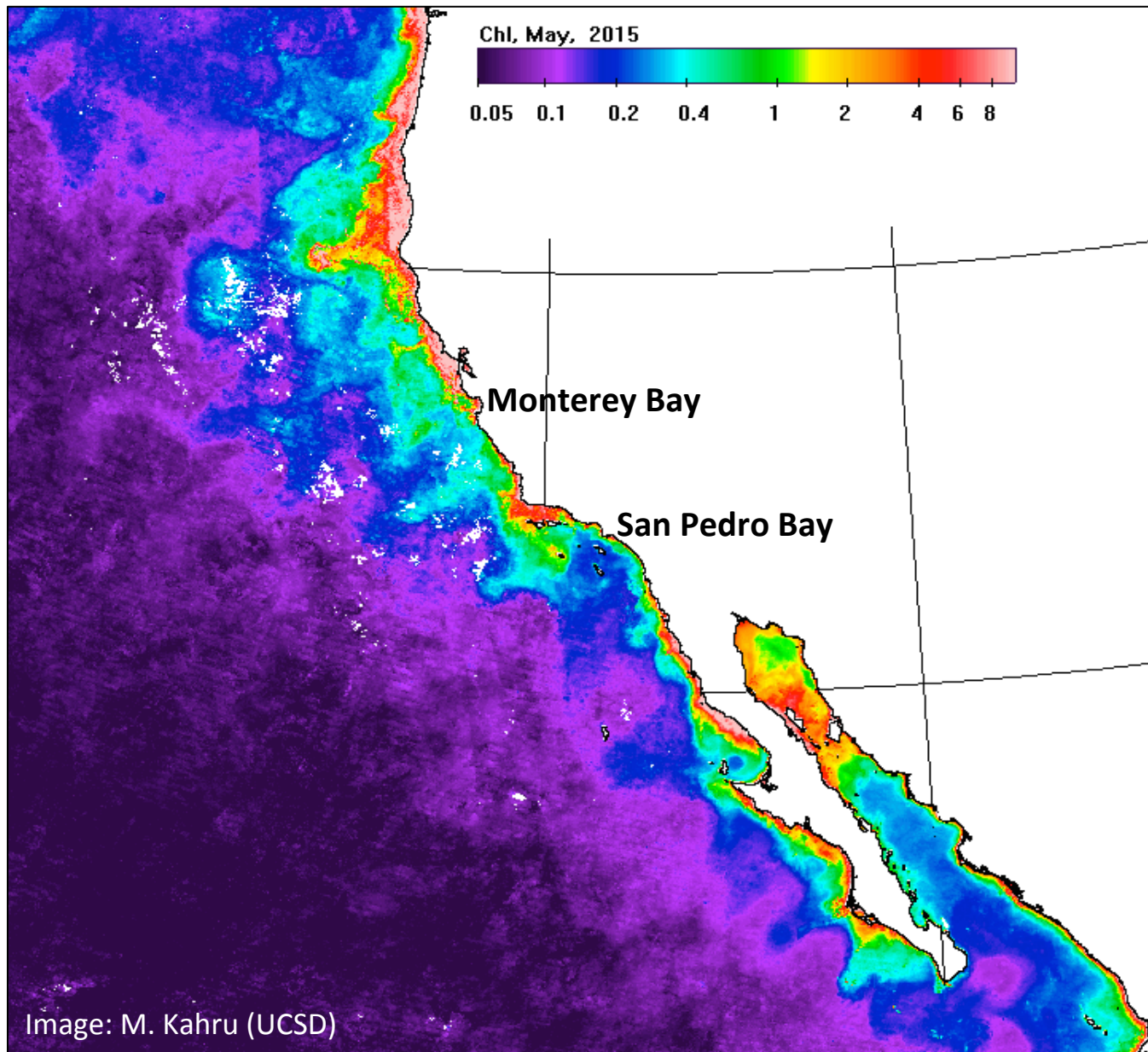
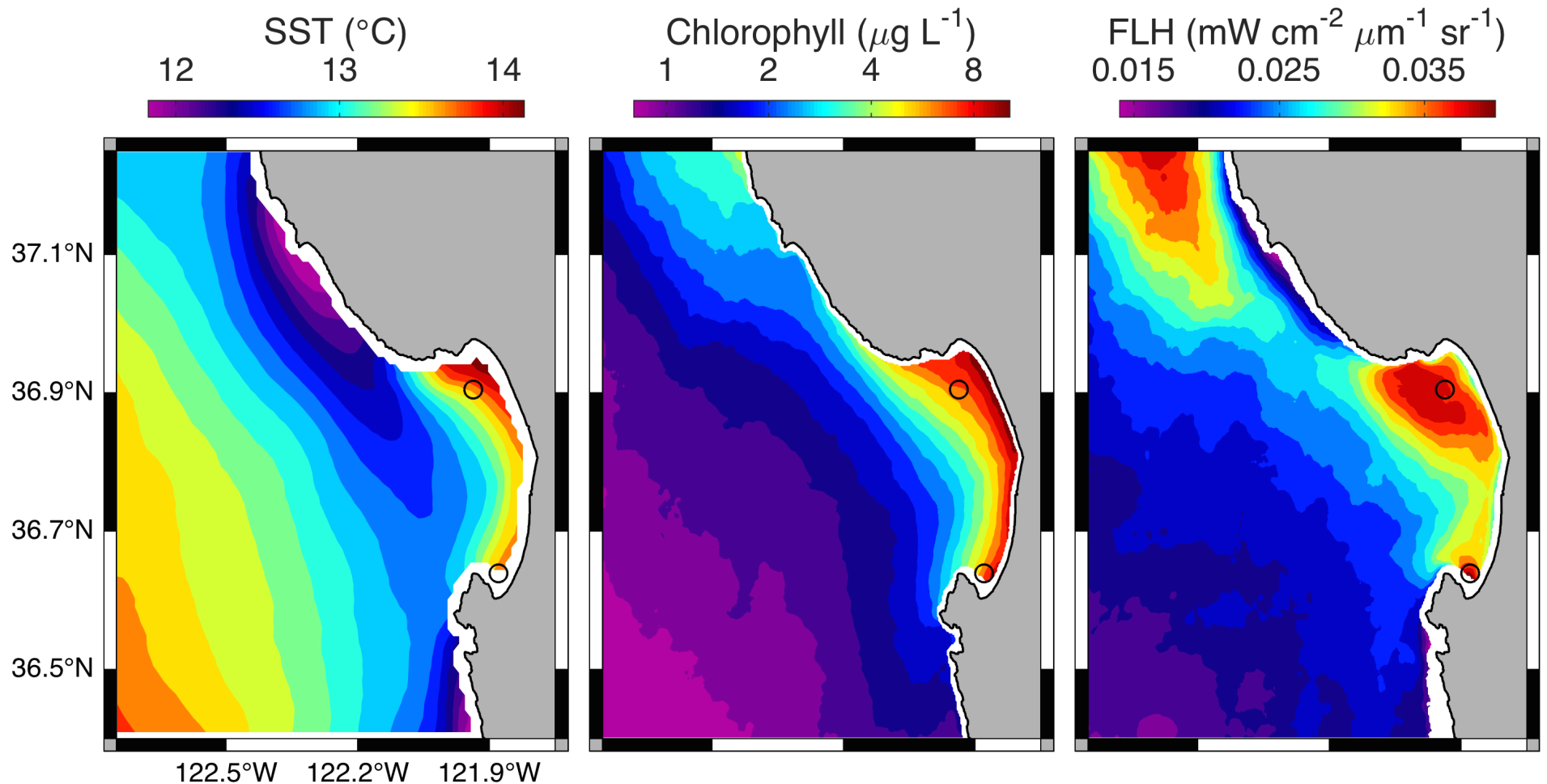


# ECOHAB / CANON Synthesis

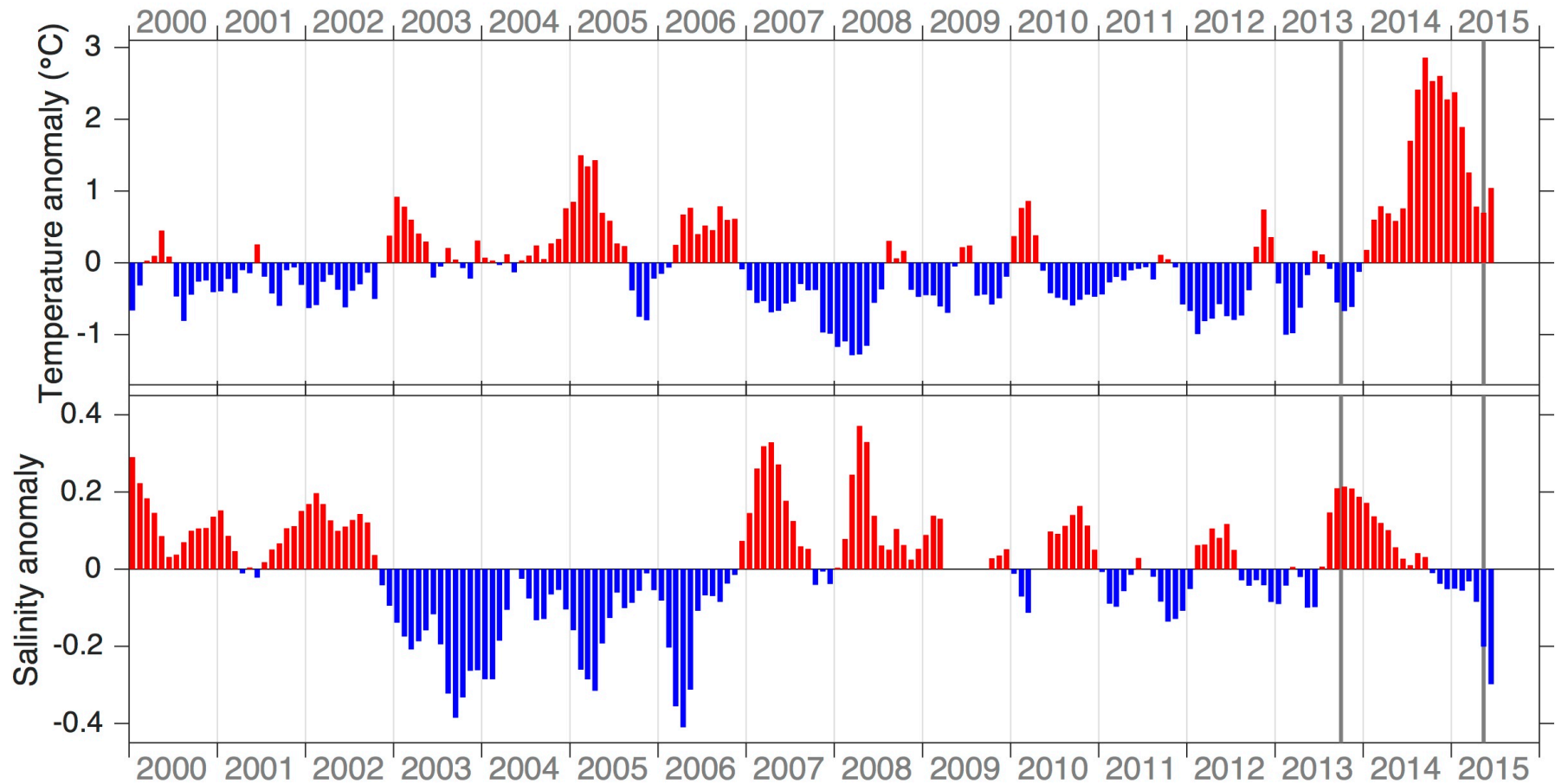


# Starting with Monterey Bay



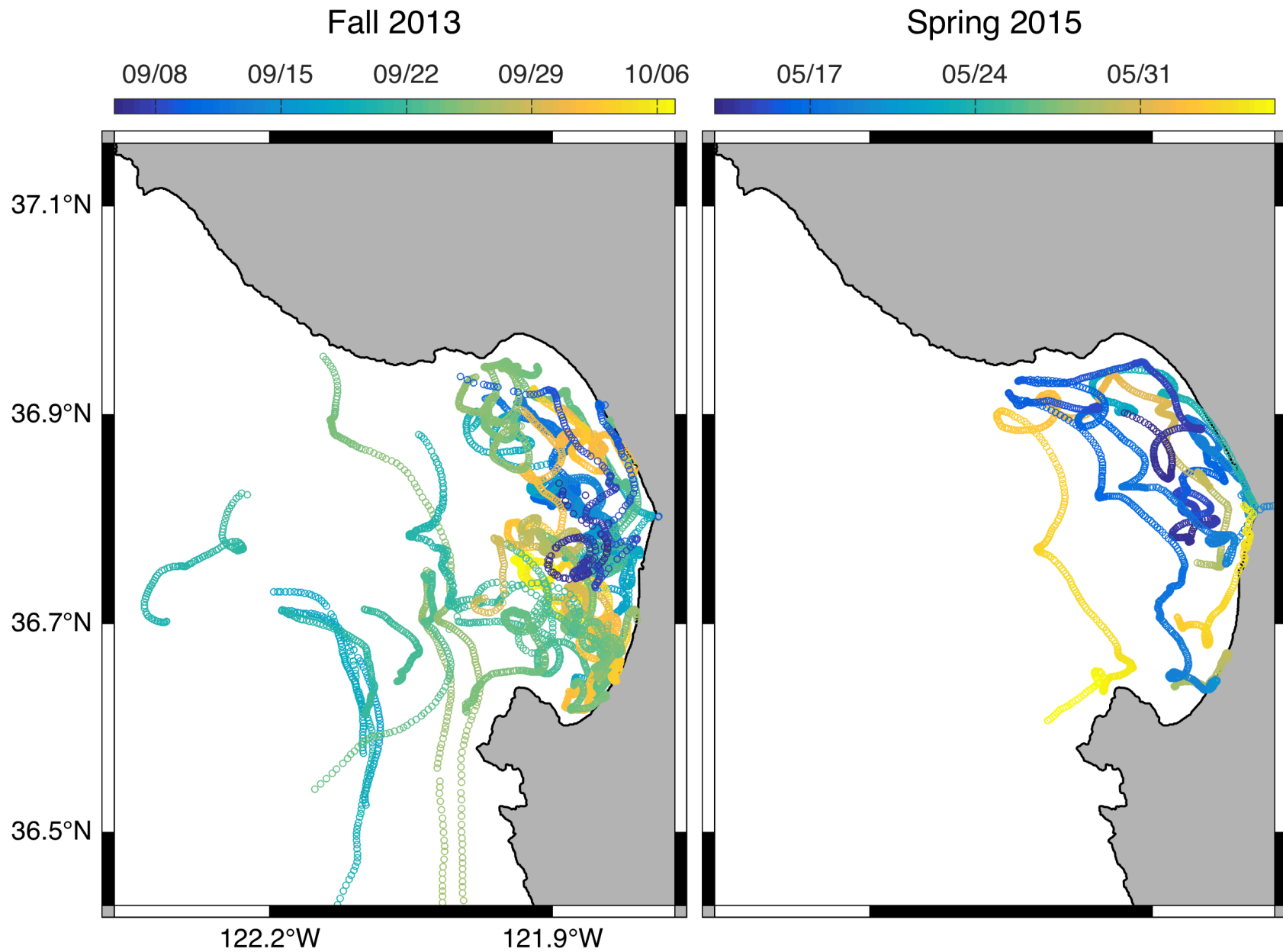
- Place ESPs in mixed layer of retentive, stratified “bloom incubators”
- Operations of AUVs, gliders, ships organized around ESP “footprint”

## Local perspective on long-term variability



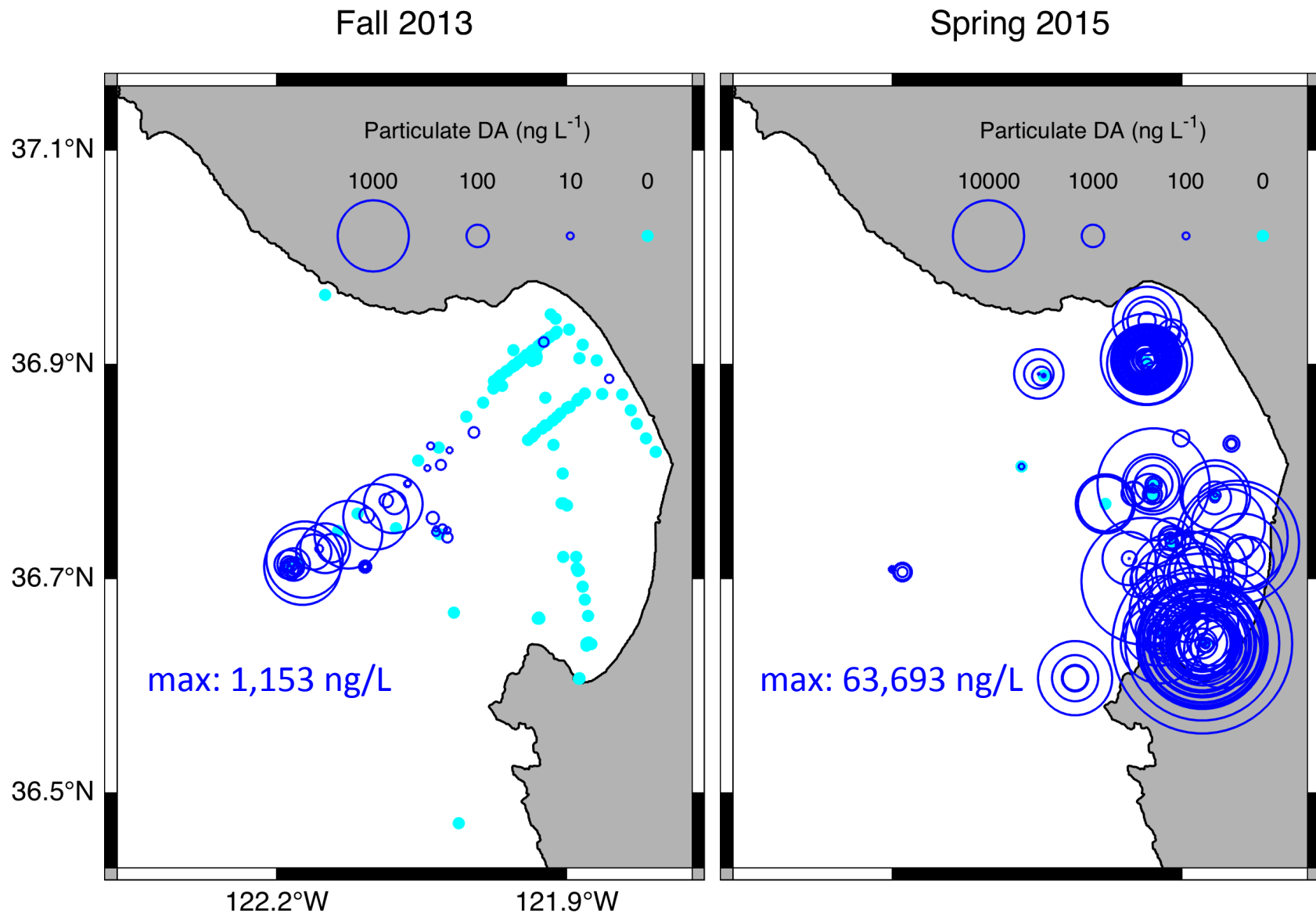
Expanding on this with satellite time-series data...

# Retention



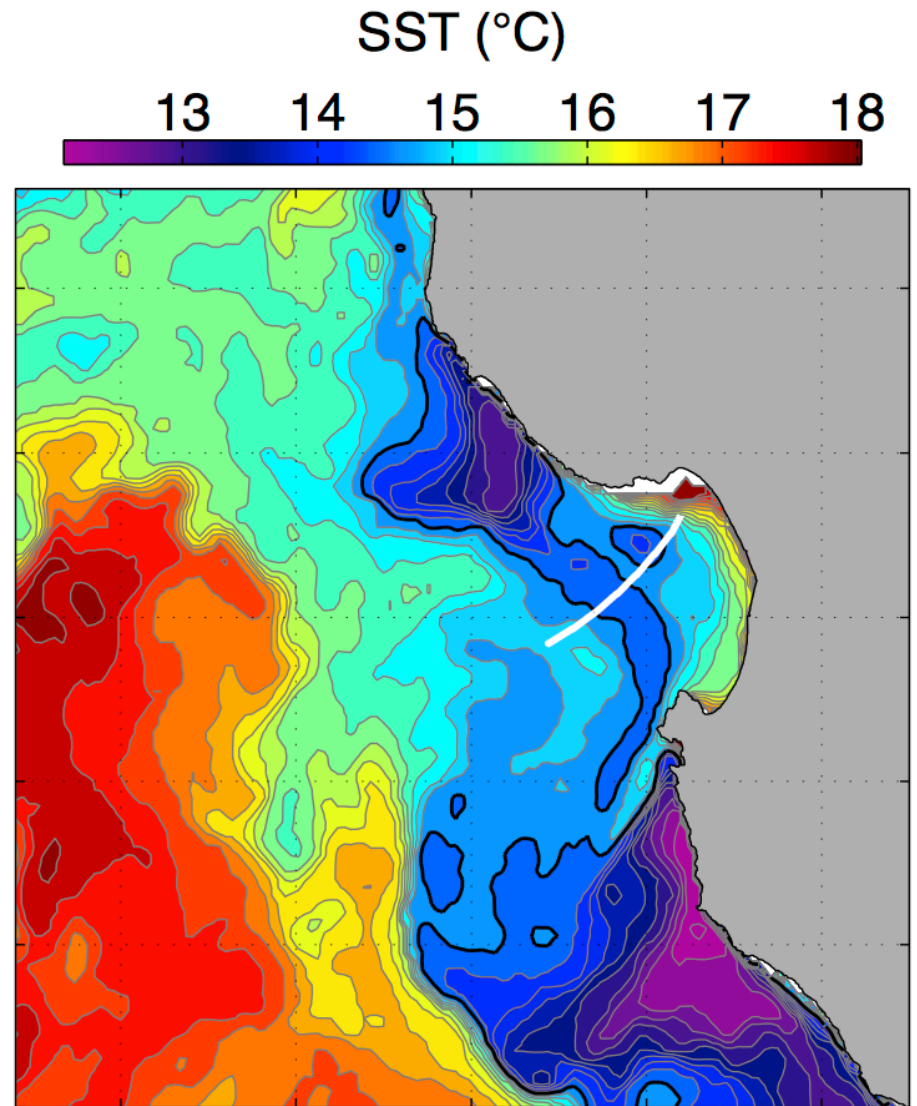


## Focus: *Pseudo-nitzschia* and domoic acid



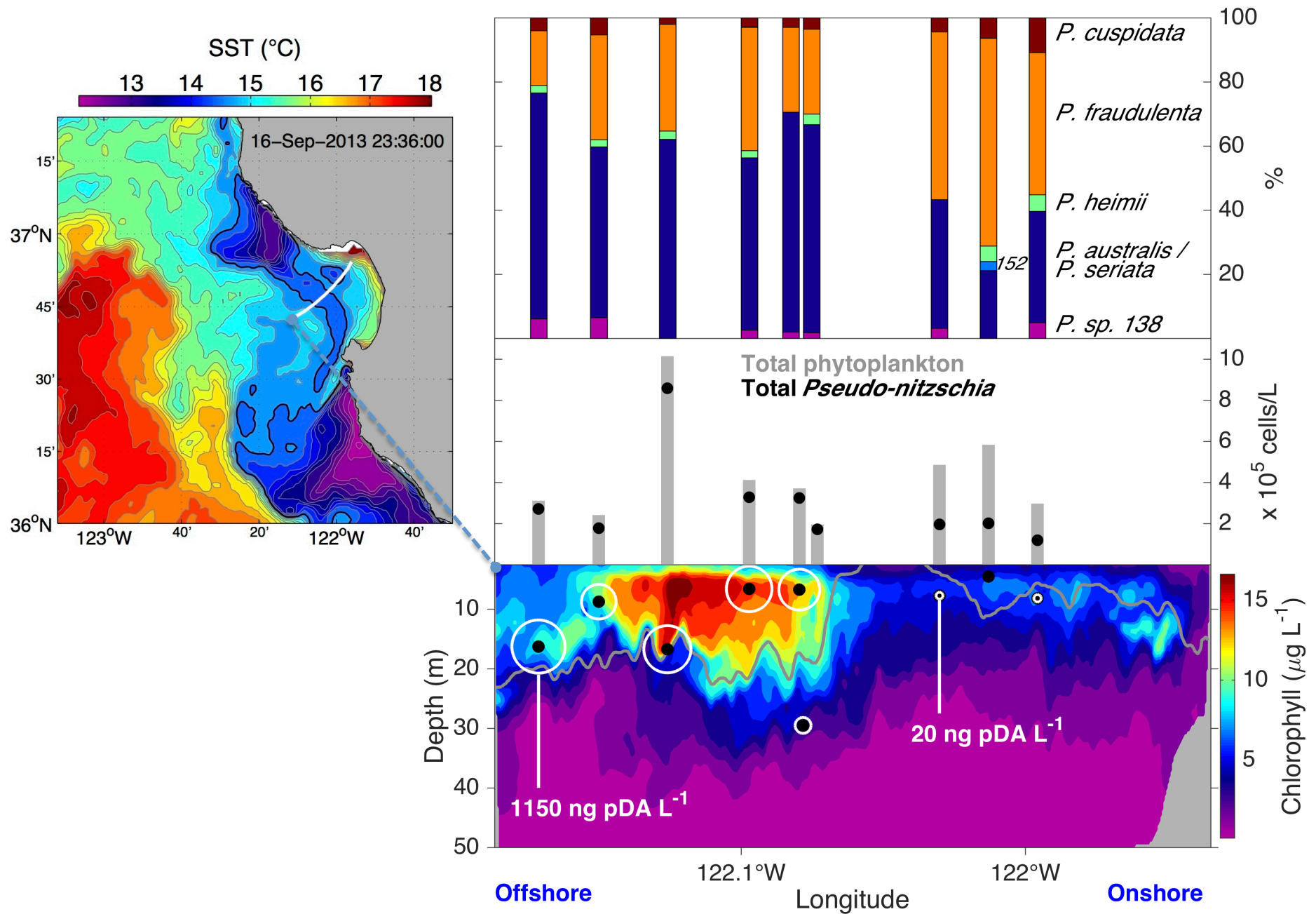
## Fall 2013: eddy incubation

MODIS Aqua, 16 September 2013

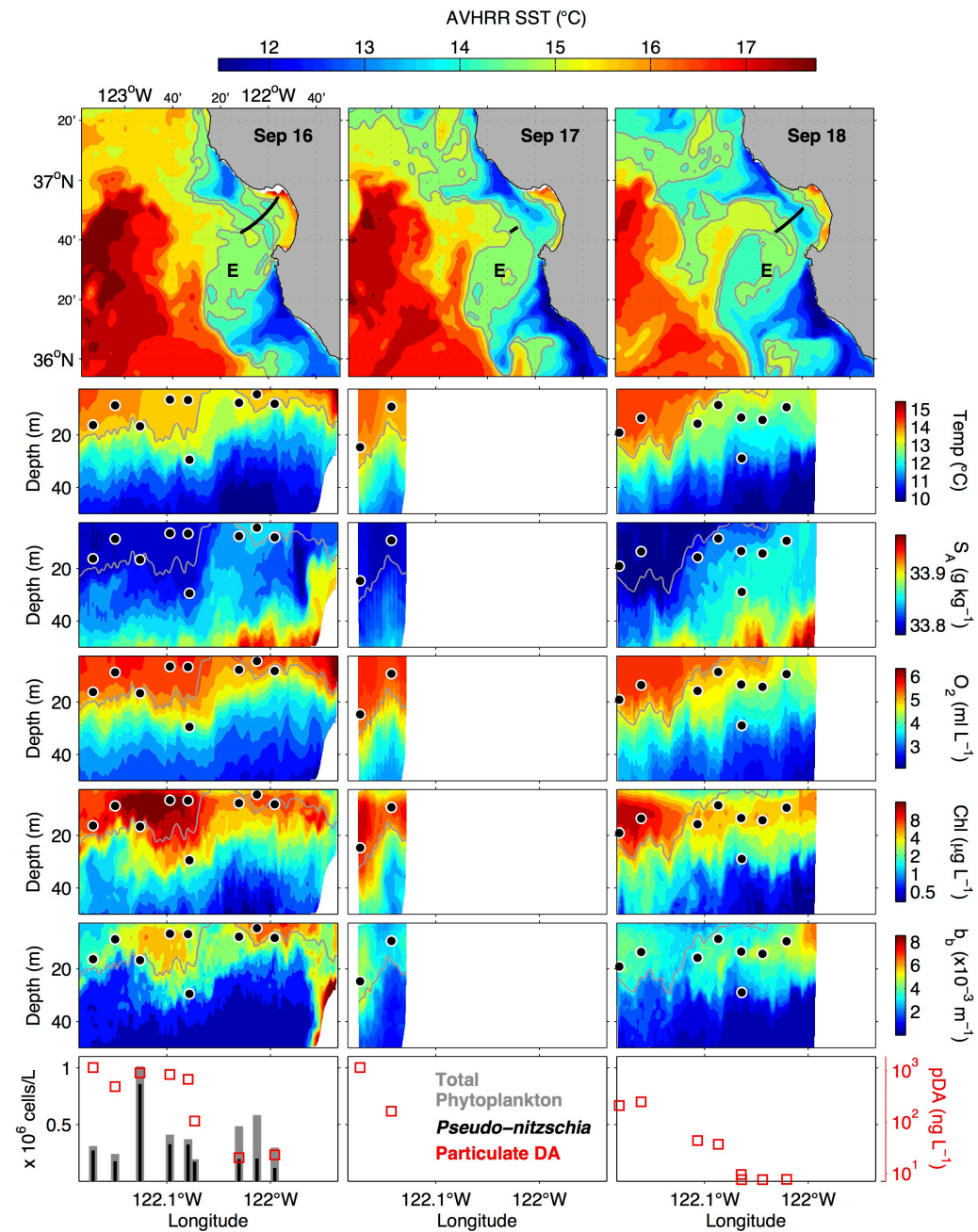


Anticyclonic eddy fed by two coastal upwelling centers

# Fall 2013: eddy incubation

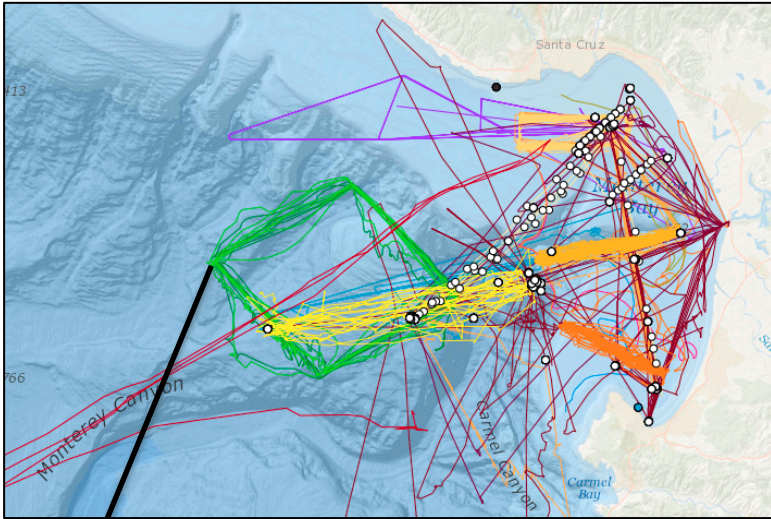


# Fall 2013 to do: consistency of pattern

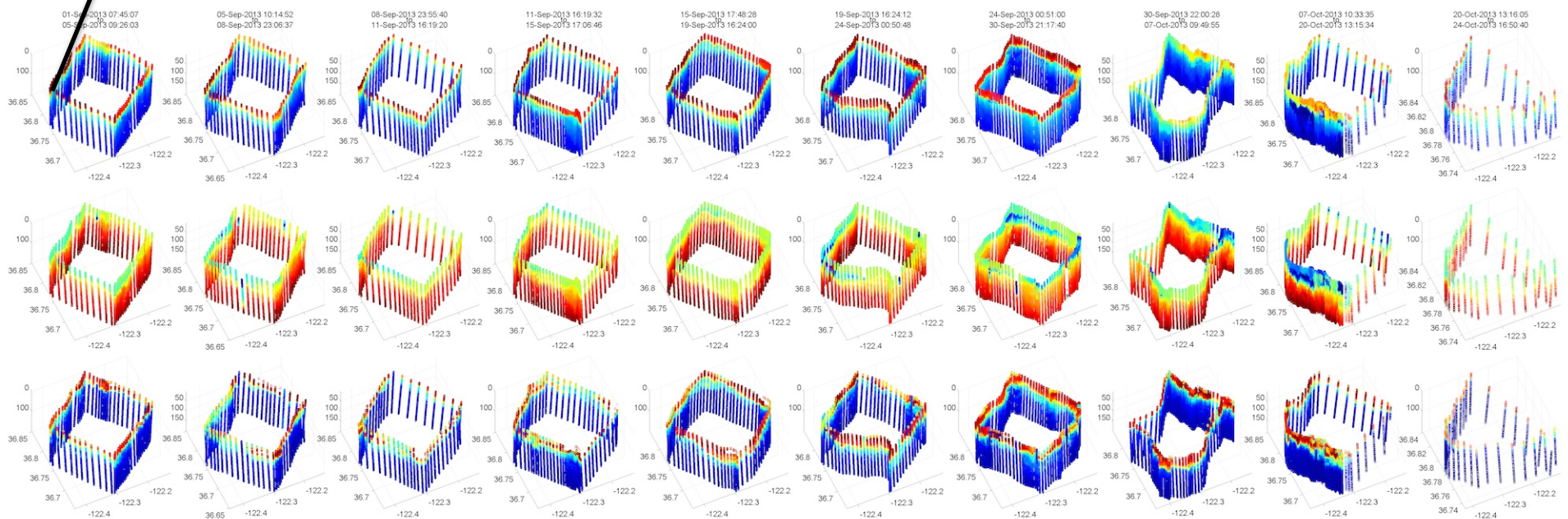




# Fall 2013 to do: get to know Eddy

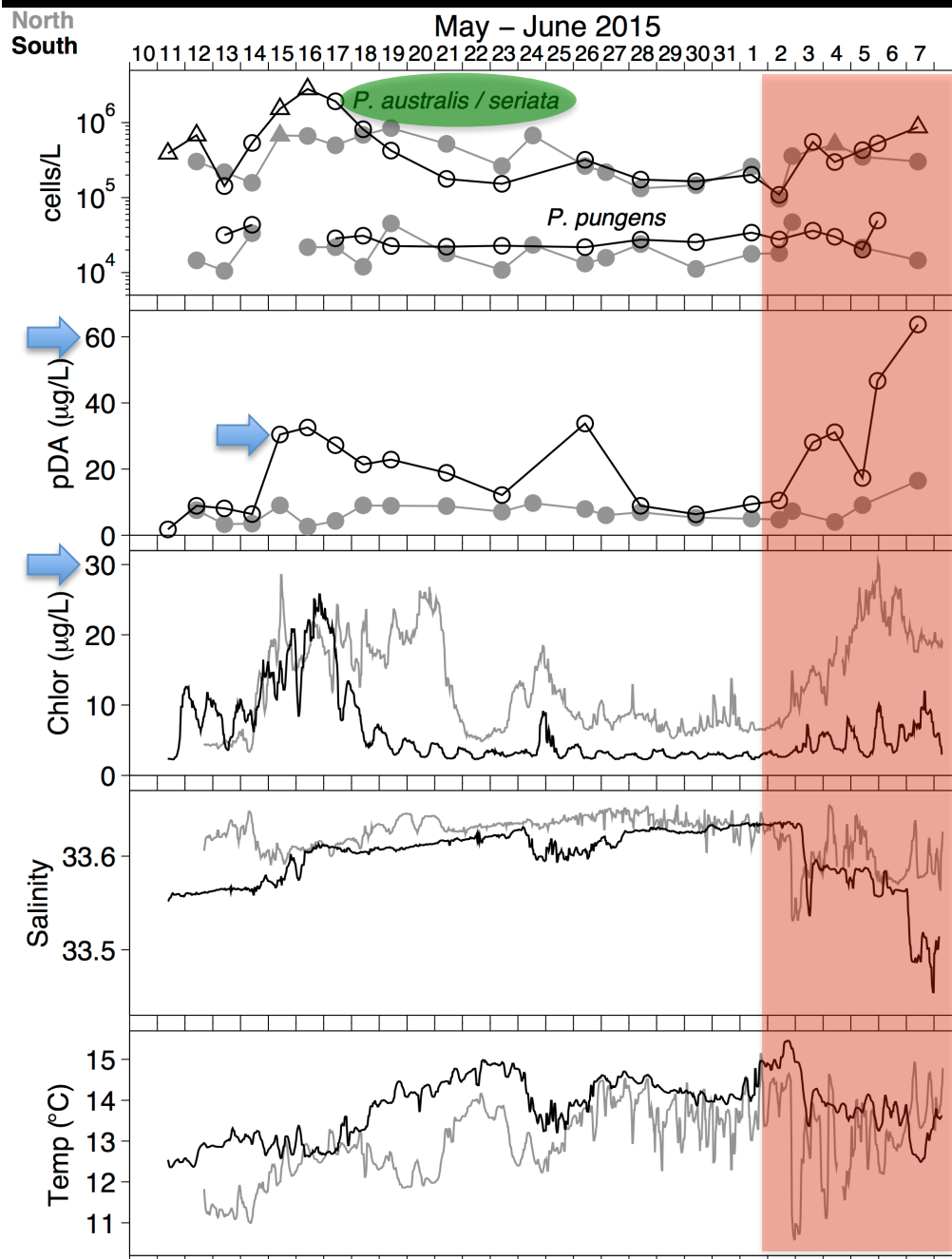


- Shown below are temperature, salinity and chlorophyll fluorescence from NPS glider 34 between Sep-1 and Oct-24 2013.
- Warming and freshening during eddy development indicated.
- Second NPS glider on racetrack: detailed 2-day resolution available. The period of Sep 15-19 relative to prior ( $\Delta S$ , Chl, T) and detailed view of volume...





# Spring 2015: moored in a very toxic *Pseudo-nitzschia* bloom

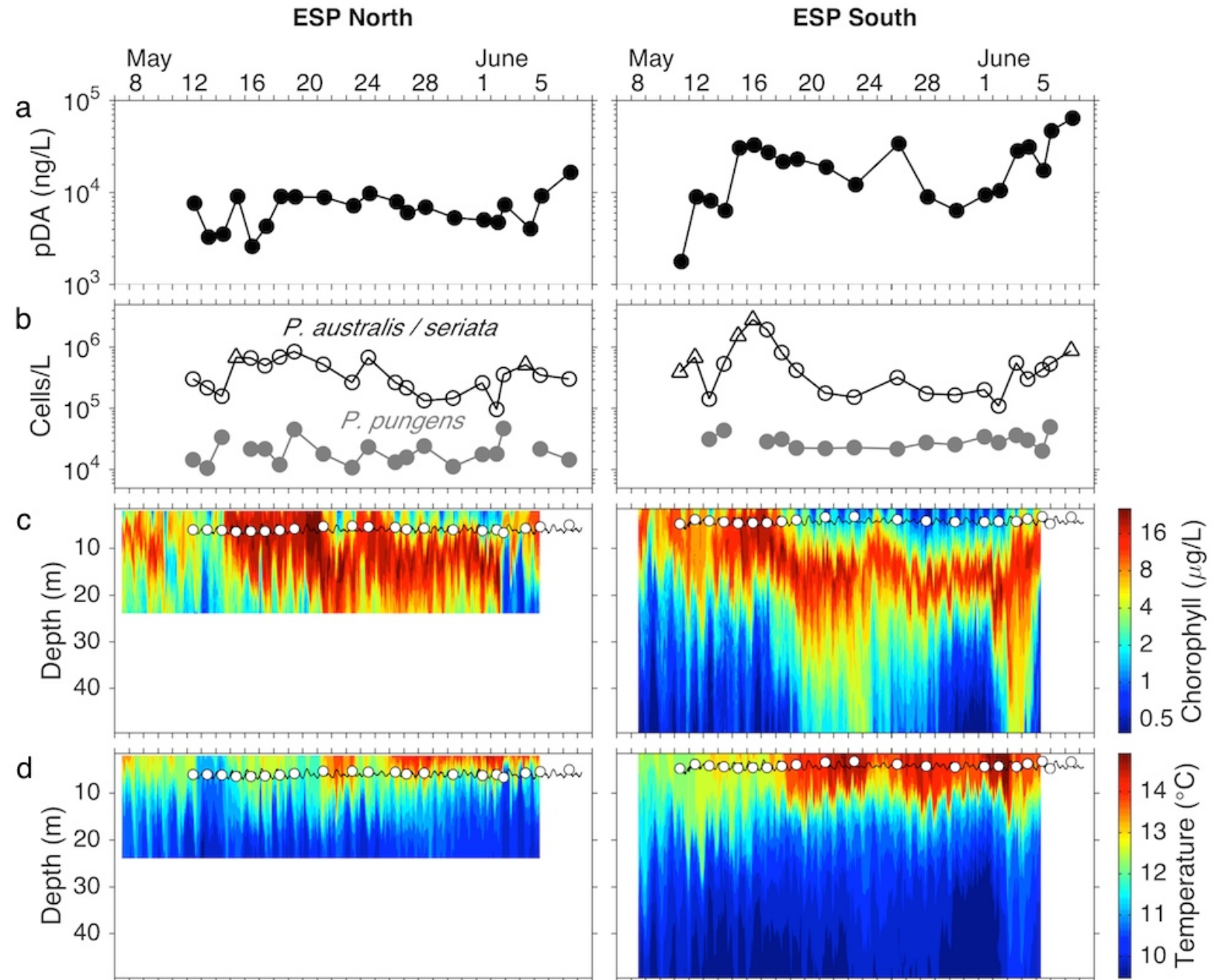


In mixed layer: mean depths 6, 4 m

*P. australis / seriata* dominant

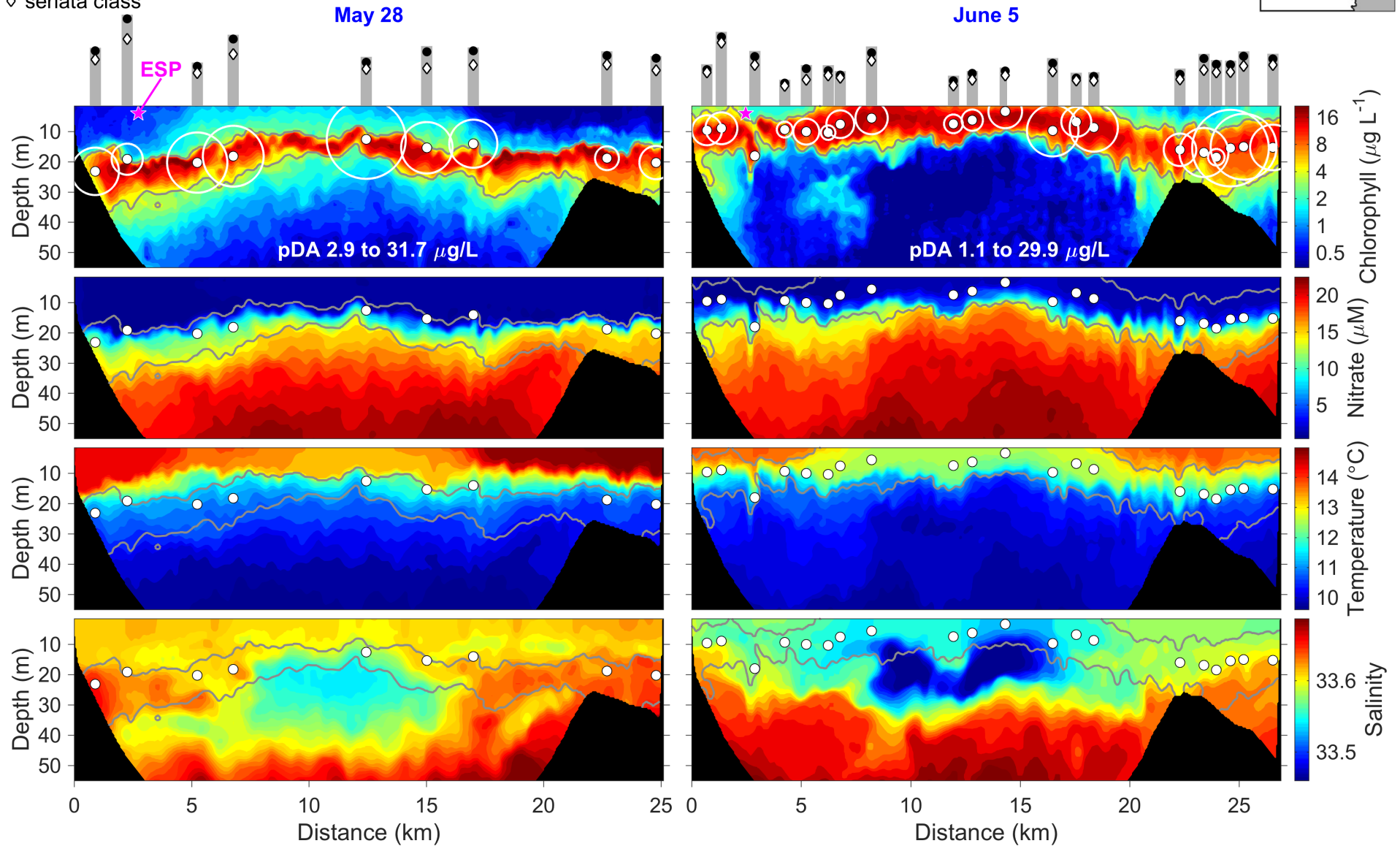
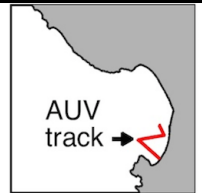
- ✧ more pDA at southern site (3x on average from ESP data; available pDA data from ship sampling indicates 2x)
- ✧ at times more pDA than chlorophyll
- ✧ Upwelling pulse late in experiment: elevated chlorophyll & highest pDA

# Spring 2015: taking refuge in the thermocline & North versus South

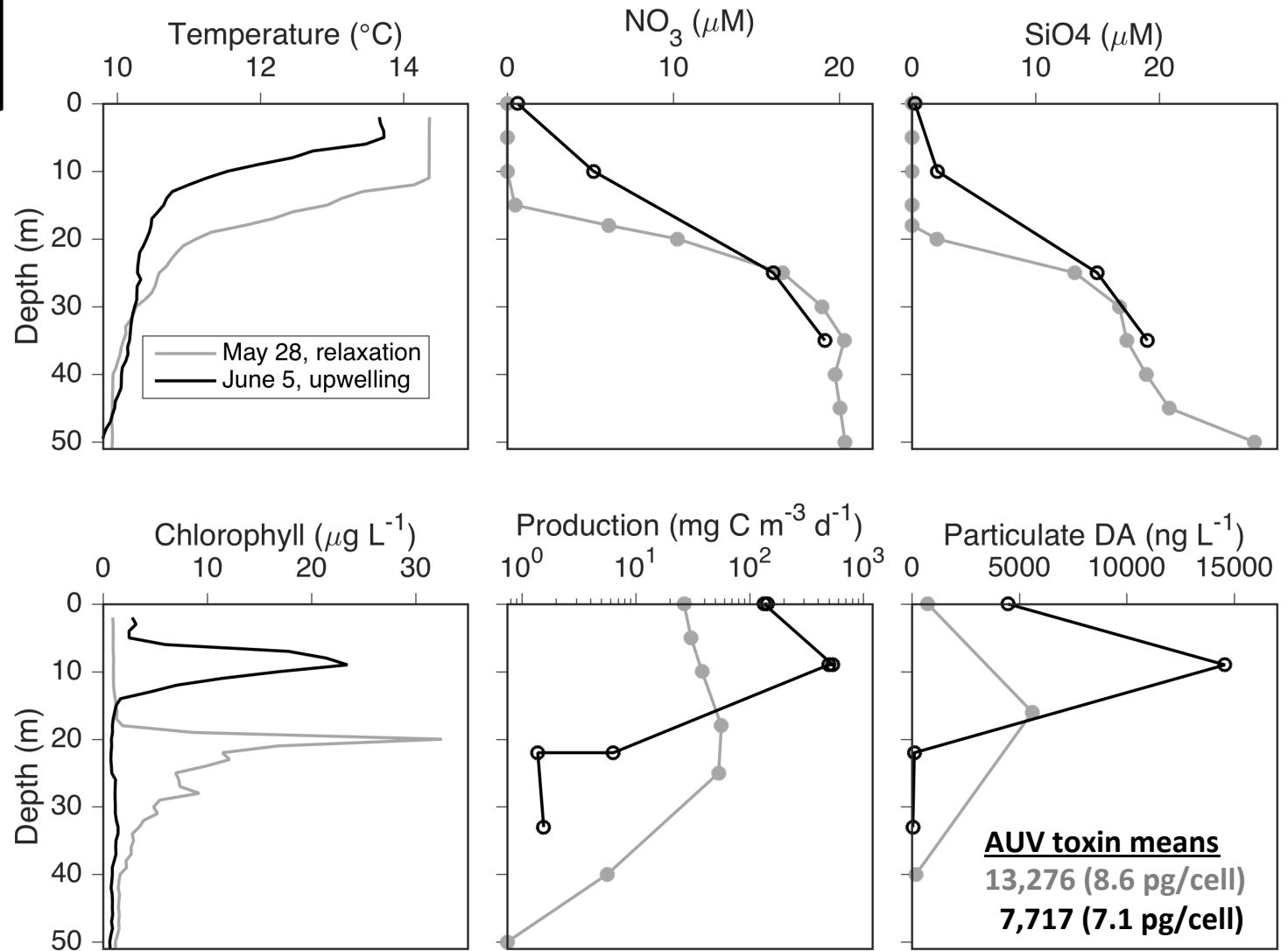


# Spring 2015: emergence from a thermocline / nutricline refuge

- Total phytoplankton, range  $7.24 \times 10^5$  to  $2.53 \times 10^6$  cells  $L^{-1}$
- *Pseudo-nitzschia*
- ◇ seriata class



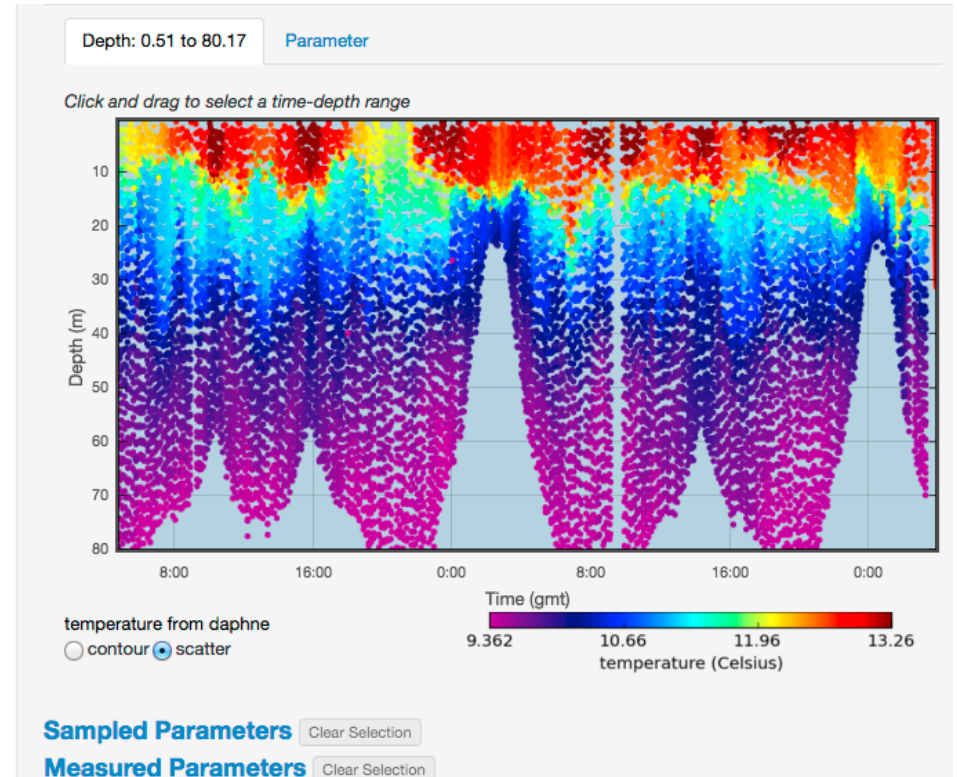
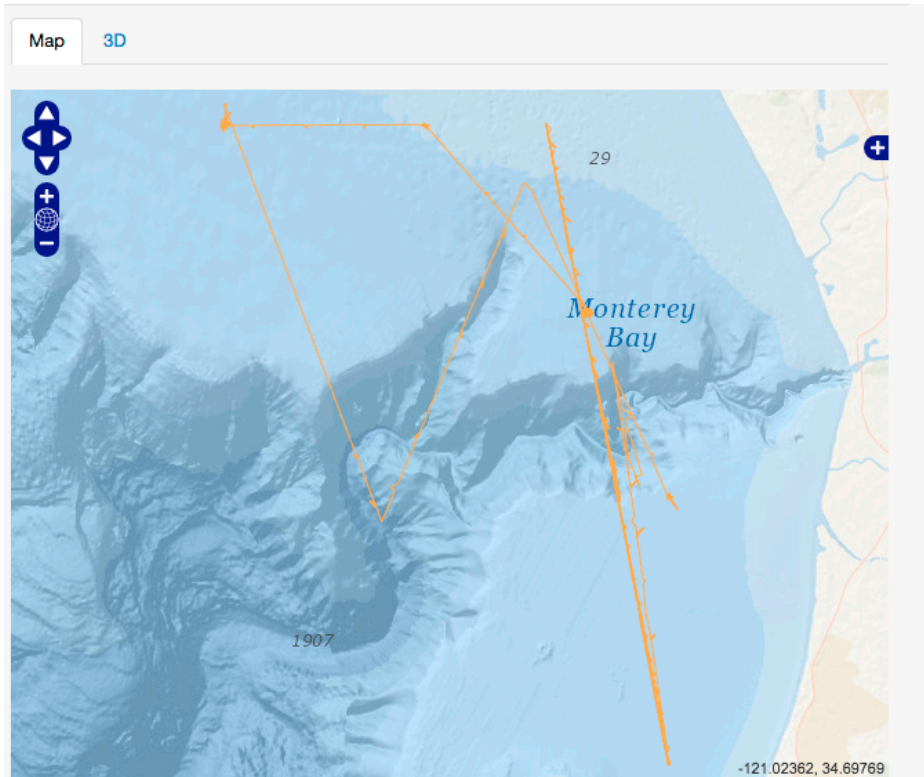
# Spring 2015: emergence from a thermocline / nutricline refuge





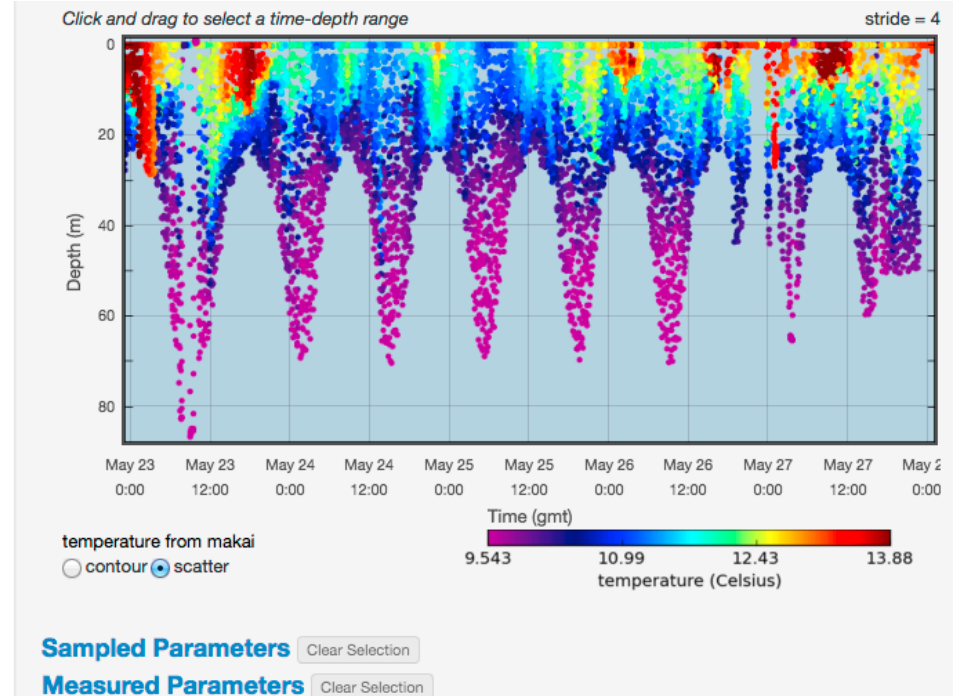
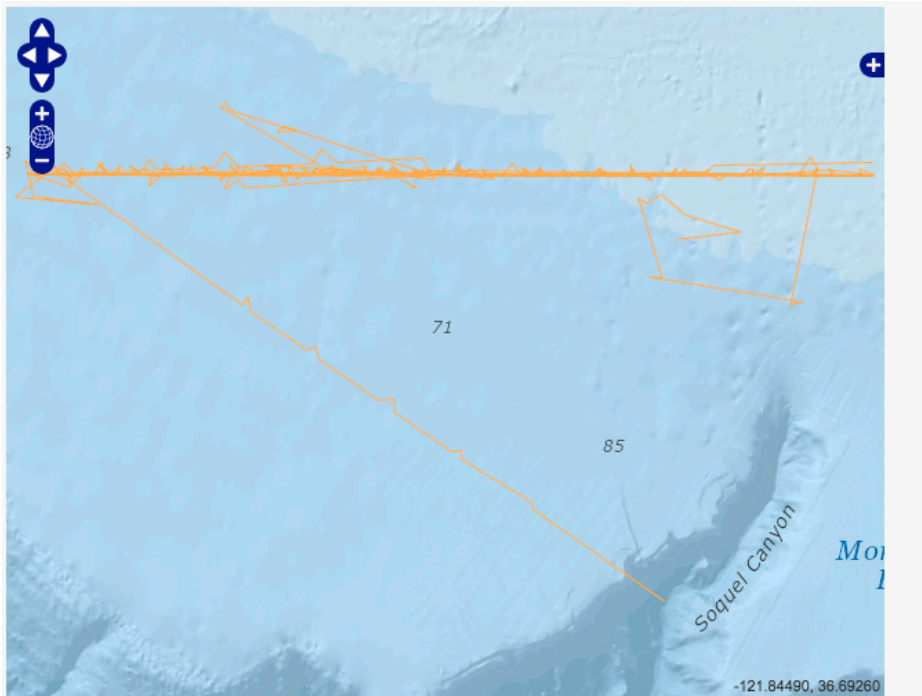
# Spring 2015 to do: North versus South, synoptic

LRAUV Daphne, 5/23 to 5/25



# Spring 2015 to do: East-West, synoptic, northern ESP

LRAUV Makai, 5/23 to 5/28



# Spring 2015 to do: East-West, synoptic, northern ESP

Waveglider Tex, 5/23 to 5/28

