

AUV CTD Meeting Agenda

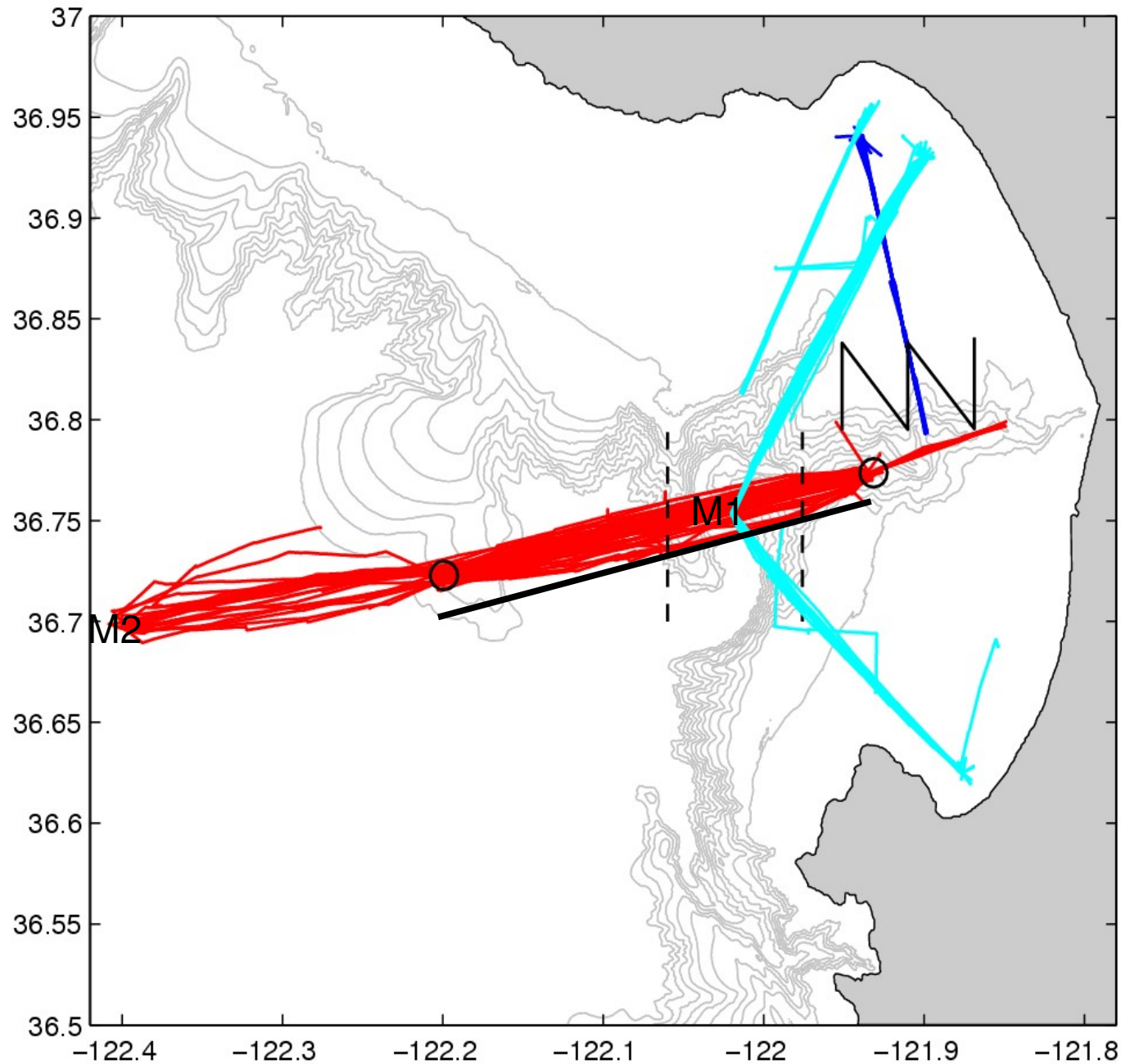
June 8, 2007

- Brief update on vehicle changes and status
- Brief summary of some time-series analysis results and software tools available for time series analysis in matlab
- Data quality and science use
 - HS2 issue learned about during time series analysis
 - Flow measurement: evidently not used, maybe confounding sensor alignment
 - How to make science data users aware of data issues (data management, Mike)
- Operations notes (Duane and Doug)
 - Pre-cruises needed for ops notes to show up in expedition database
 - Cruise track planning and getting info to AUV ops with lead time
 - How to request gulper
 - Upcoming applications of the autonomy group
 - Instrument serial numbers should come across with data transfer to SSDS
 - Notification of science when sensors are changed
- New sensors:
 - Getting LOPC up, running and data analyzed (Sackmann)
 - CDOM fluorometer for coastal plume studies (Ryan)
 - PAR sensor (Johnson, Chavez, Kudela)
- 2008 proposal

Vehicle changes / status

- New nose configuration
- New compass
- Gulper mid-section
- Other?

Time-series analysis results / software tools



Long-term and seasonal mean sections

Sampling frequency (surveys up to March 25, 2007)

Canyon-axis surveys (48):

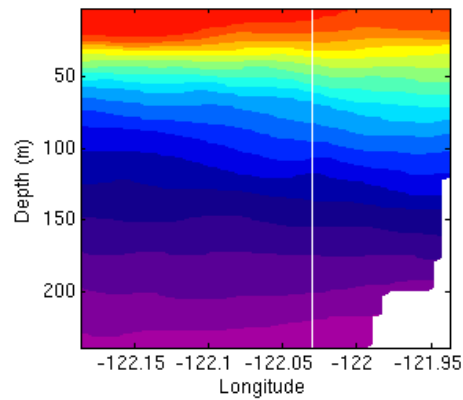
- Winter (NDJ): 11
- Spring (FMA): 10
- Summer (MJJ): 10
- Fall (ASO): 17

Shelf “chevron” surveys, partial or full (45):

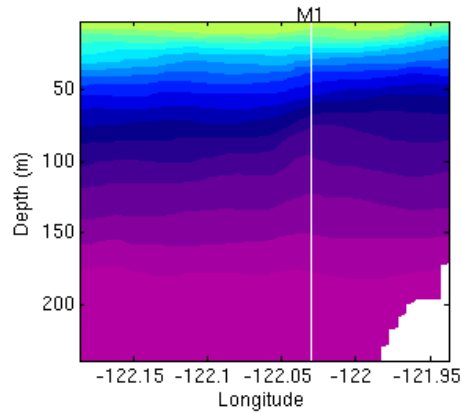
- Winter (NDJ): 10
- Spring (FMA): 4 *with southern bay only sampled once
- Summer (MJJ): 14
- Fall (ASO): 19

Seasonal patterns in hydrography, canyon axis

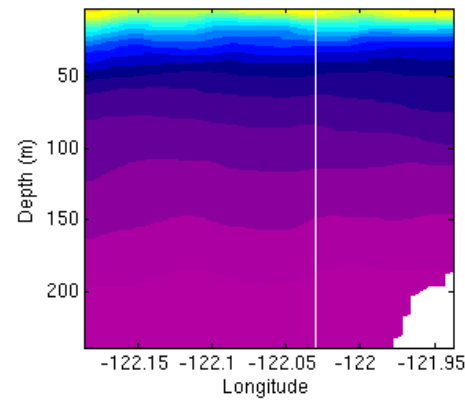
Winter



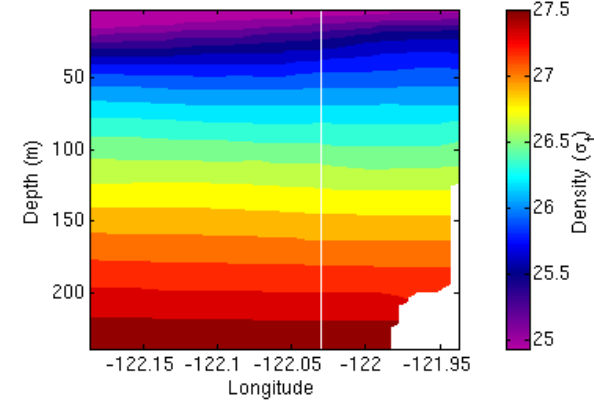
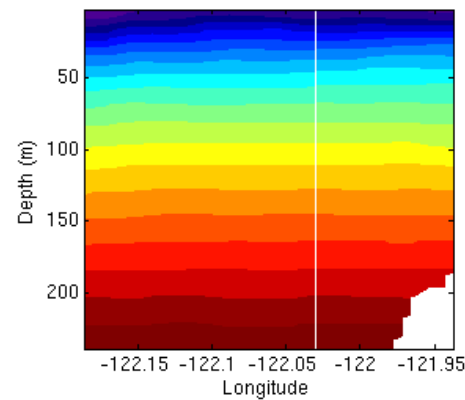
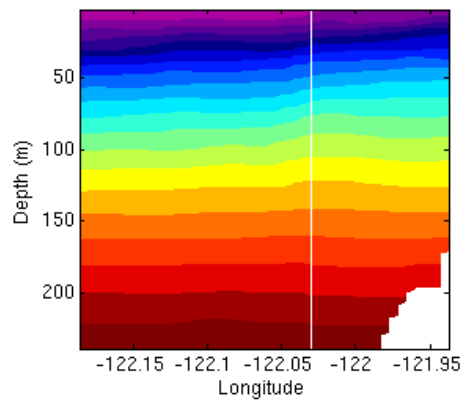
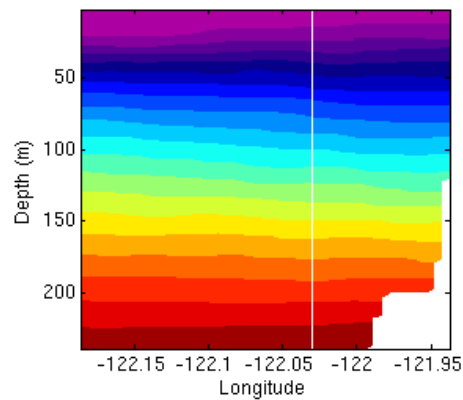
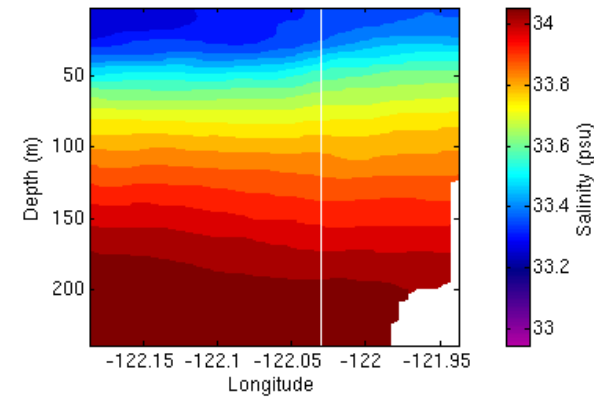
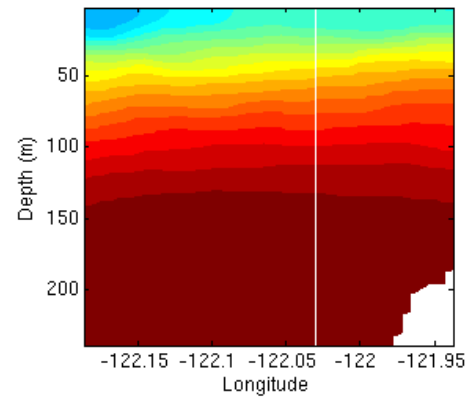
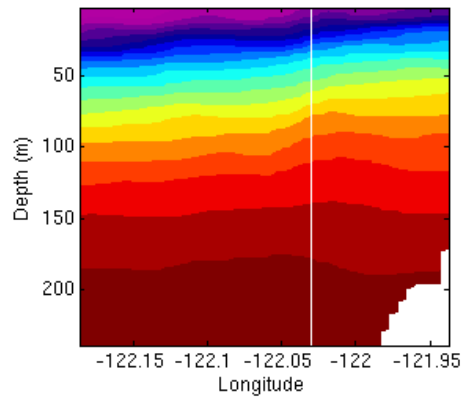
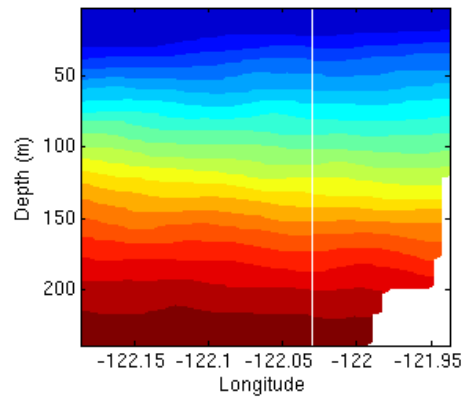
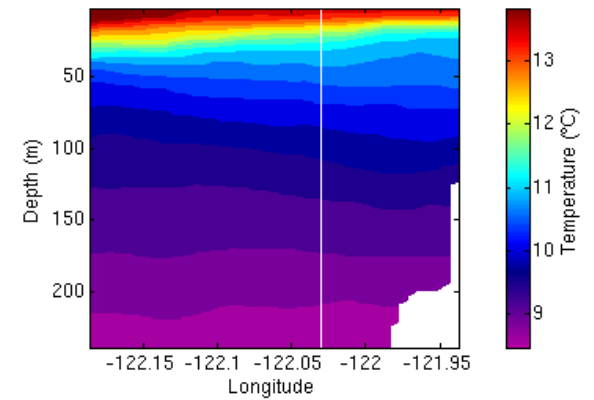
Spring



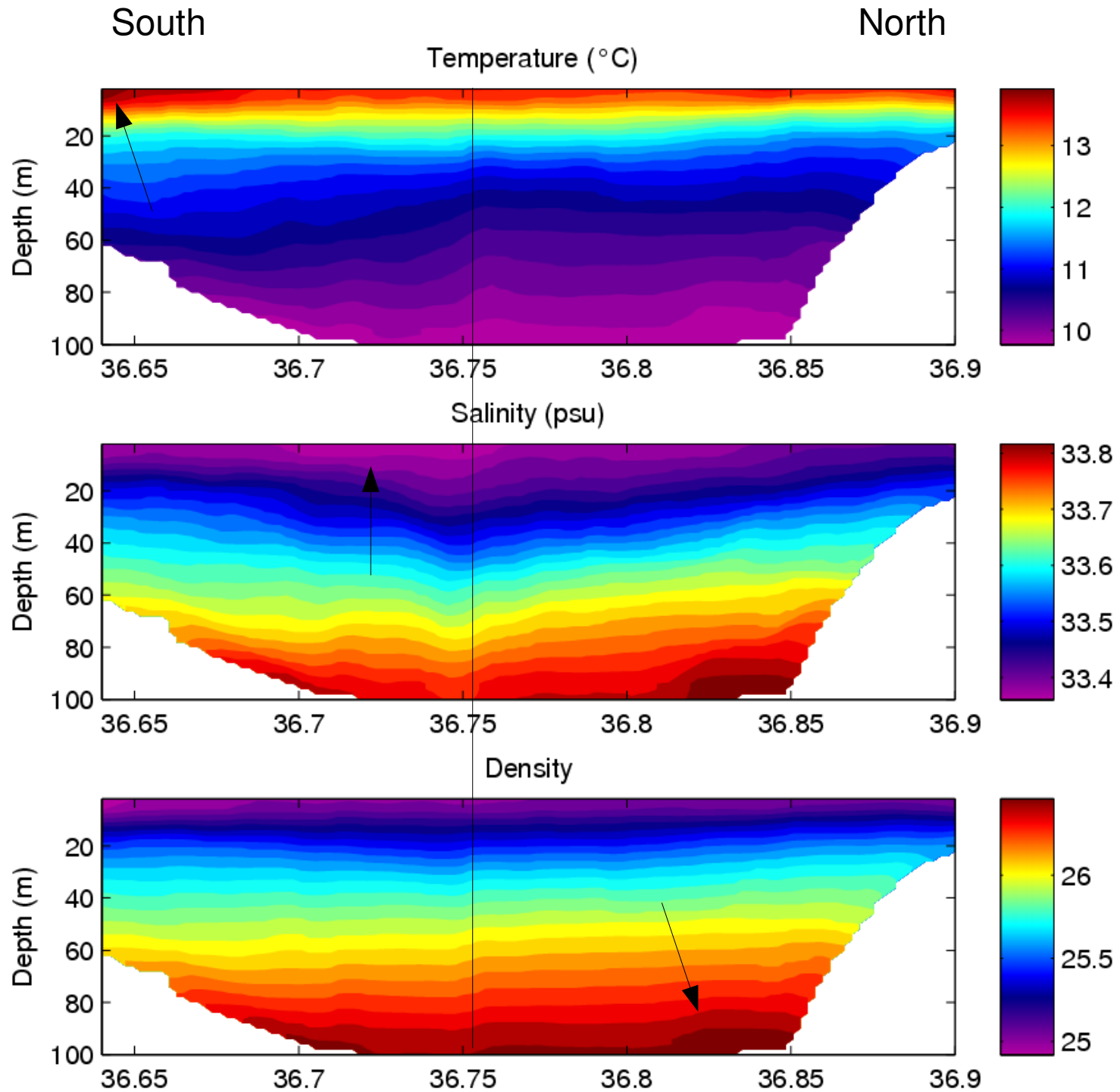
Summer



Fall

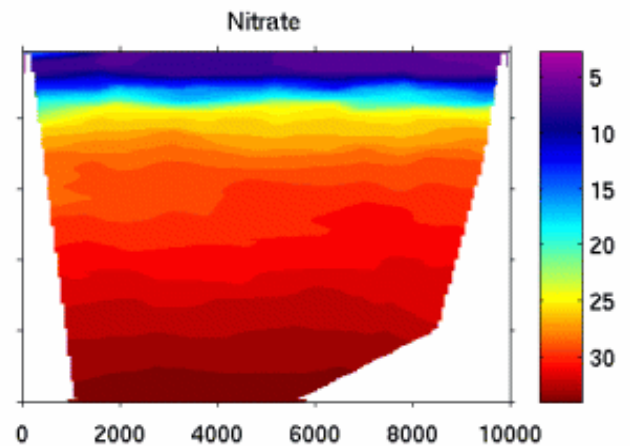
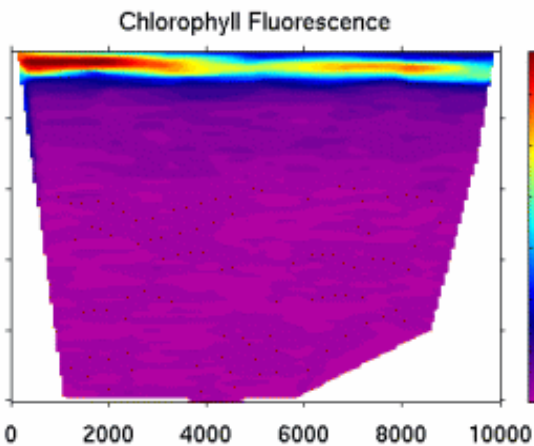
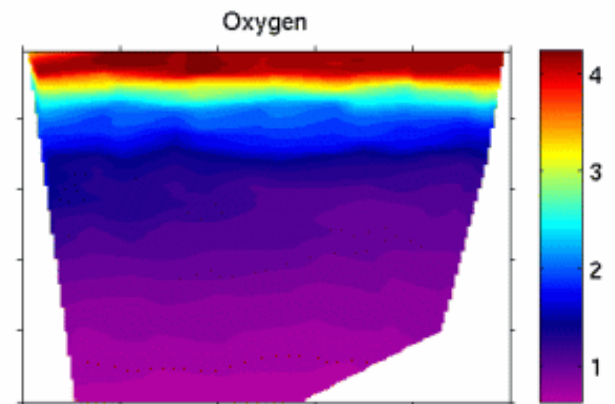
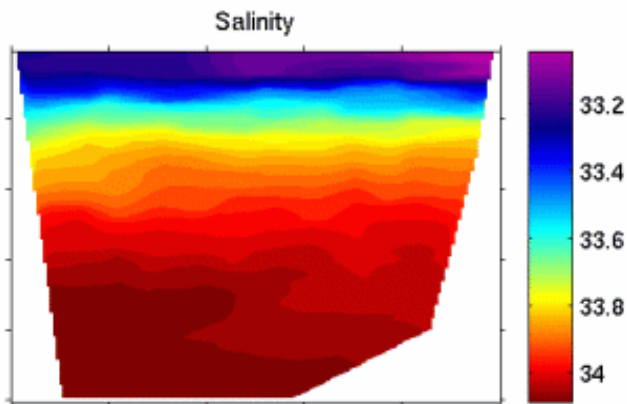
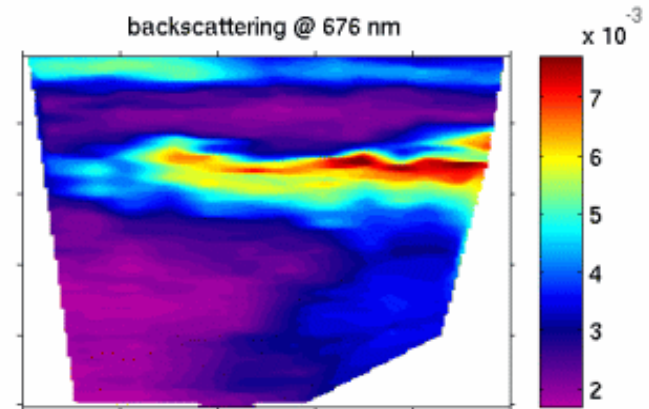
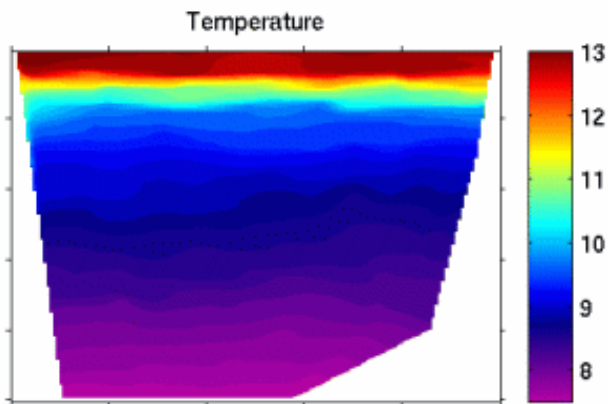
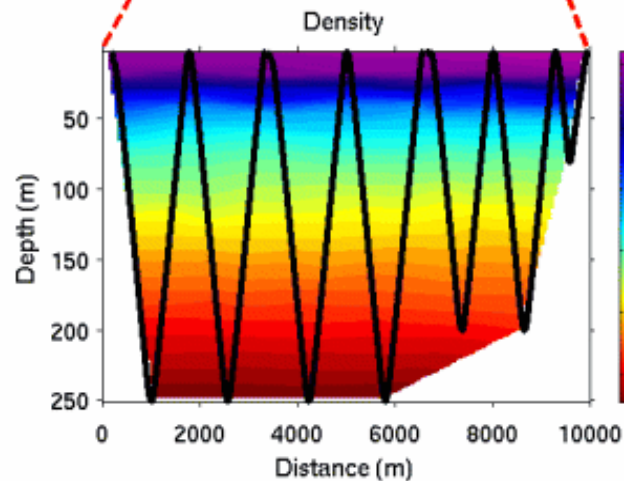
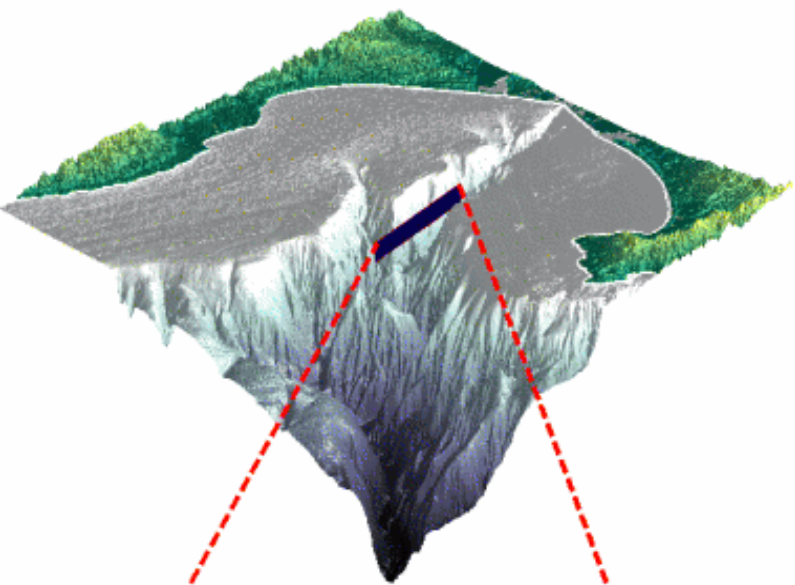


Long-term mean hydrography, shelf surveys



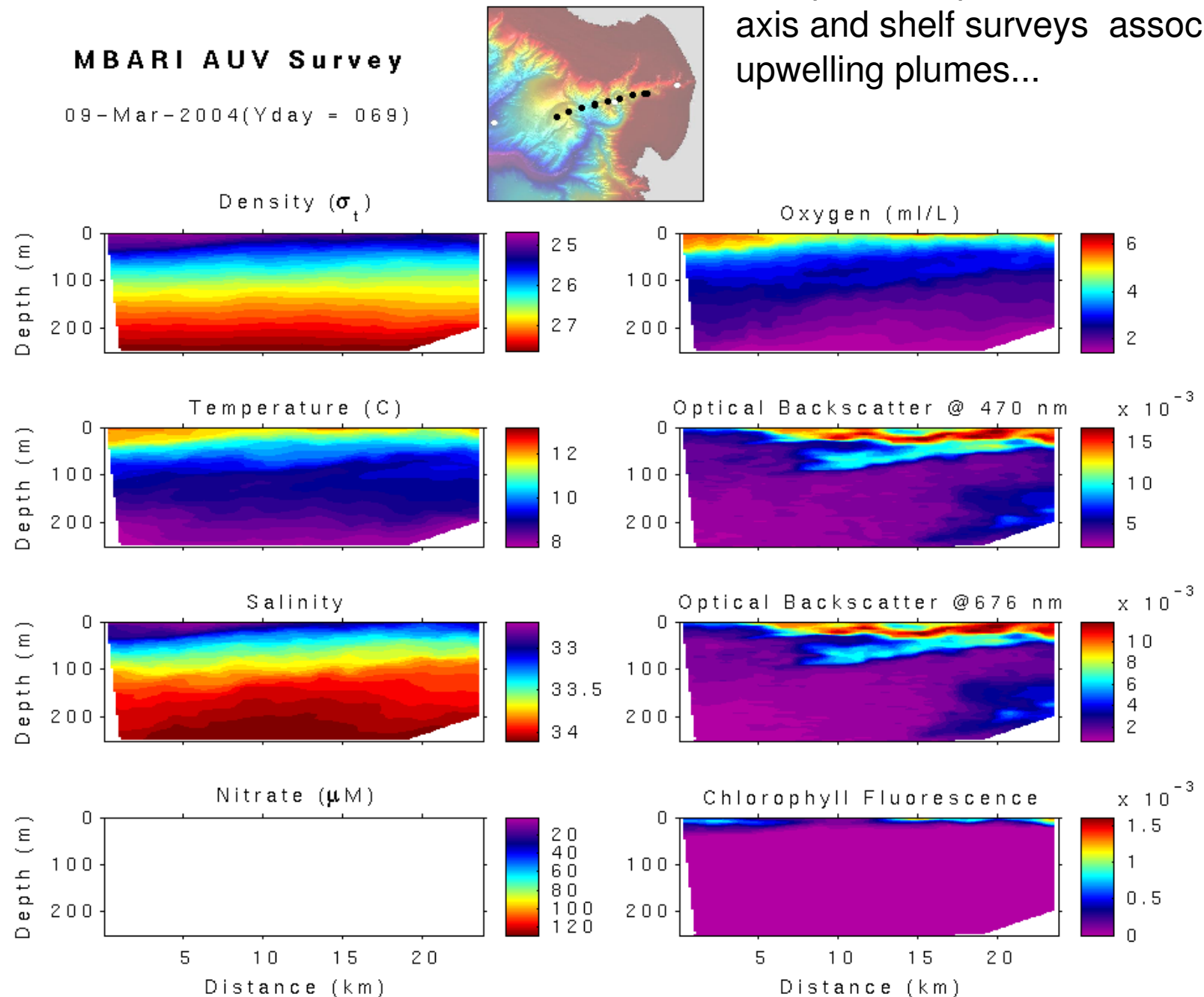
Intermediate Nepheloid Layers (INLs)

MBARI AUV CTD Time Series Survey
May 5, 2003

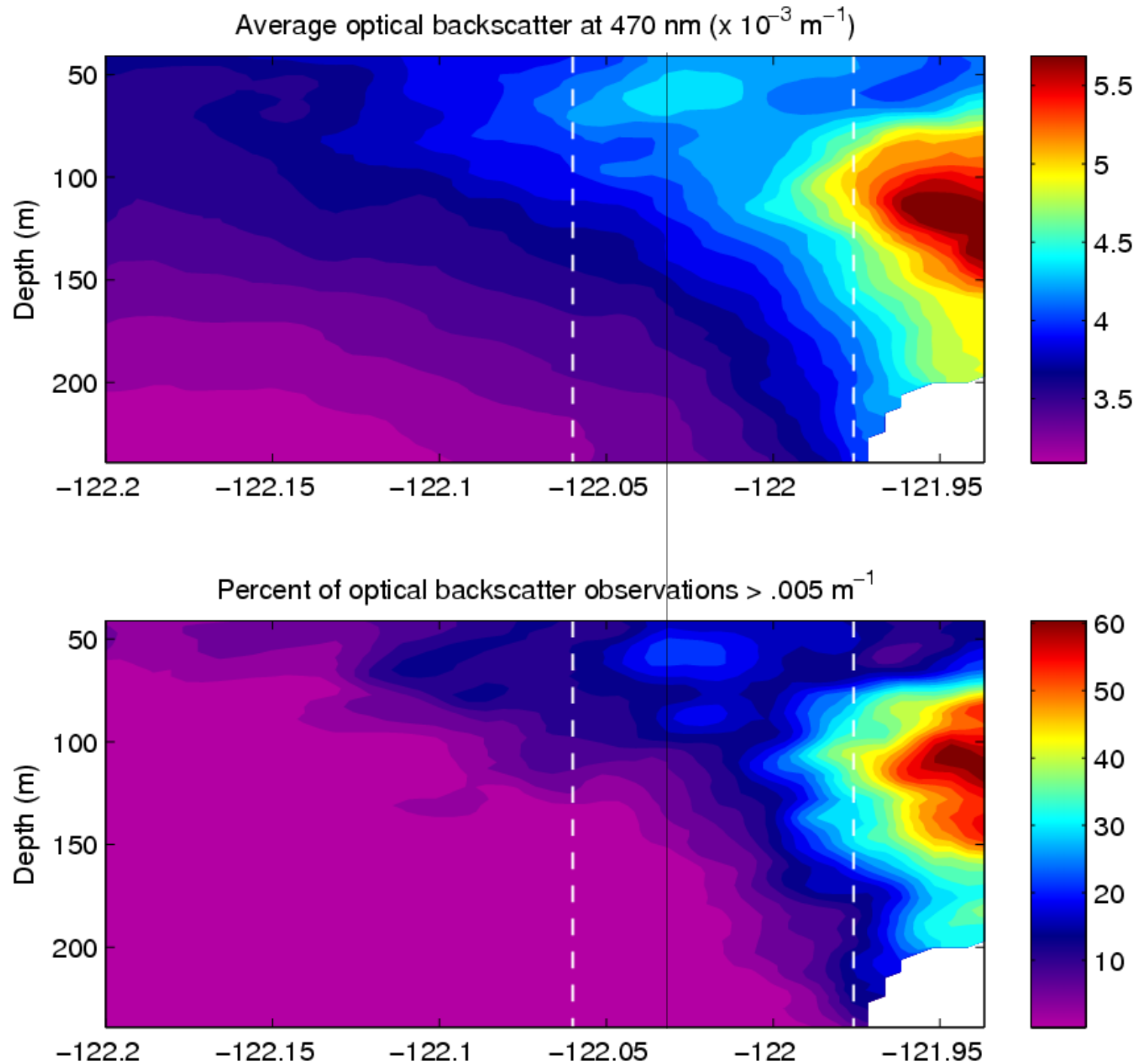


INL transport has consequences for plankton ecology

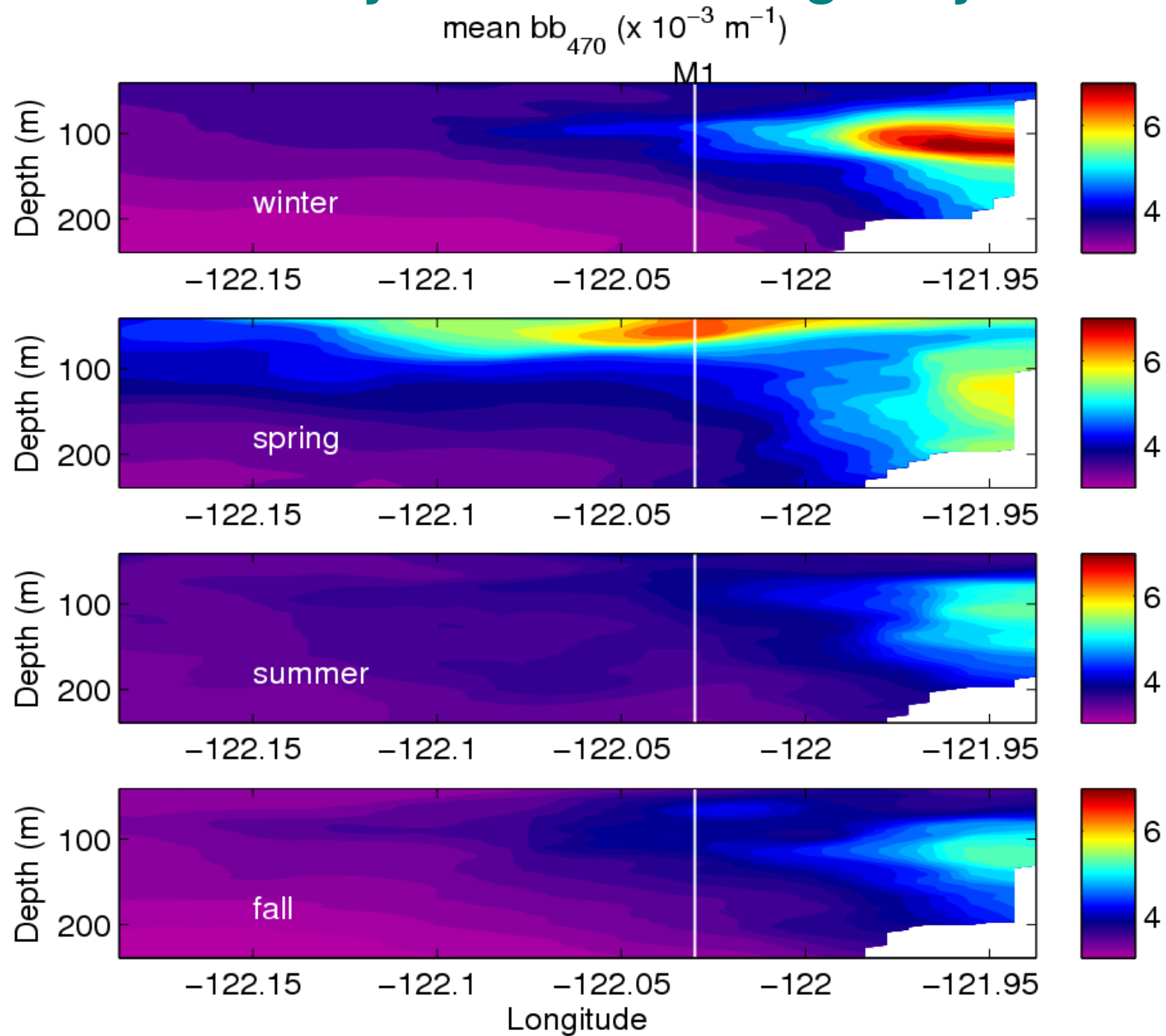
Multiple examples of INLs in canyon axis and shelf surveys associated with upwelling plumes...



Long-term mean bb: intermediate nepheloid layers (INLs)

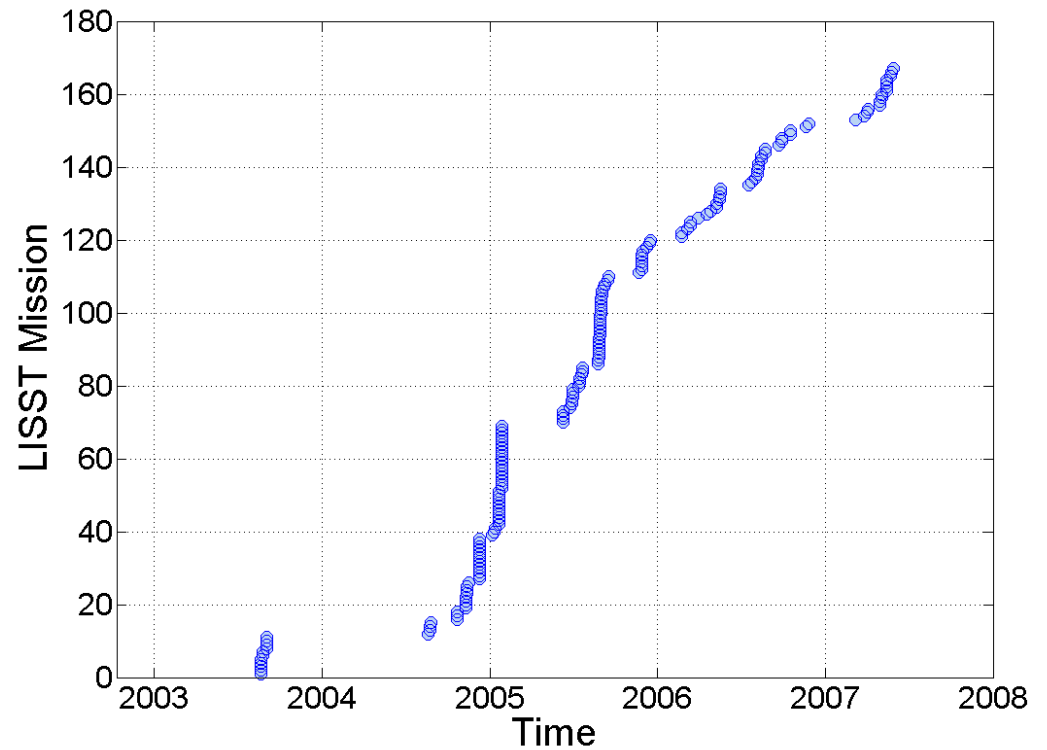
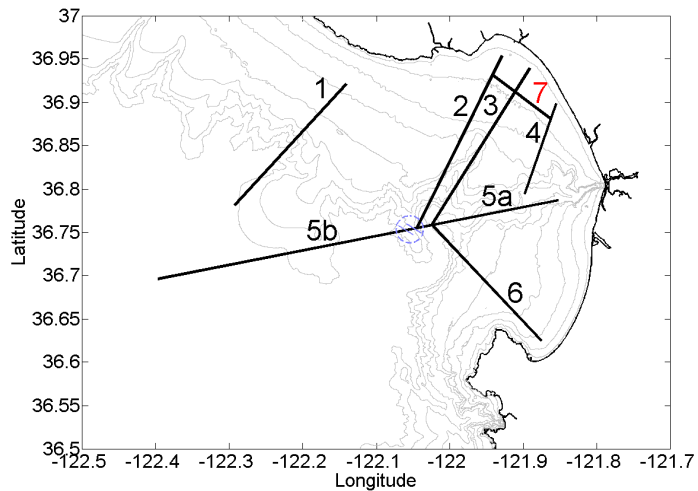
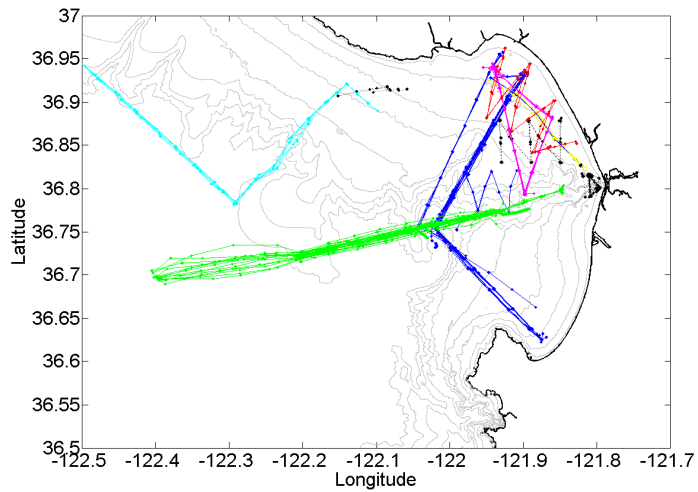


Seasonal cycle of INLs along canyon axis

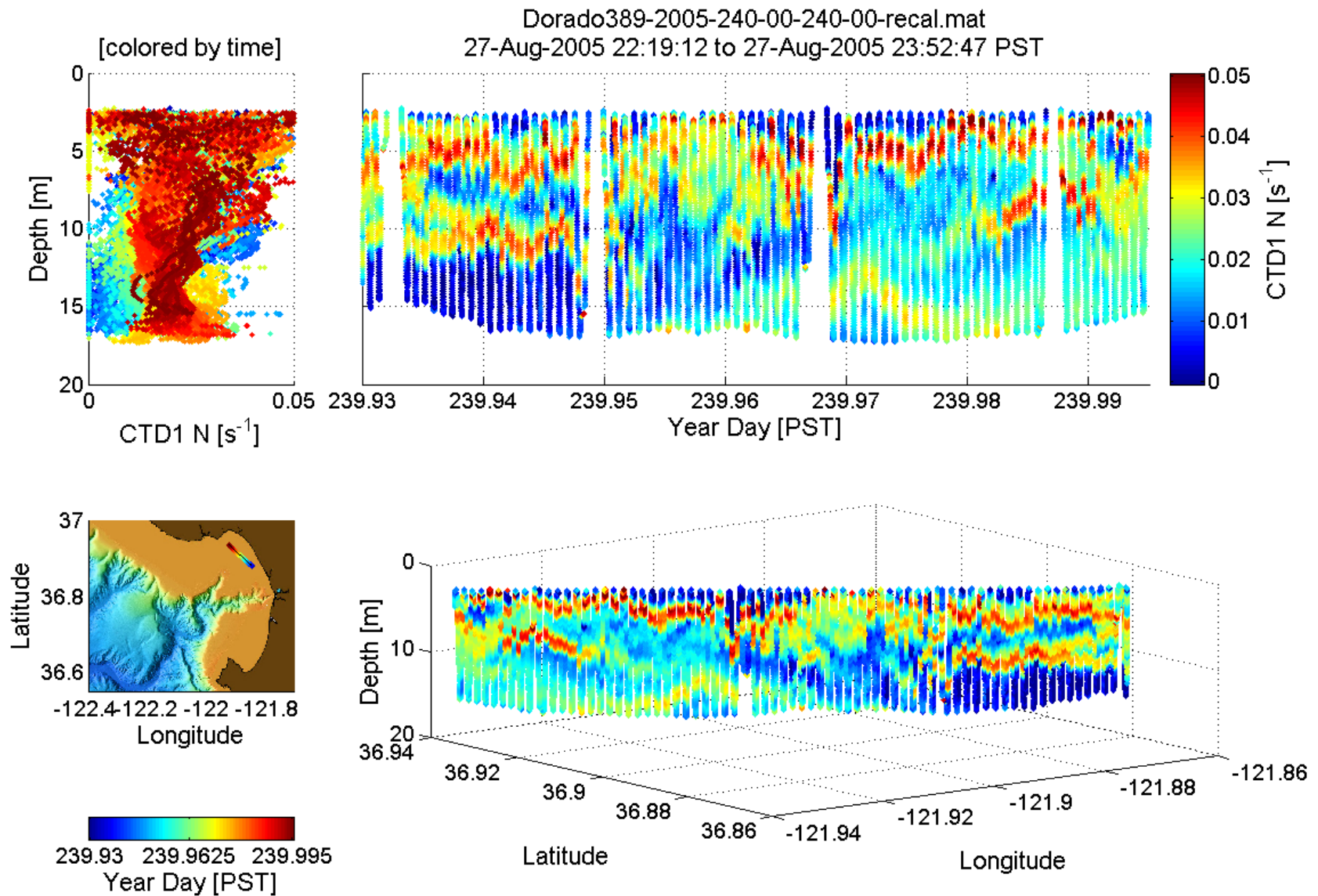


Excludes upper 40 m where the phytoplankton have high bb

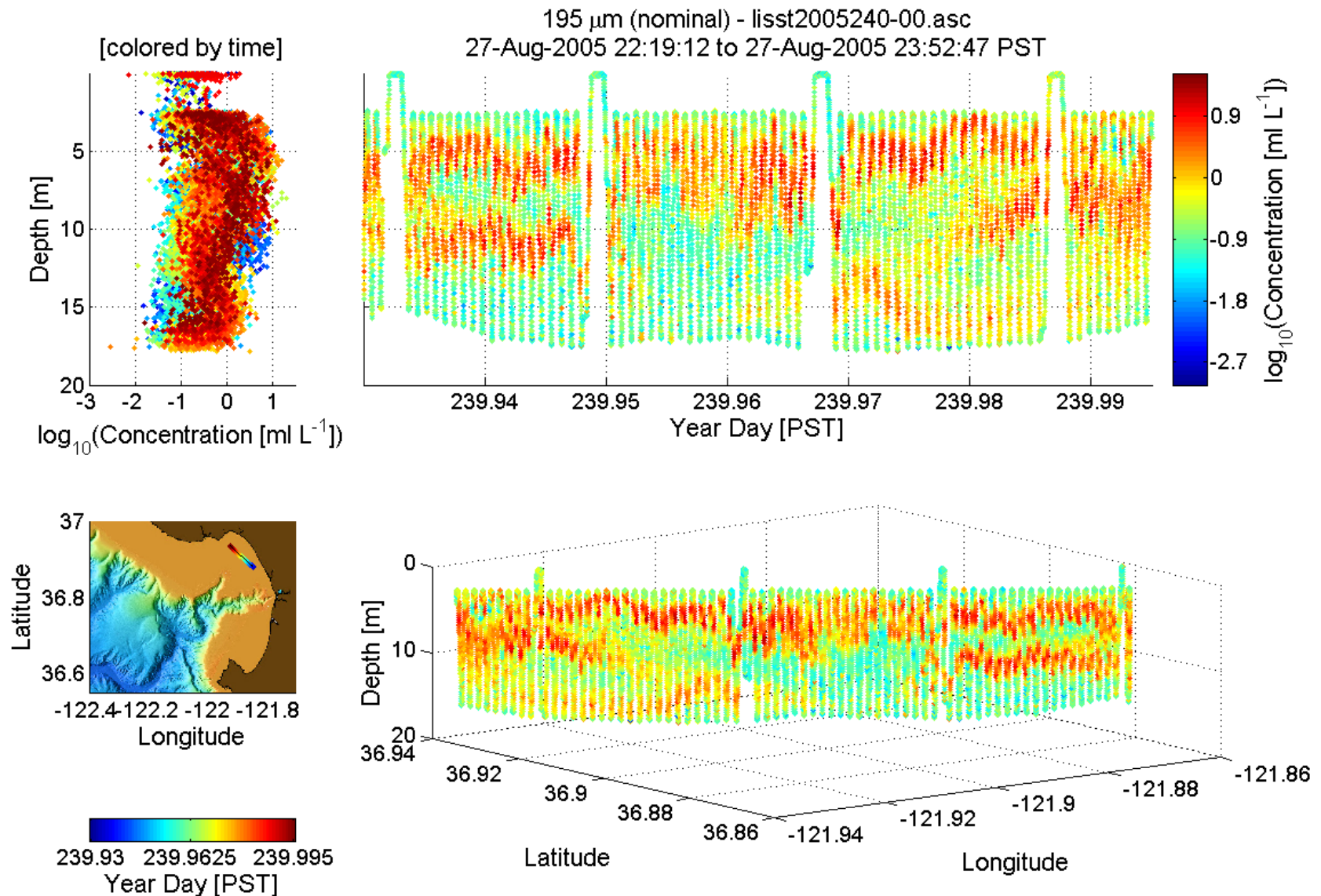
Large Aggregates Associated with Density Discontinuities (from LISST)



Brunt-Vaisala Frequency (measure of density gradient)



Large Particle Concentration (195 μm from LISST)



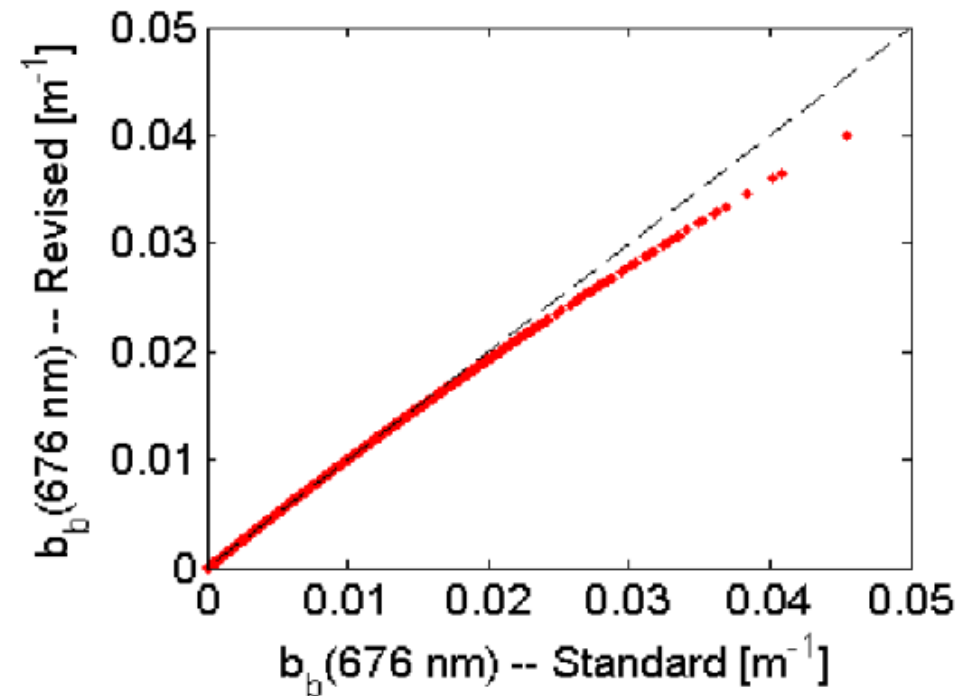
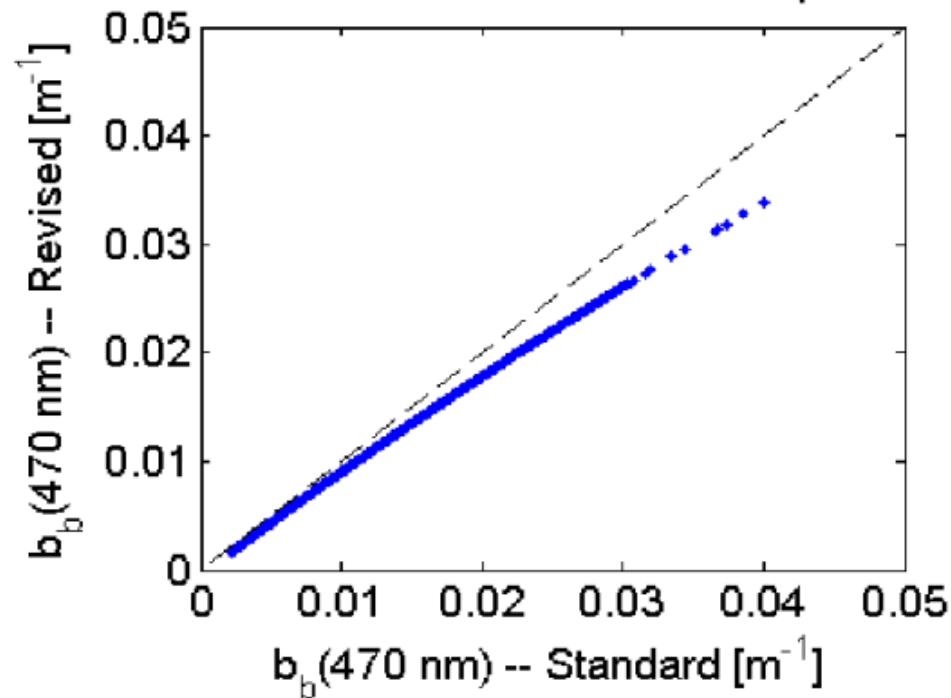
MATLAB scripts for time-series analysis

- ◆ Start with a classified list, e.g. only canyon axis runs
- ◆ Preview all, and identify only “good” data for averaging. First cut excludes a few sections completely because of a bad patch; better QC would allow the good subset to be used.
 - ◆ May have a different set of “good” surveys, depending on the sensor that you are focused on.
 - ◆ May want to subset the full survey, e.g. shelf surveys limited to La Selva – M1 – Monterey (input time limits); extended canyon axis surveys limited to the inbound portion that is continuous yo-yo. For this you can just pick the time-range off of a preview plot and save it to constrain the binning.
- ◆ Set up the binning grid: depth x [latitude or longitude]
- ◆ Run the binning, including subsetting unique to each survey.
- ◆ Plot

Data quality and science use

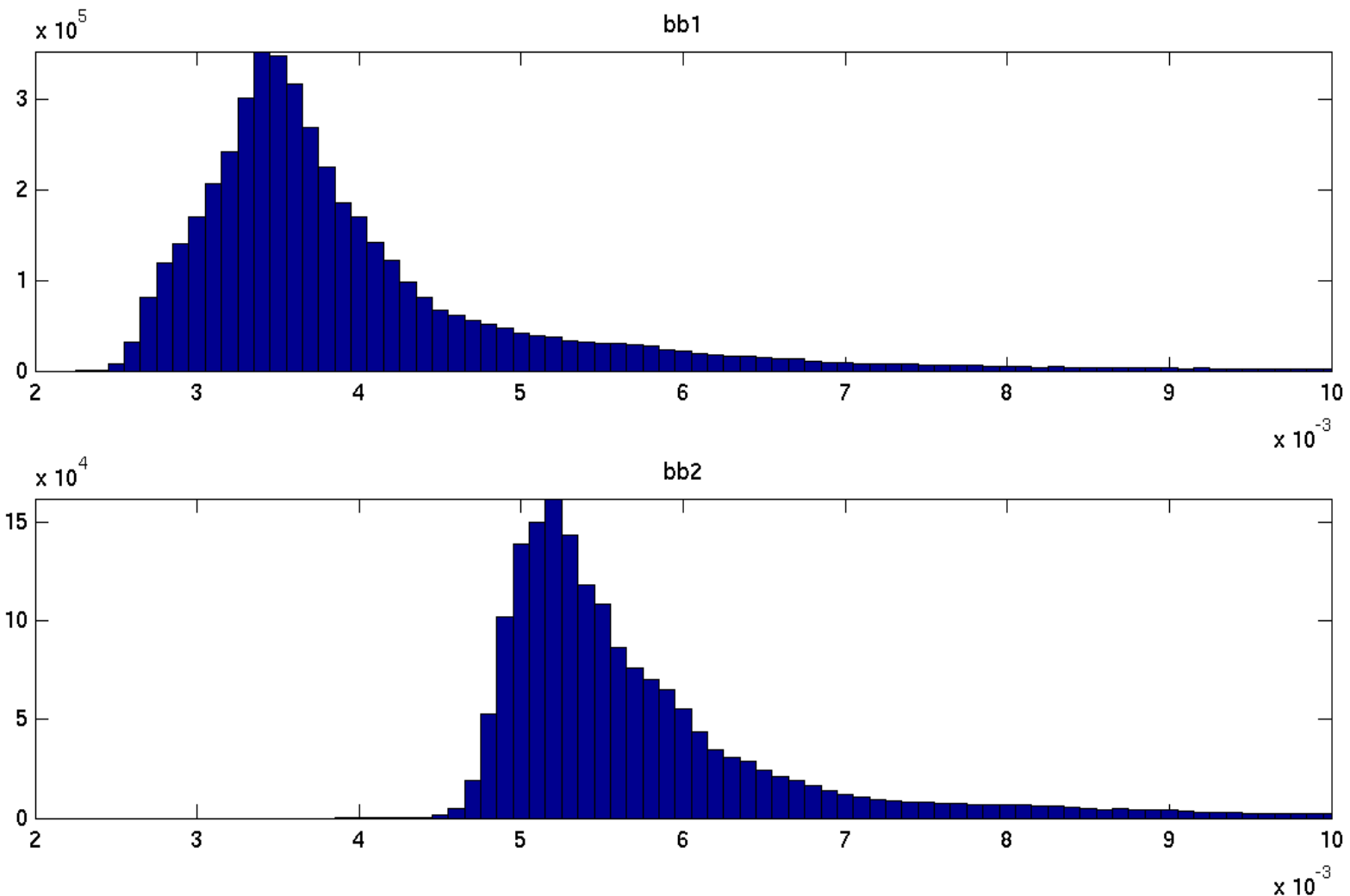
1. HOBI Labs HS2:

- proper calibration
- a “baseline jump”

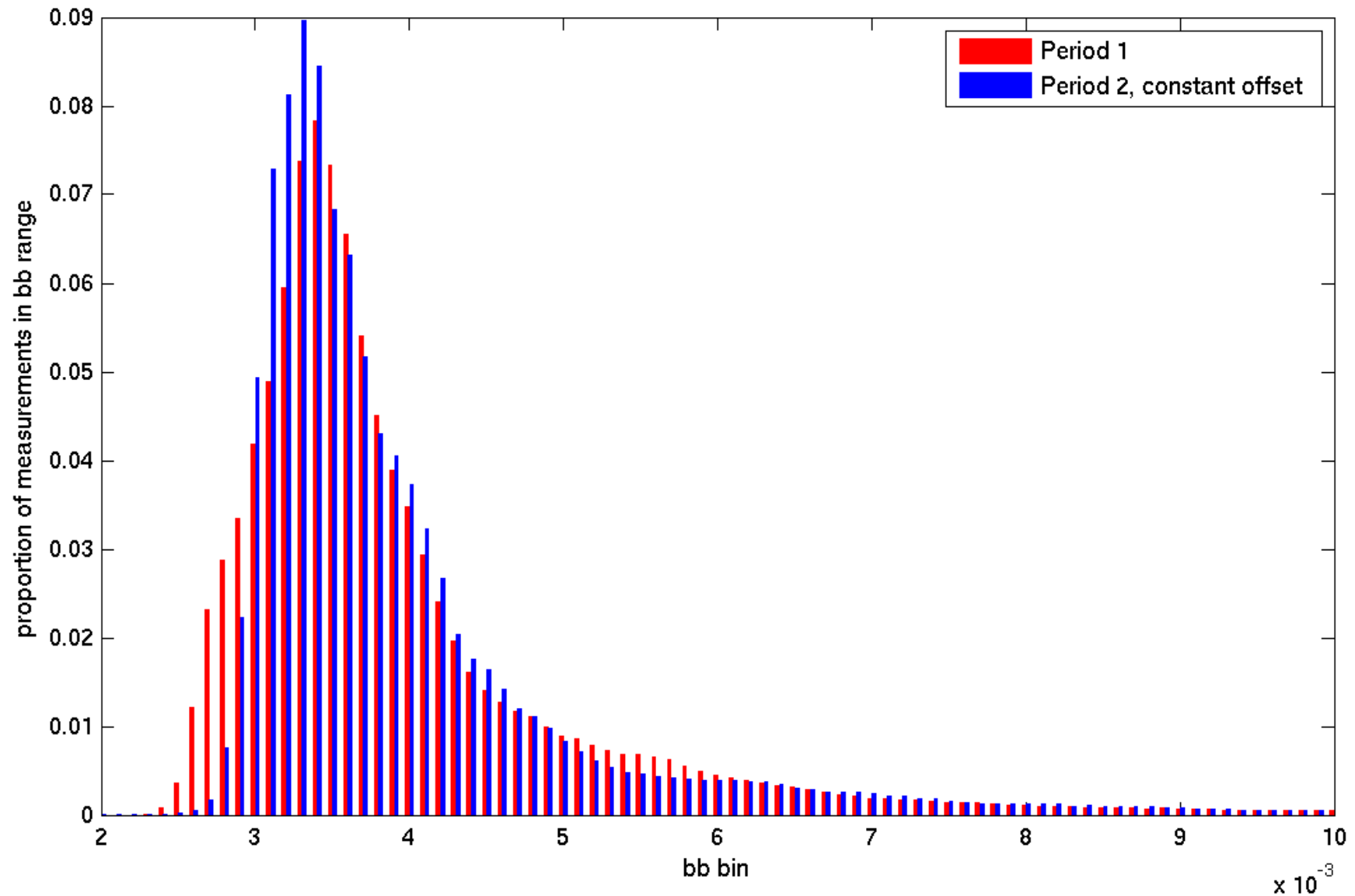


HS2 “baseline jump” characterized from canyon axis series

- Sensor was replaced between 2005096 and 2005103, no shift evident
- Very noisy, unusable HS2 data on 2005257 (sensor failure).
- Shift-up in bb range after sensor repair (2005299 forward)
- Shift back down with 2007085, following swap back to the original HS-2 sensor

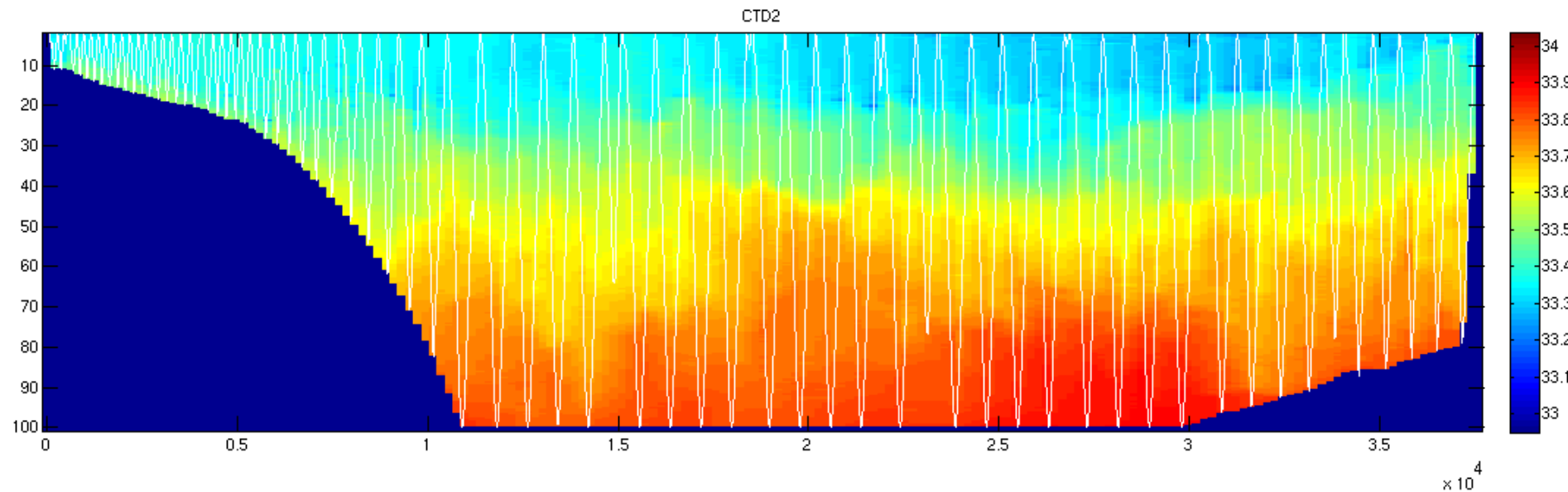
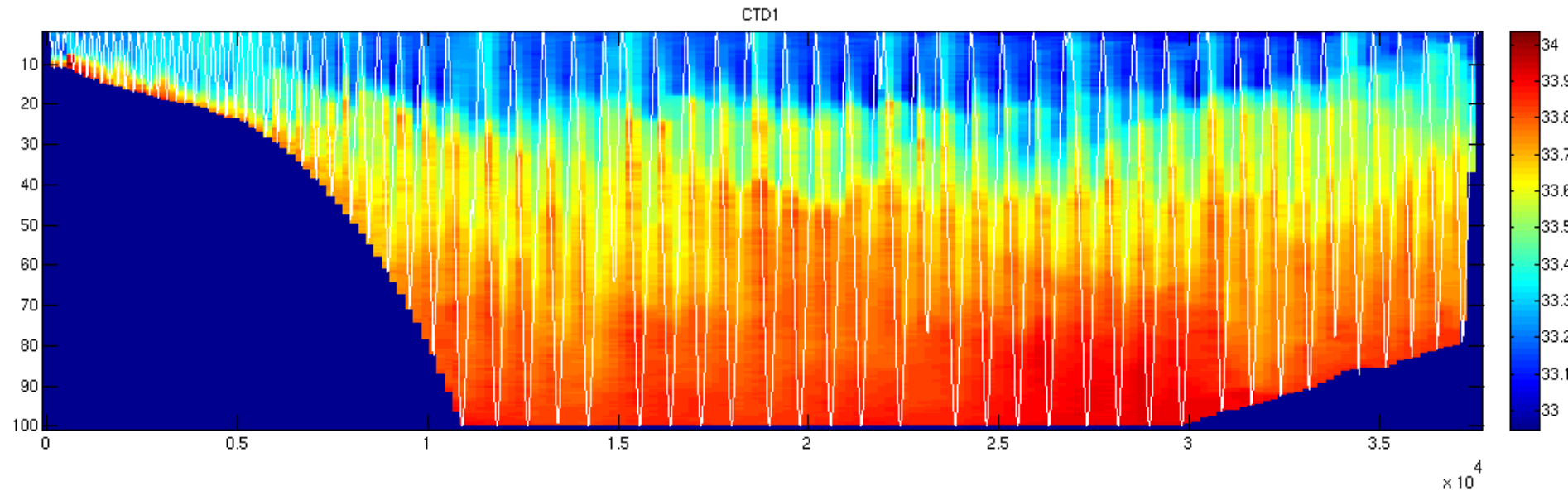


- Simplest: used median difference as a constant offset.
- Differences in conditions sampled or sensor response?



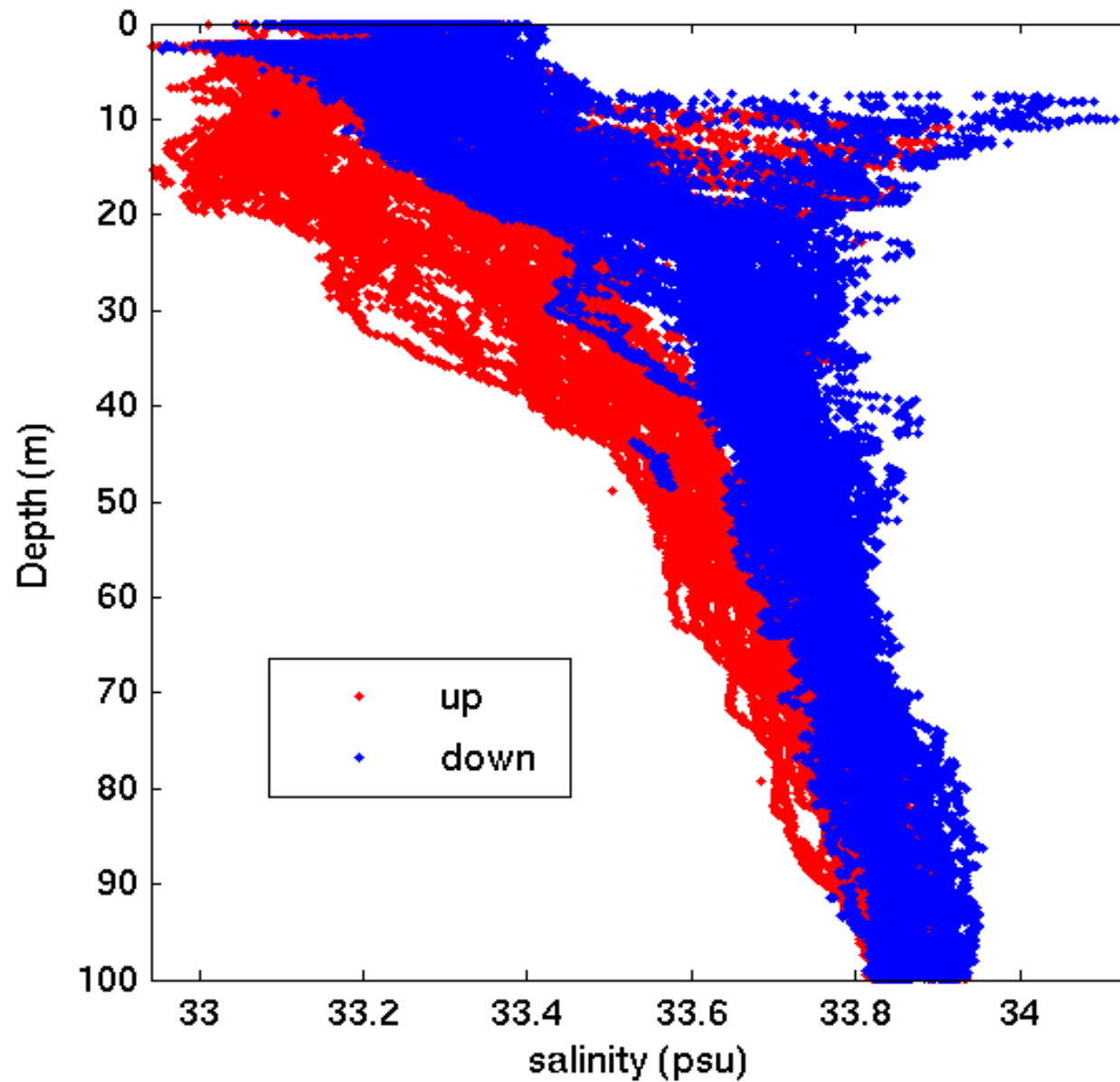
Hysteresis in salinity:

Can be very different between CTDs, suggesting one CTD with a flow problem

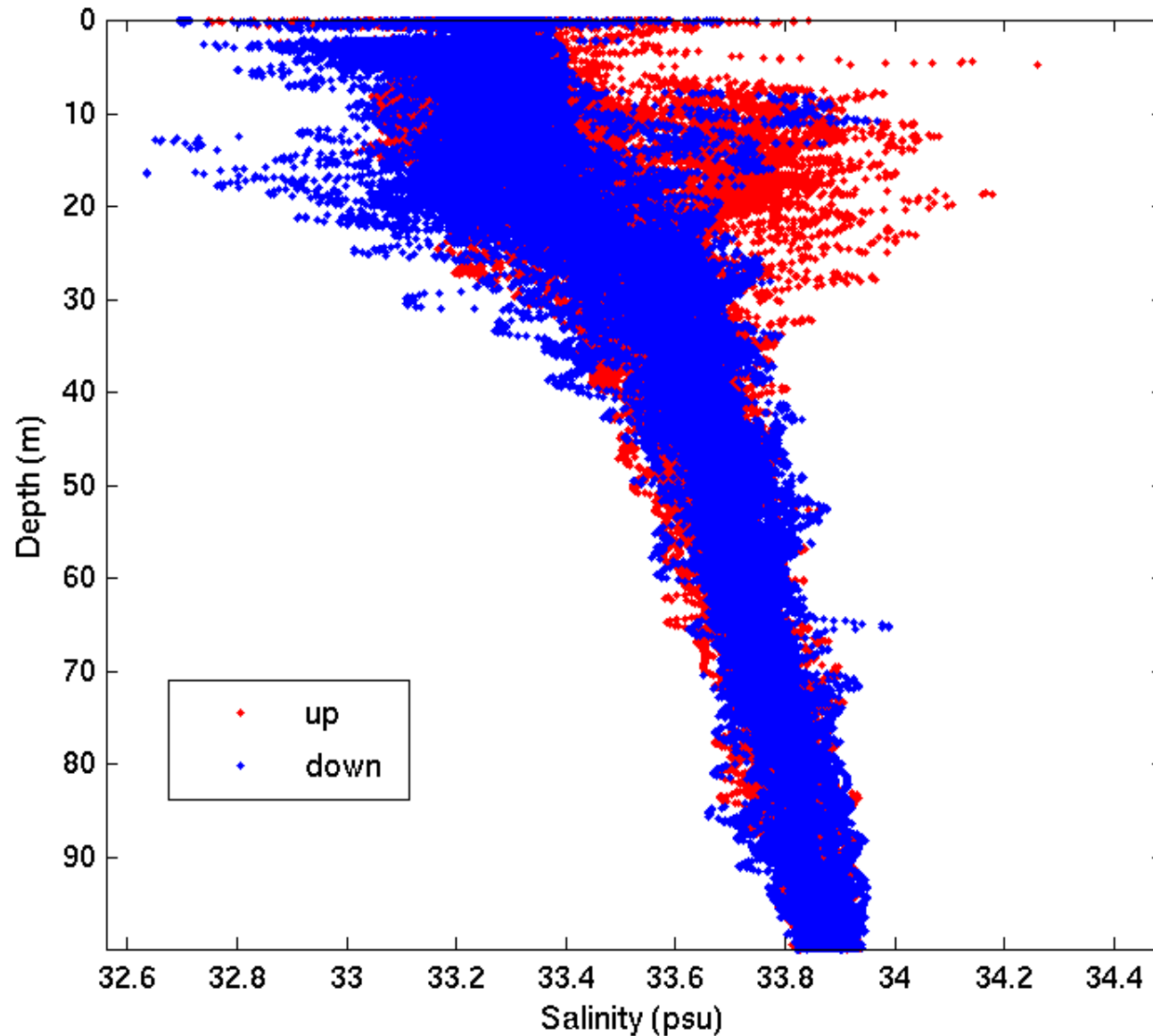


Shelf survey 2005 123

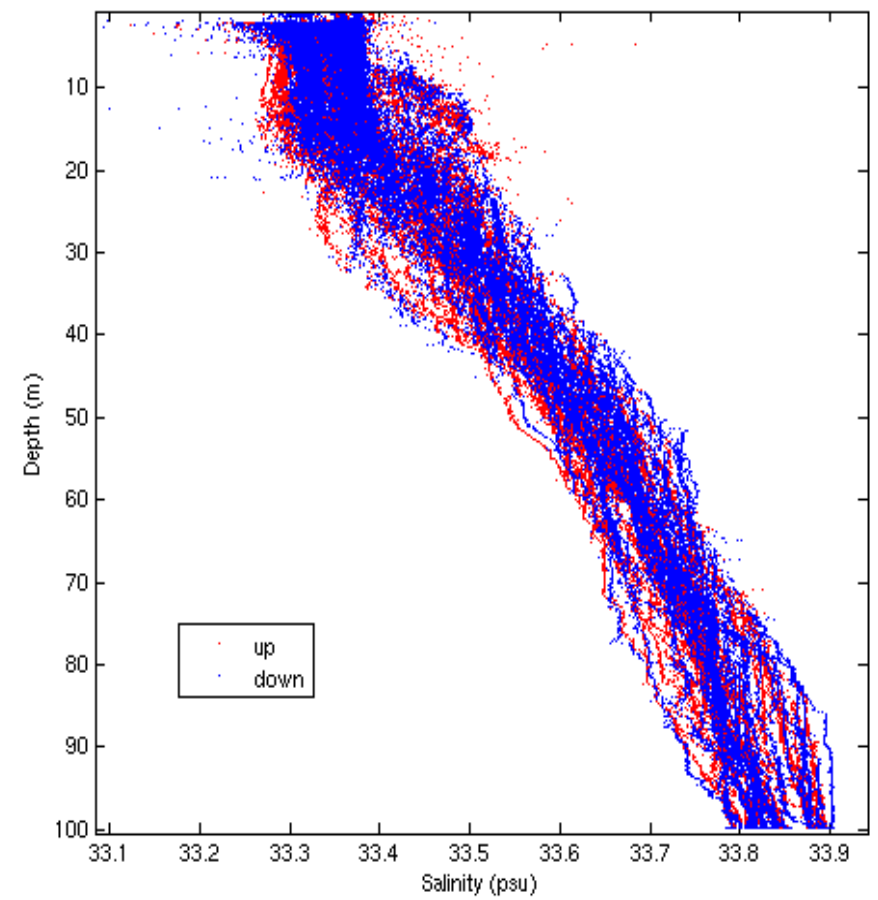
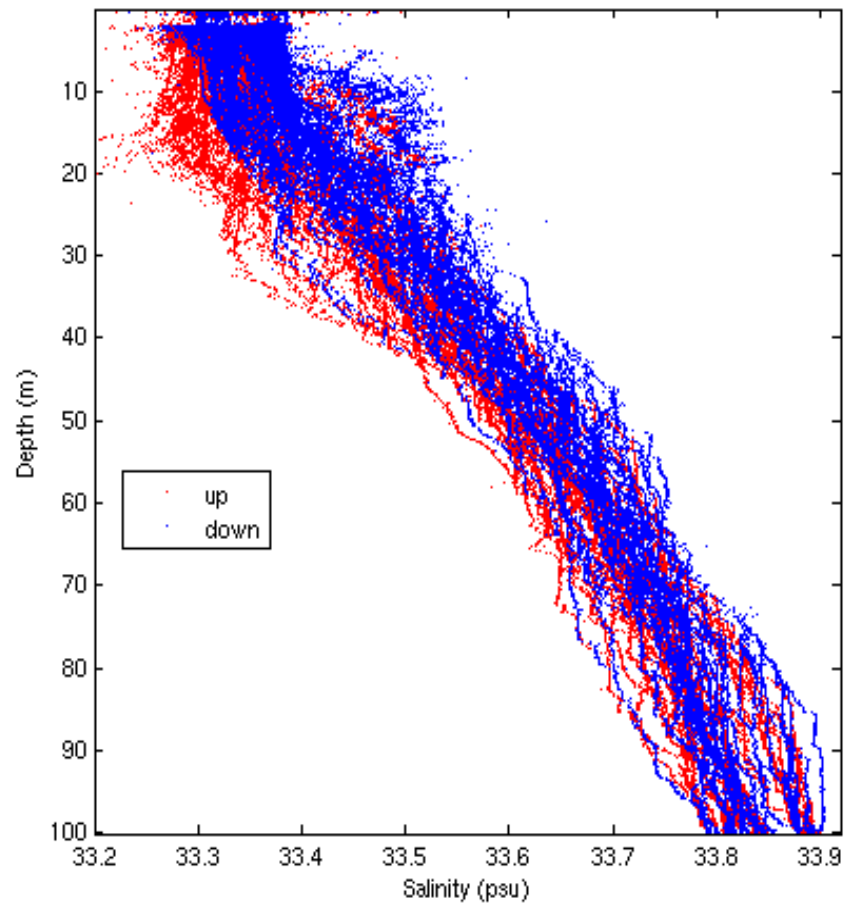
Salinity lower on upcast, higher on downcast
Opposite of what would be expected for plumbing lag...



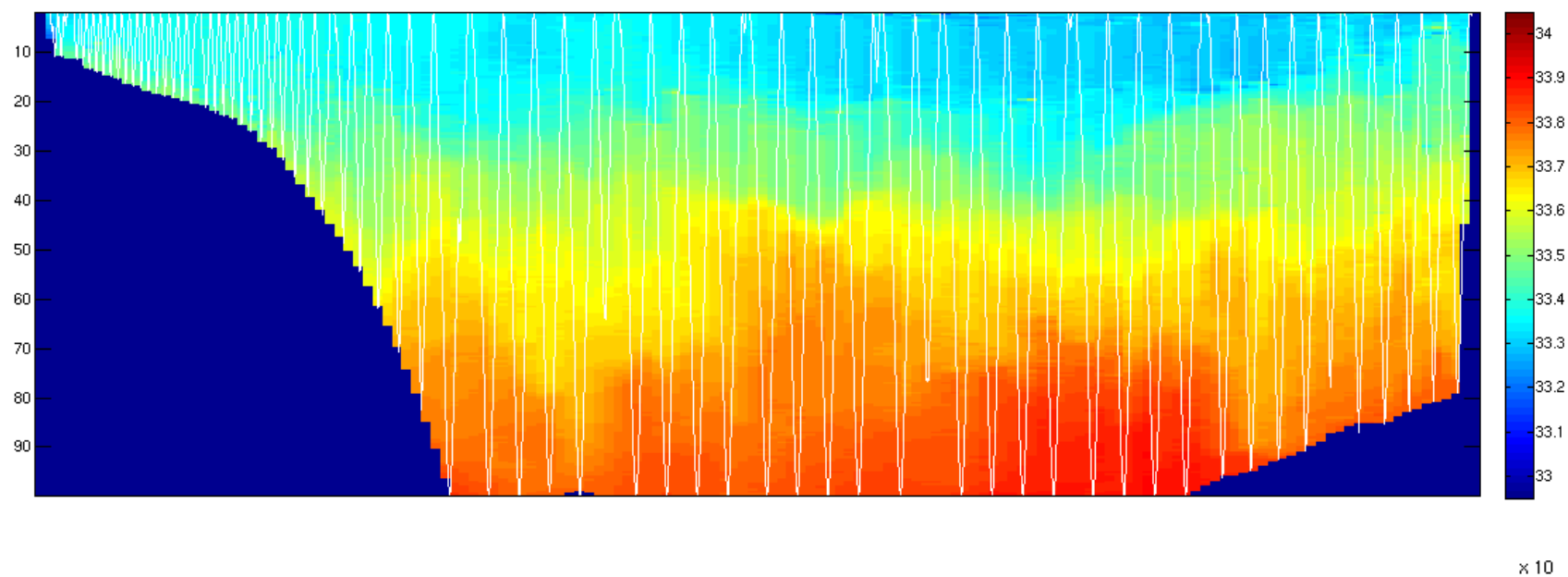
Salinity is computed from conductivity (ratio), temperature and pressure. Effects of temperature misalignment are significant. Same survey, 4 second lag for temperature – conductivity alignment... better, but gridded section has a lot of noise still



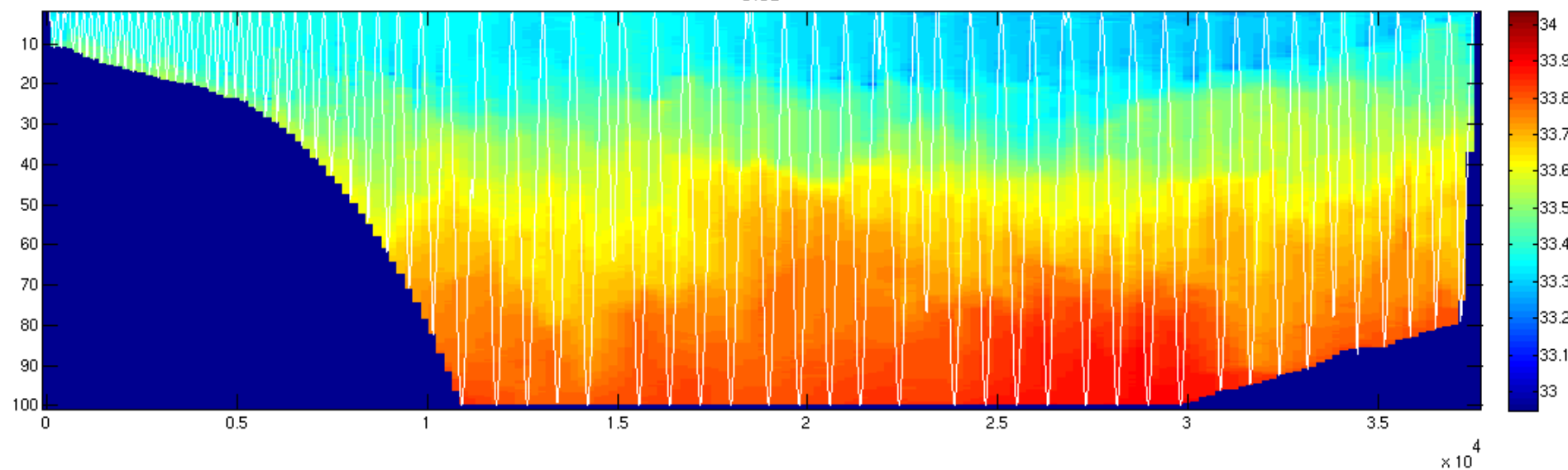
CTD2: more mild hysteresis, applied 0.5 second lag



Aligned (0.5 second lag between temperature and conductivity)



Not aligned



The alignment of geometry and plumbing need to be revisited with the new nose and sensor configuration :

- geometric corrections: sensor positions relative to the pressure measurement (account for vehicle pitch)
- plumbing lag corrections (tubing volume between intake and sensor, flow rate)

The standard align_geom.m accounts for variation in sensor vertical position due to the pitch of the vehicle, referencing a standard center point on the vehicle. This center point was defined as the point where the center line of the vehicle intersects the first joining ring. Questions for Erich: Why are there offsets specified and used for parosci?

```
parosci sensor_offsets=[-0.927,-0.076];  
ctd sensor_offsets=[1.003,0.0001];
```

Flow sensors:

- Not providing usable data (i.e. zeros, not just a matter of calibrating)
- Are they causing variability in flow rates that only confounds alignment?

Operations notes

- ◆ Pre-cruises needed for ops notes to show up in expedition database
- ◆ Cruise track planning and getting info to AUV ops with lead time
- ◆ How to request gulper
- ◆ Upcoming applications of the autonomy group
- ◆ Instrument serial numbers should come across with data transfer to SSDS
- ◆ Notification of science when sensors are changed

New sensors

- Getting LOPC up, running and data analyzed (Sackmann)
- CDOM fluorometer for coastal plume studies (Ryan)
- PAR sensor (Johnson, Chavez, Kudela)

2008 Proposal

Consider current sampling attributes & 2008-specific plans

Is the current sampling program working well for your research goals?

What adjustments would you make?

John:

- 100 m is too shallow off the shelf to resolve INLs, extend to 150 m
- Study the inner shelf by regular sampling (12-m isobath surveys started May 2007)
- Fill gap in spring monitoring on the shelf, especially south
- Expand event detection / gulper use for INLs, fronts, phytoplankton patches

You:

→

Do collaborative projects during 2008 motivate a more intensive period of observation?

If so, when & where?