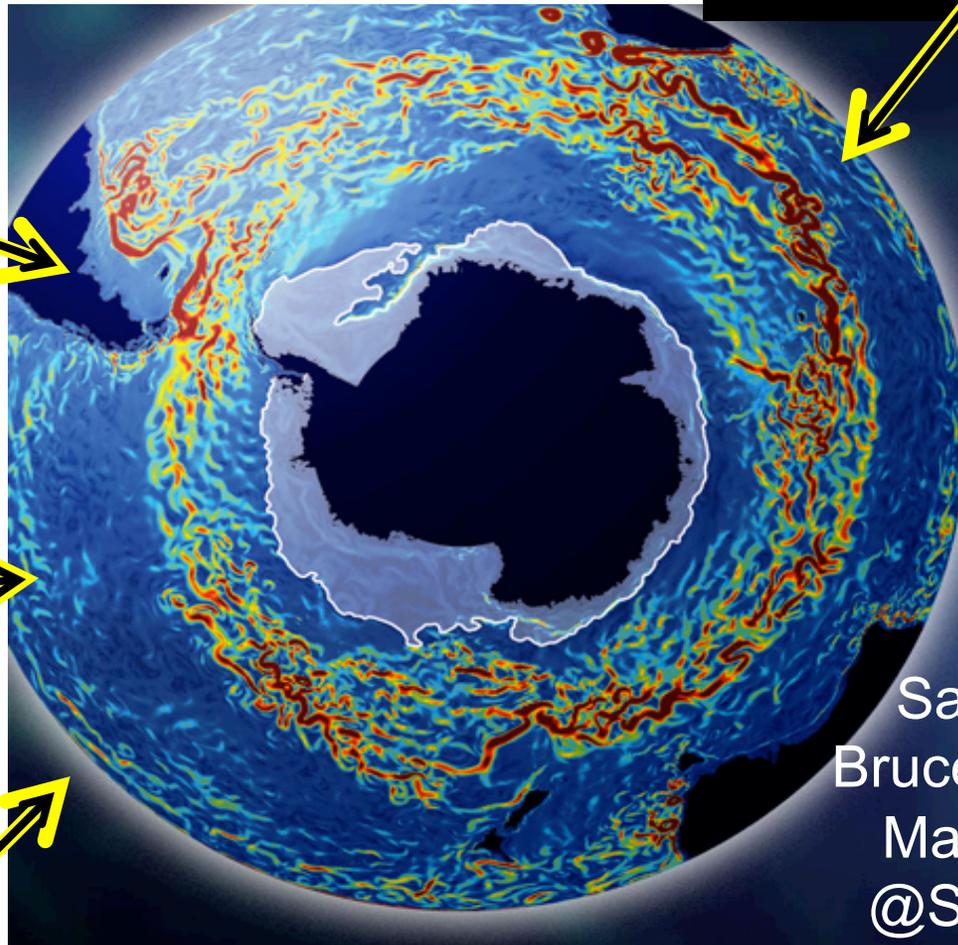
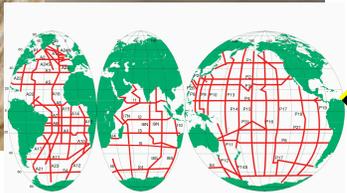
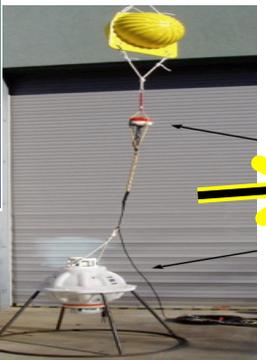
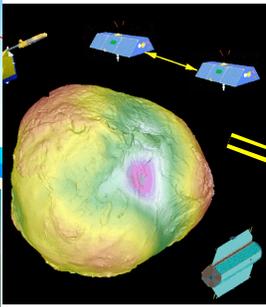
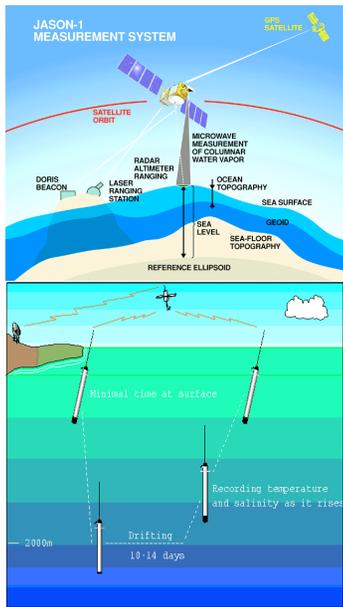
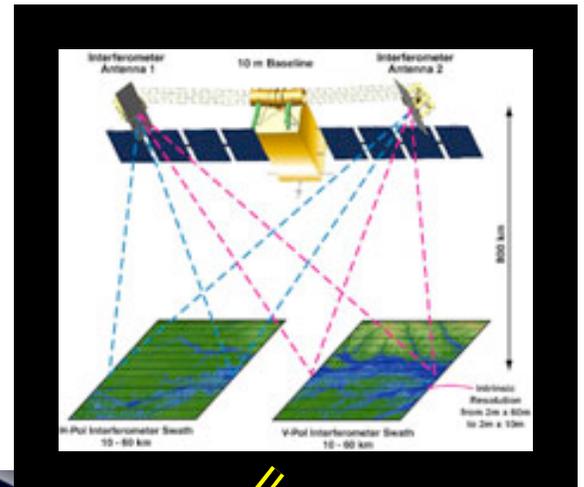


4D-Var state estimation for maximum information return from SWOT observations in the California Current System and the Southern Ocean



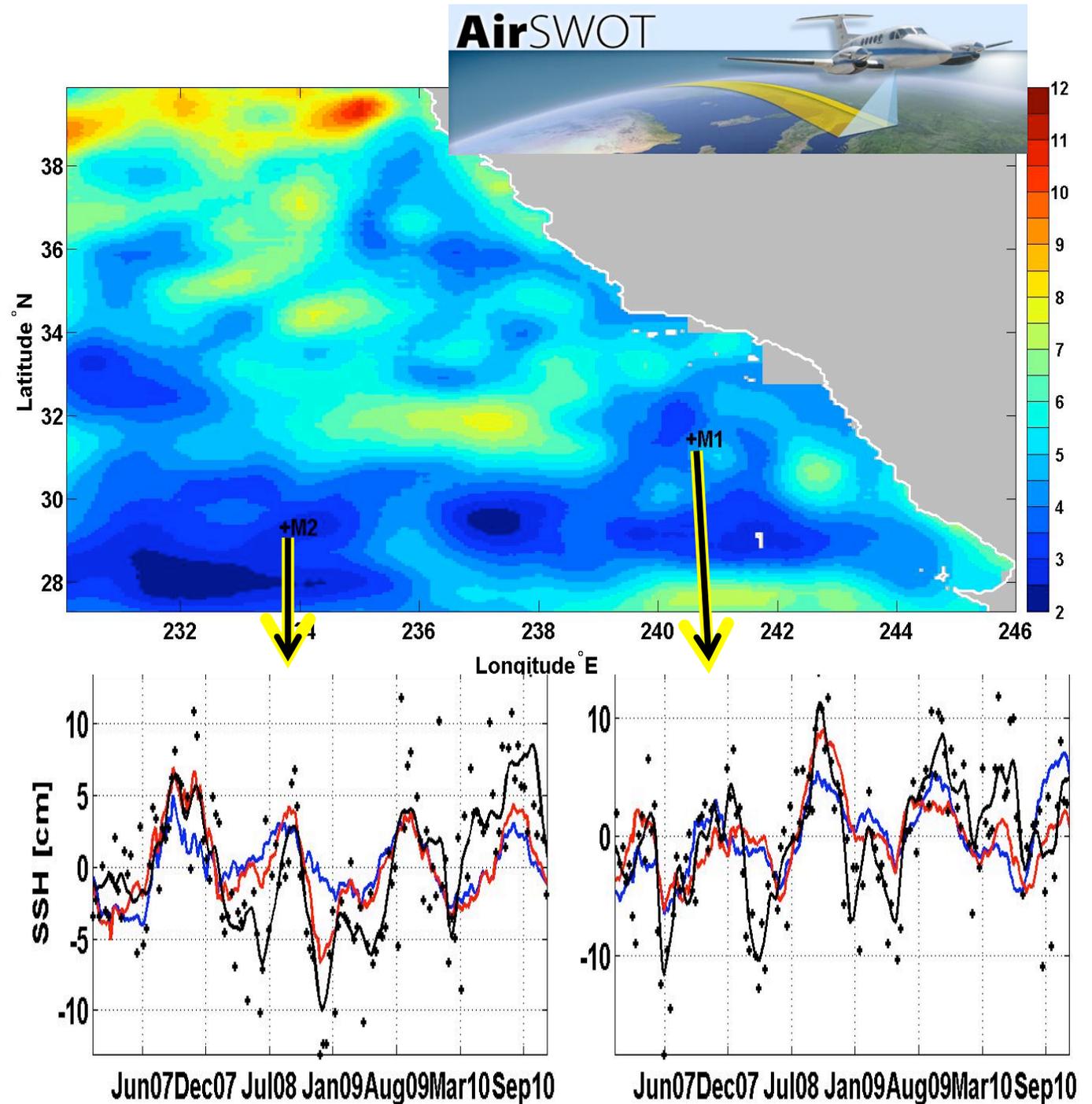
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Bruce Cornuelle
Matt Mazloff
@SIO-UCSD

An eddy resolving California Current System State Estimate (CASE) for 2007 – 2010

Top: RMS difference between AVISO product and CASE

Bottom: Time-series of control run (blue), latest CASE solution (green), AVISO product (black), and Jason 1 & 2 obs. (+)

- ITER0
- ITER172
- AVISO
- + Jason 1&2

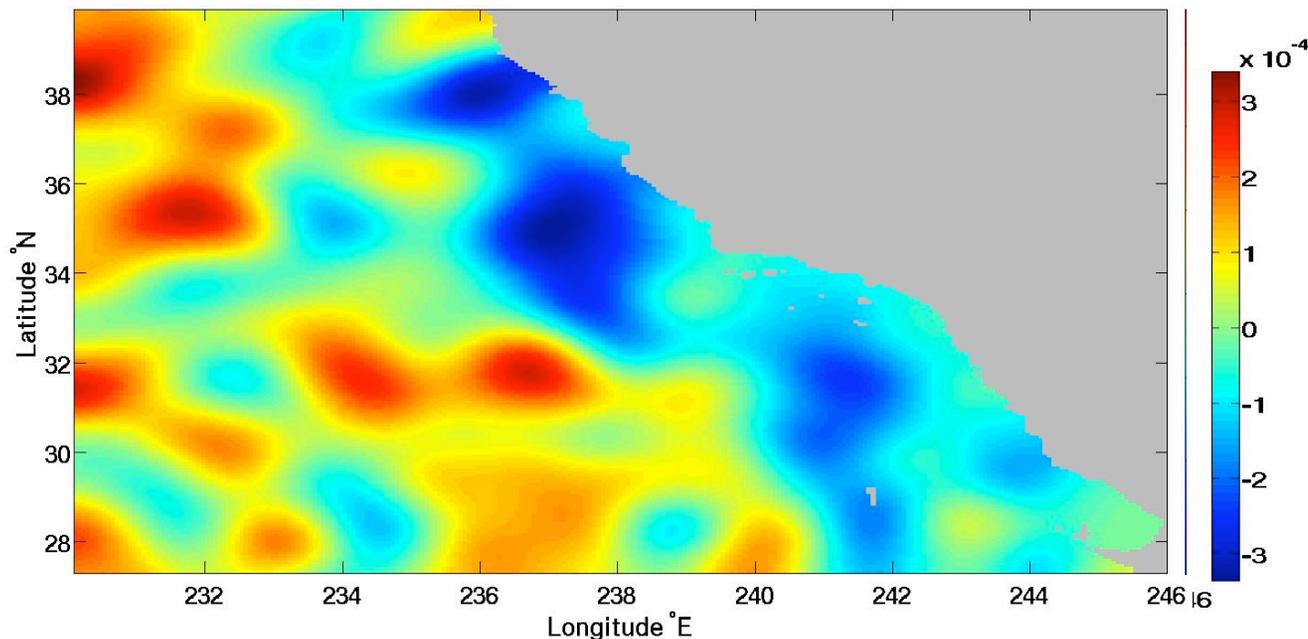


Supporting SWOT: What are error budget requirements for assimilation?

- What error information do we need to assimilate?
- How much uncertainty can we tolerate in atm corrections?
- Will a nadir-only radiometer suffice?

Approach: CASE allows estimation of error structure by quantifying consistency with ocean model physics and ocean observations.

$$J = \left[MDT_{\text{model}} - (MSS - Geoid - F_{60}) \right]^2 \sigma_M^{-2} + (F_{60})^2 \sigma_F^{-2}$$



Example: Determine consistency between CCS state estimate and mean dynamic topography (MDT). Solve for an error field with spatial structure $> 60\text{km}$, F_{60} . Geoid here is TIM2I: Pail et al, *J. Geodesy*. 2011