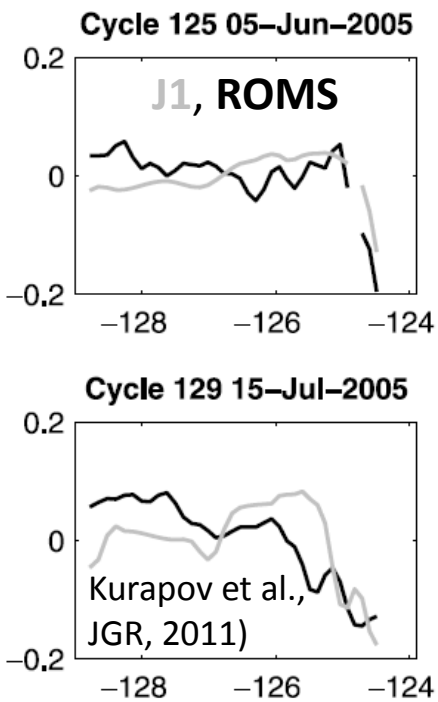
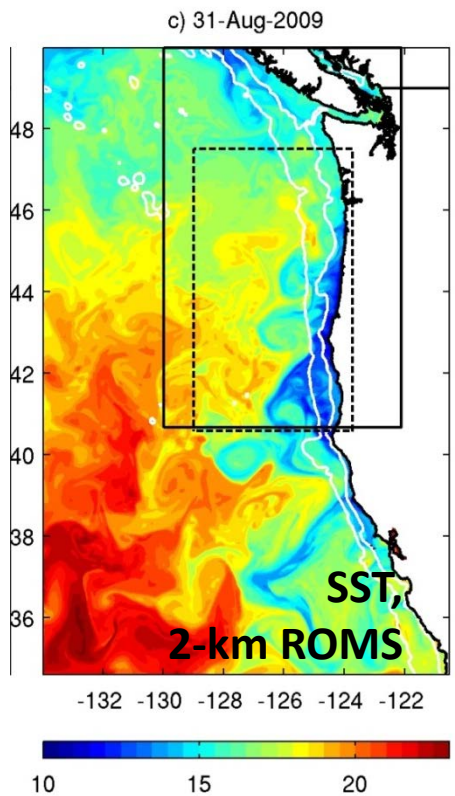
# Regional and Coastal Ocean Applications of SWOT

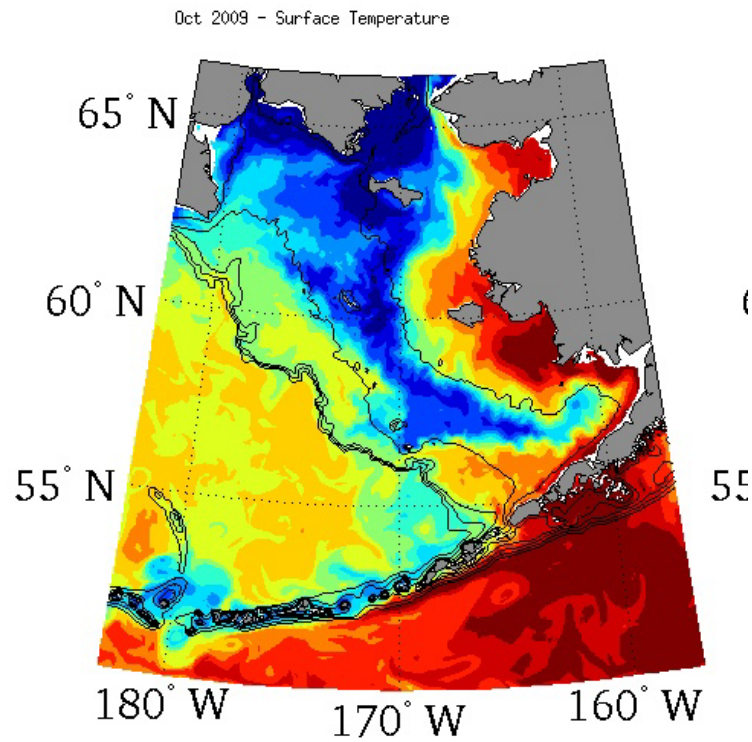
PIs: *Alexander Kurapov, P. Ted Strub* (Oregon State University)

Use a combination of models, available observations, and adjoint-based data assimilation tools to understand the nature of the SSH signal in coastal areas (upwelling systems, frontal processes, river plumes, storms, ice)

Model applications (dx= 3, 2, 1, 0.2 km), US West Coast, Bering Sea



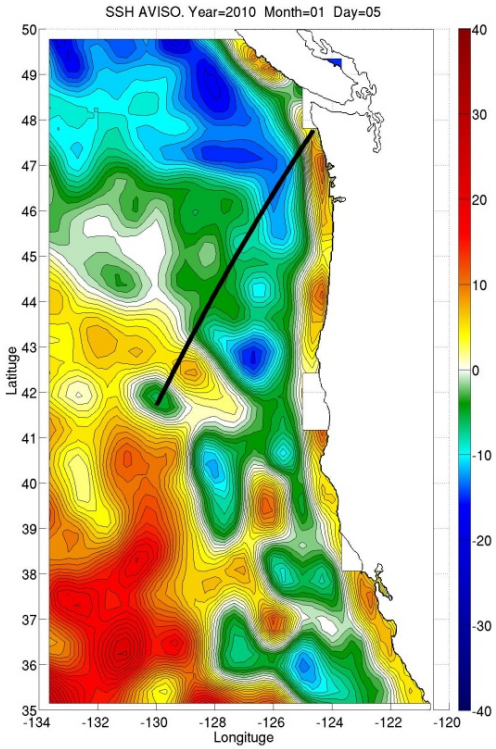



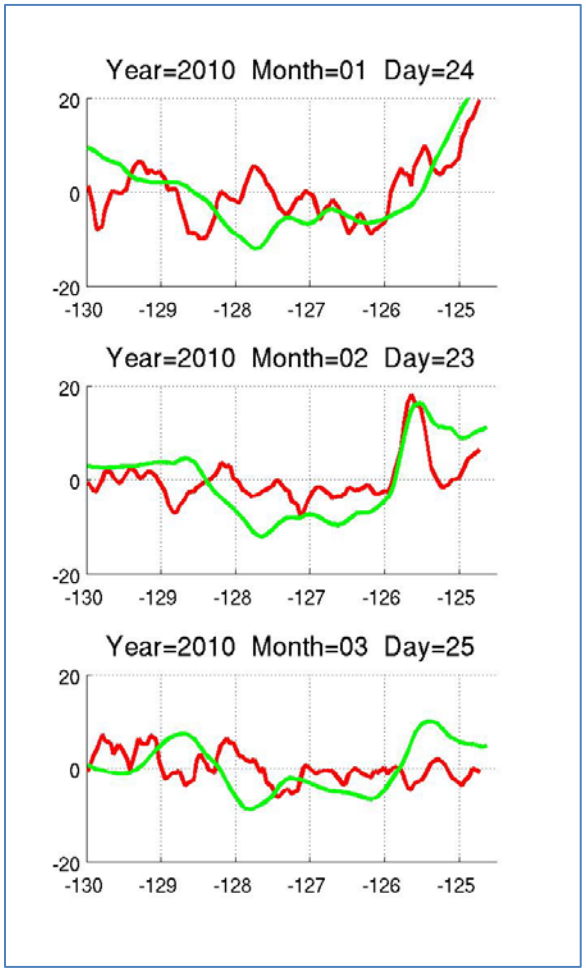



**Objectives:**

- Quantifying variability of SSH from observations and high-resolution models
- Advanced data assimilation (incl. a pilot real-time forecast system off Oregon)
- Synergy of high-resolution imagery, in particular, for estimating ocean surface velocity
- Merging SWOT observations with other types of data
- Internal tides
- Analysis of SSH measurements in the presence of ice
- Utility of SWOT data for societal applications (in particular, navigation, fisheries, and environmental hazard response)

**Shown:**
(left) AVISO SSH 1/5/2010,
(right) **alongtrack altimetry** &
and **ROMS SSH** compared



**Addressing issues relevant to SWOT:**

High-resolution models (dx< 1km): explain SSH variability at those scales

Large internal tides in the Bering Sea: effects on sea surface topography

Assess the signal in reprocessed (high-resolution) along-track data (in collaboration with N. Picot et al., CNES)

Data assimilation: provide smooth maps of SSH, synthesis with other data; constrain surface velocity estimates

Experiments with synthetic SWOT data: coverage vs. repeat cycle, different noise levels. Demonstrate the effect of SWOT data assimilation on subsurface fields estimation