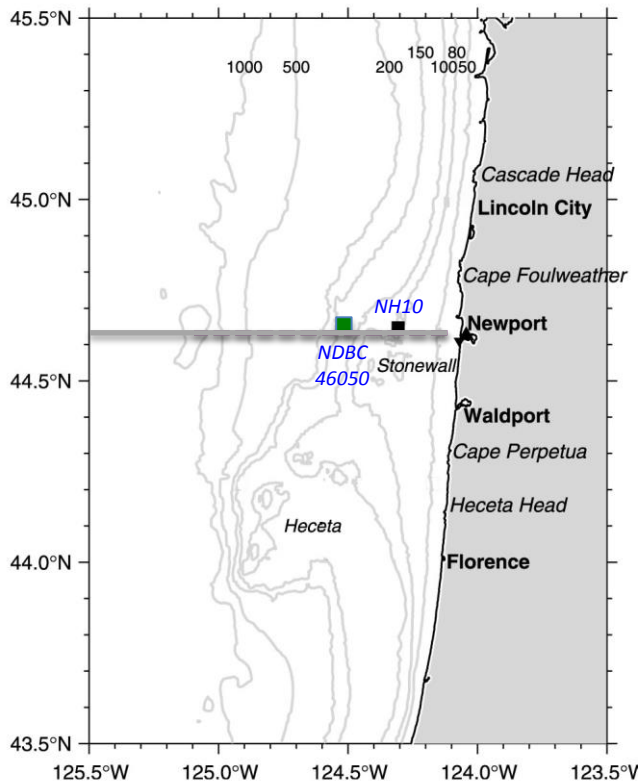




Time Series off Newport, Oregon

Mike Kosro, Craig Risien with contributions from
Ted Strub, Burke Hales, Jack Barth, Kipp Shearman
+ NANOOS Data/Products committees
Acknowledgement: Murray Levine



Newport Hydrographic Line (since 1960's)

NH10: long-term mid-shelf shelf mooring, 83m
10-14 T, 3 S, ADCP, winds, now OA
NANOOS funding from 7/2006:

Measured met, waves, SST at NDBC 46050 (NOAA)
Coastal Tide Gauges

Remote sensing: HF surface current mapping, altimeter,
surface T, etc.

Slocum glider (Barth/Shearman, NANOOS funding thru
9/2014, transitioned to OOI).

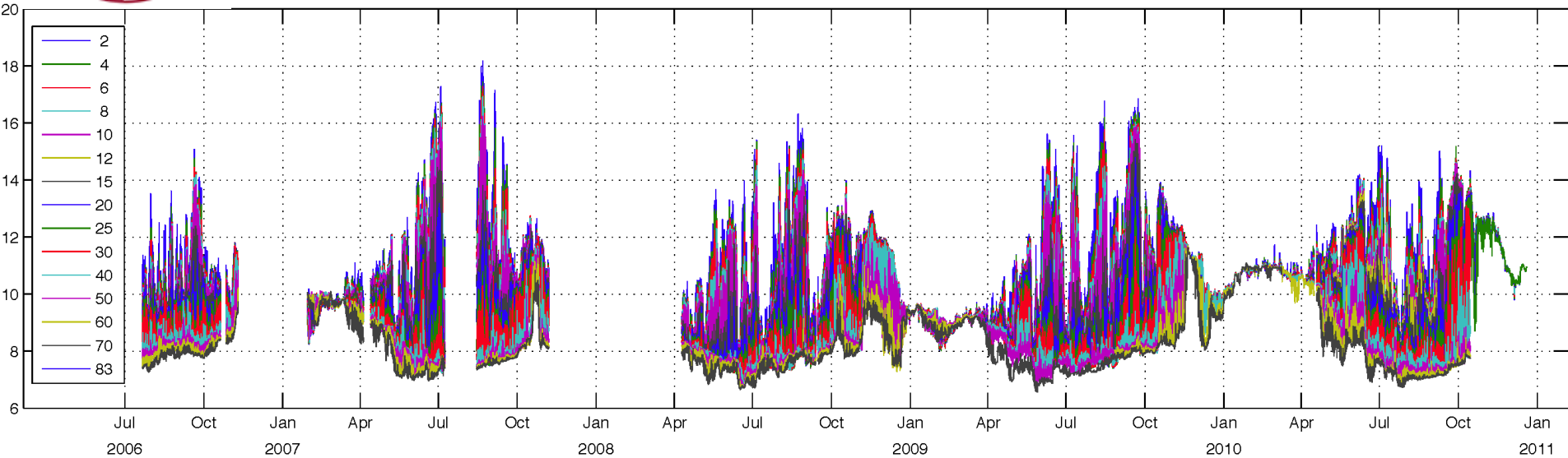
Ocean modeling: Alex Kurapov (with & without DA)+others

OOI: Ocean Observatories Initiative
Endurance Array (NSF) (Dever, Barth)

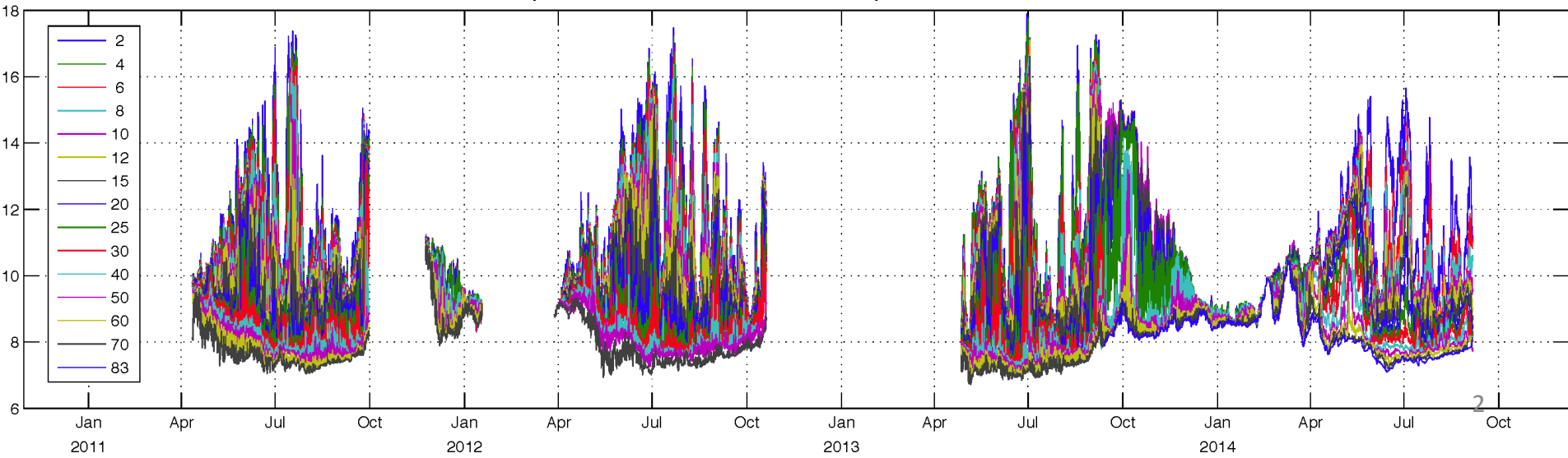


NH10 Temperature Time Series, 7/2006 to 9/2014

Temperature time series, all depths, 2006–2011

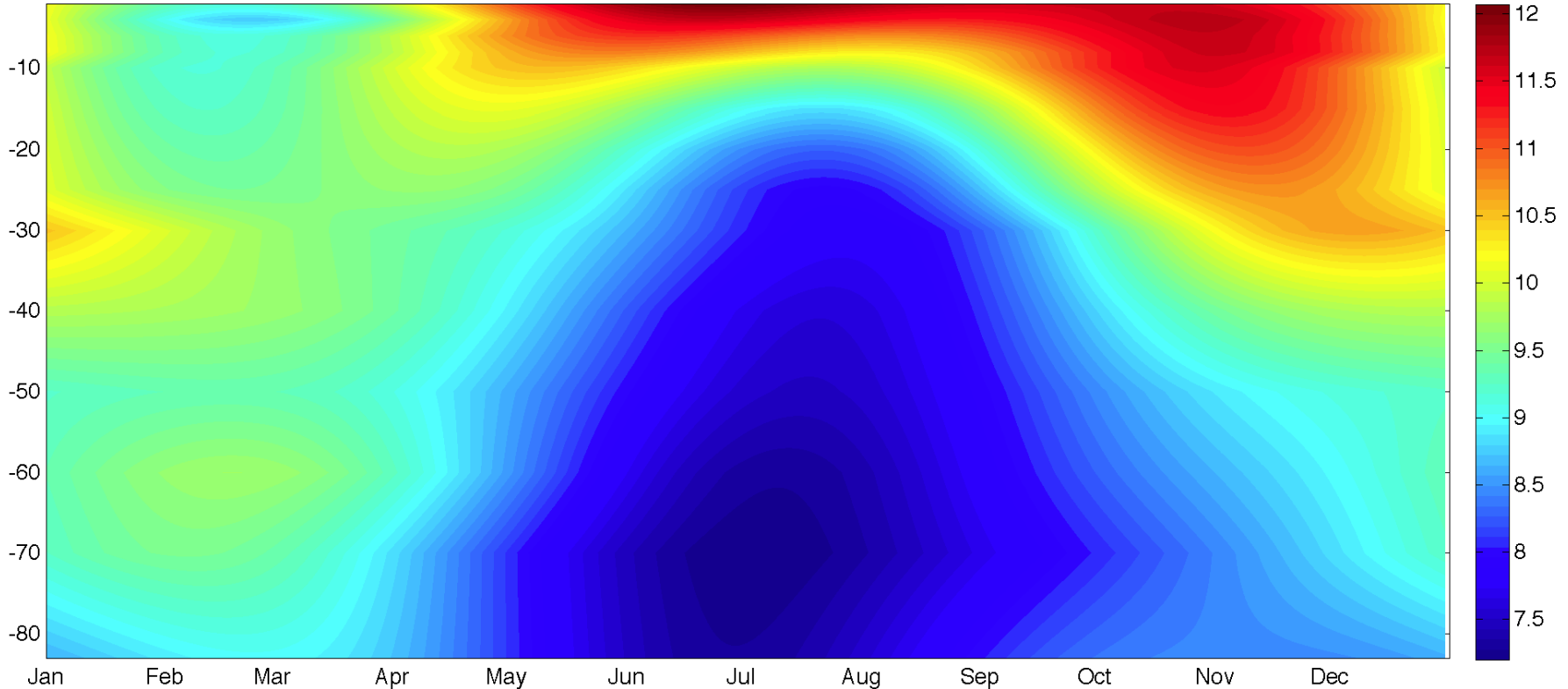


Temperature time series, all depths, 2011–9/2014



NH10: $T(z,t)$, Seasonal Cycle (7/2006 – 9/2014)

NH10, Annual/Semi-Annual Cycle fit to $T(z)$, 7/2006 to 9/2014



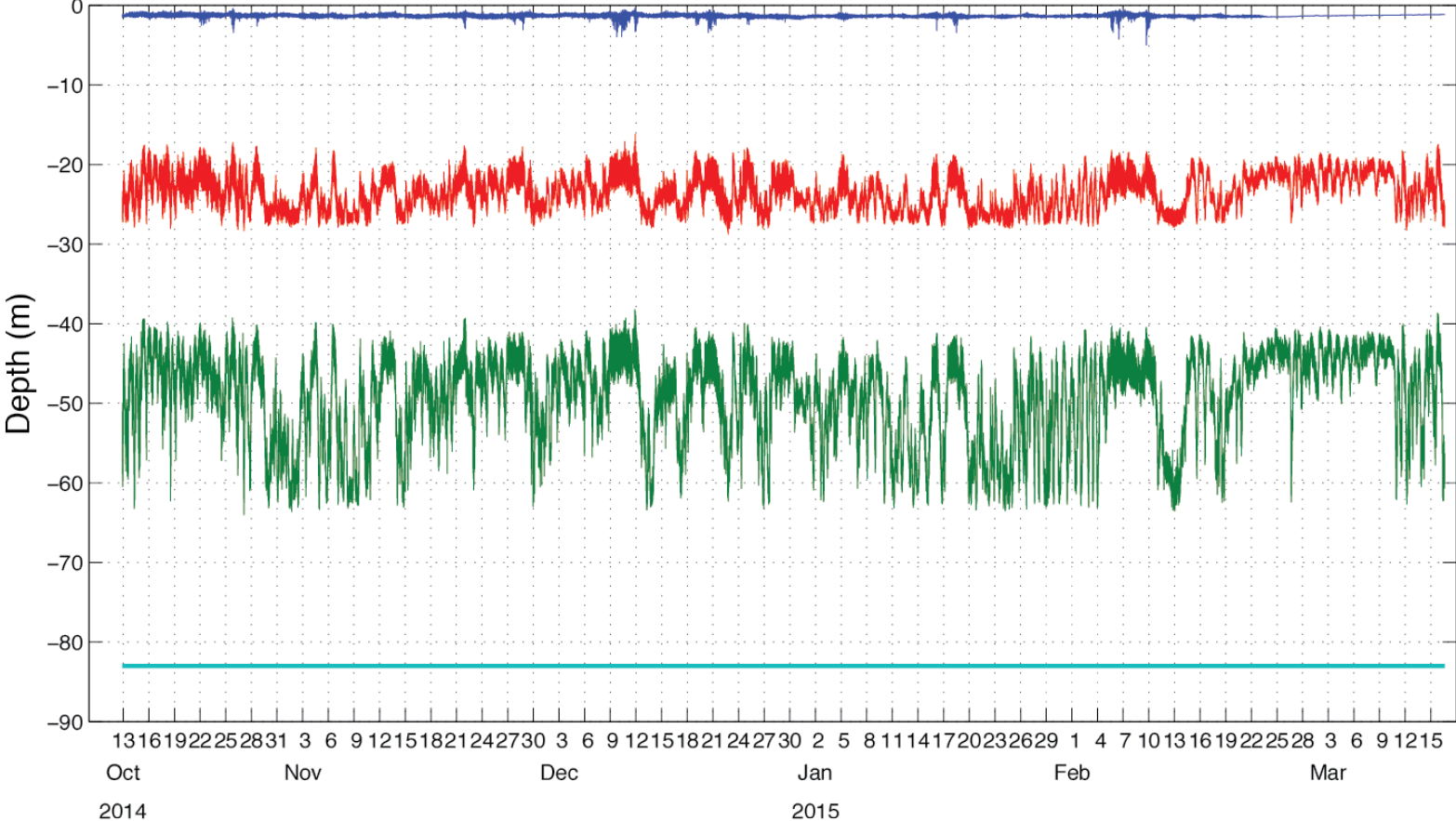
Very strong seasonal cycle

Stratified strongly spring – fall, weak or no stratification in winter

Cold temperatures near bottom first, rise through water column over spring

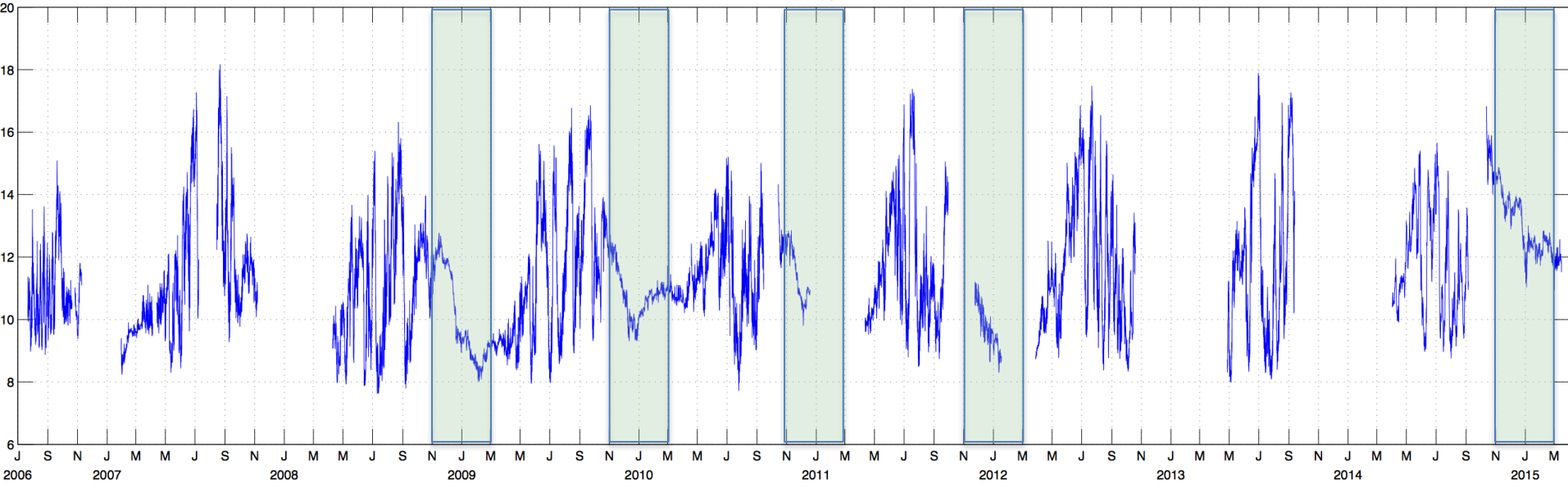
Fall: surface layer warms and deepens (downwelling)

Depth of pressure sensing instruments, Deployment NH2014.10

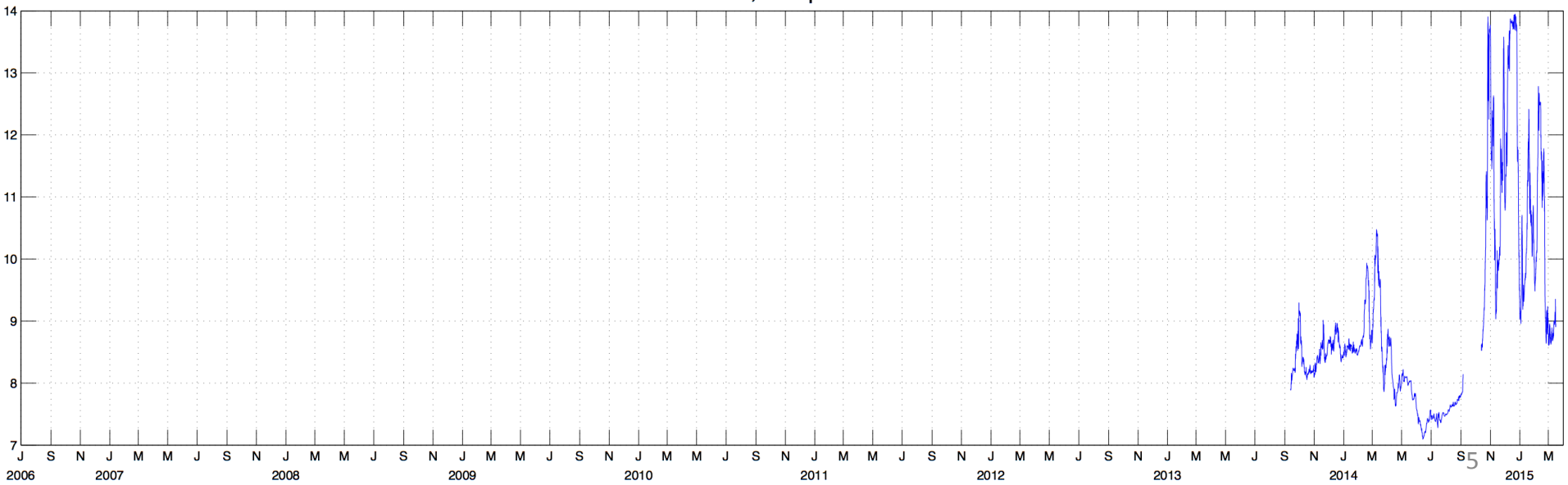


Full Time Series Including 10/2014-3/2015. Top (2m) and Bottom (83m)

NANOOS NH10, Temperature at 2m

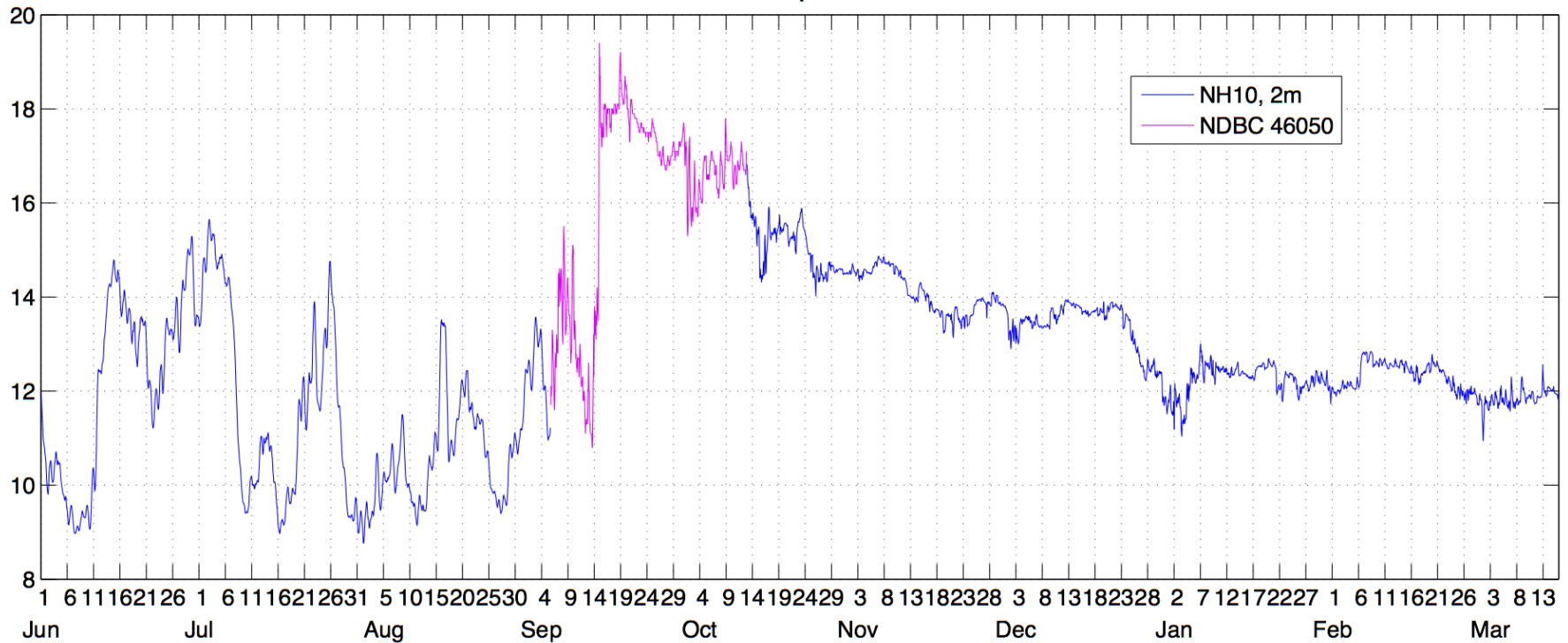


NANOOS NH10, Temperature at bottom



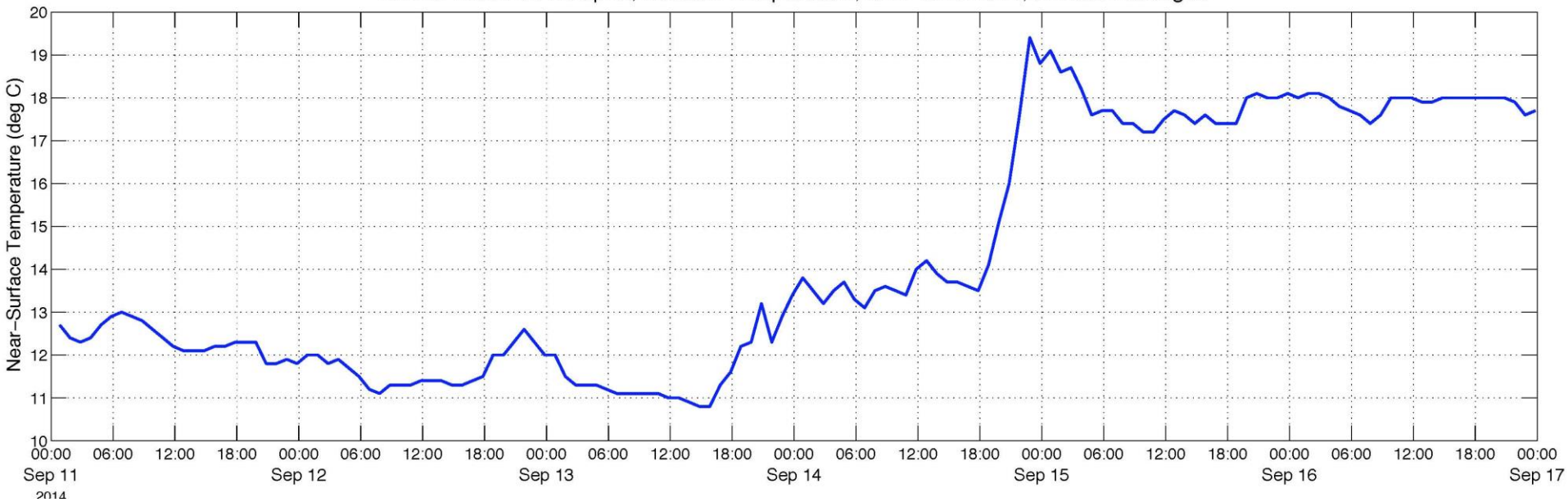
Surface Temperature, 6/1/2014 – 3/14/2015

Near-surface T, offshore Newport, June 2014 – March 2015



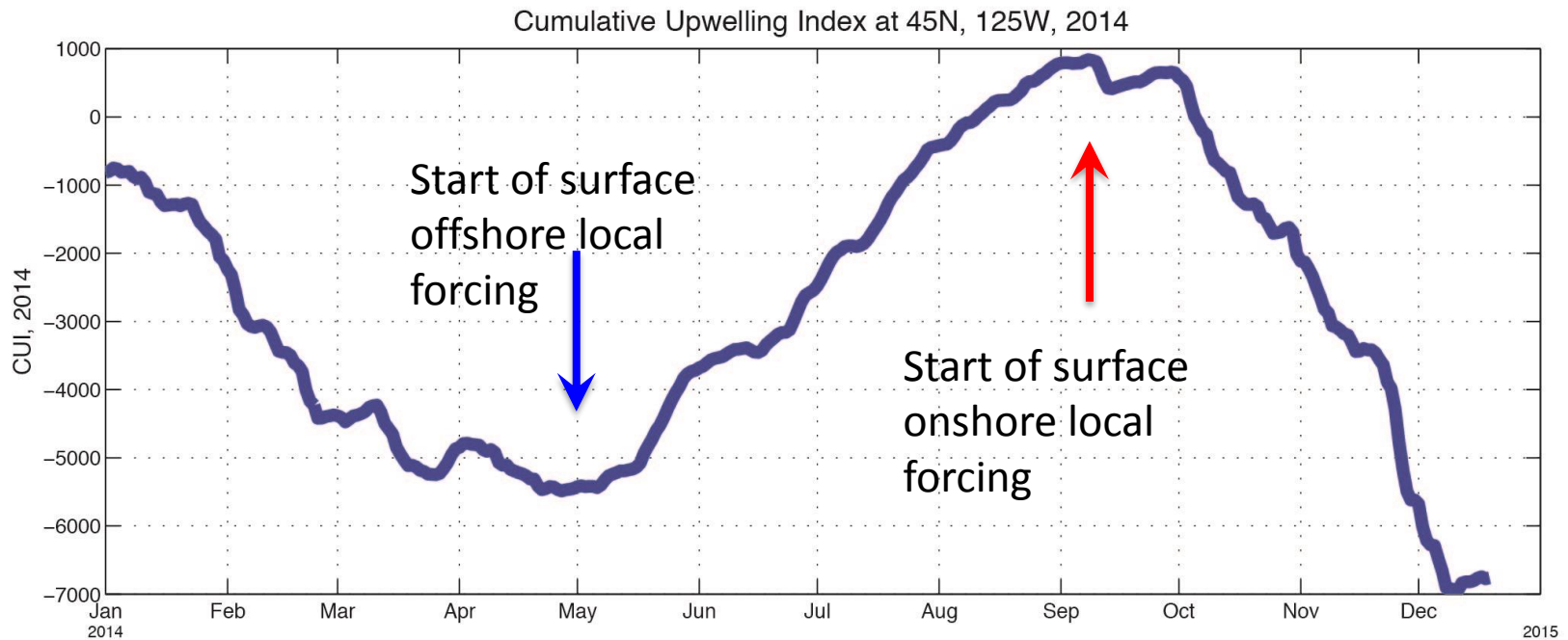
Strongest Front Arrival at 46050: 9/15/2014 approx 18:00

NDBC 46050 off Newport, Surface Temperature, 9/11–9/17/2014, Frontal Passages



Onset of Downwelling?

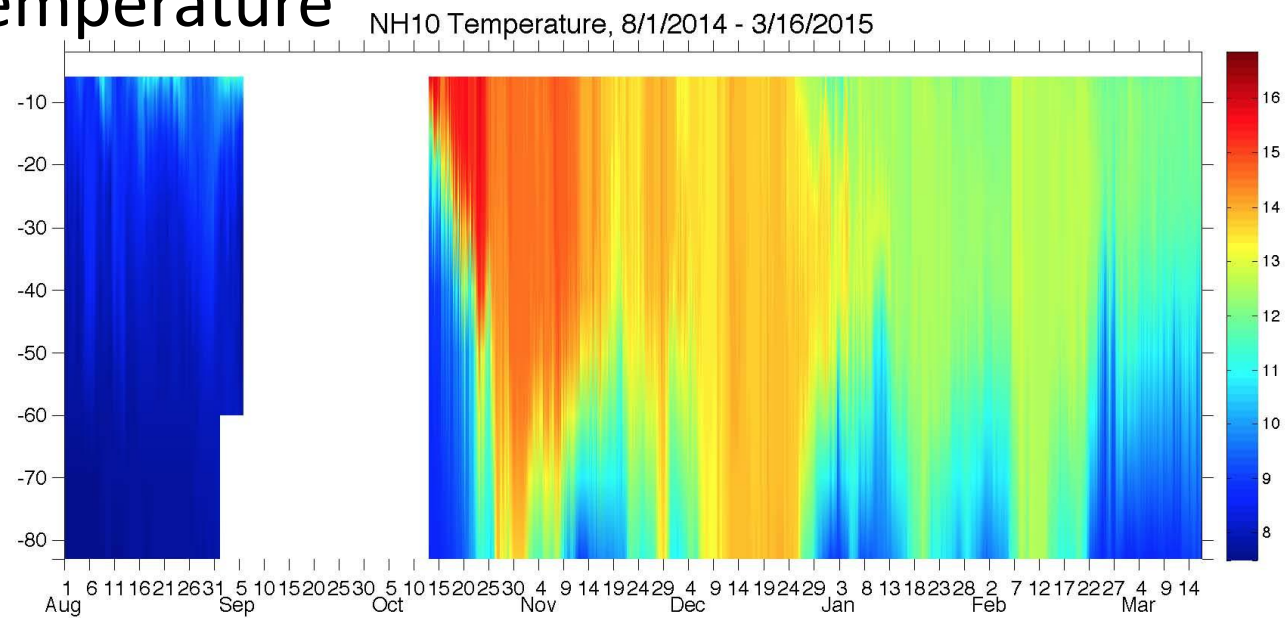
2014 Cumulative Upwelling Index (NOAA PFEL) (neg. of time-integrated Ekman Transport) at 45°N, 125°W



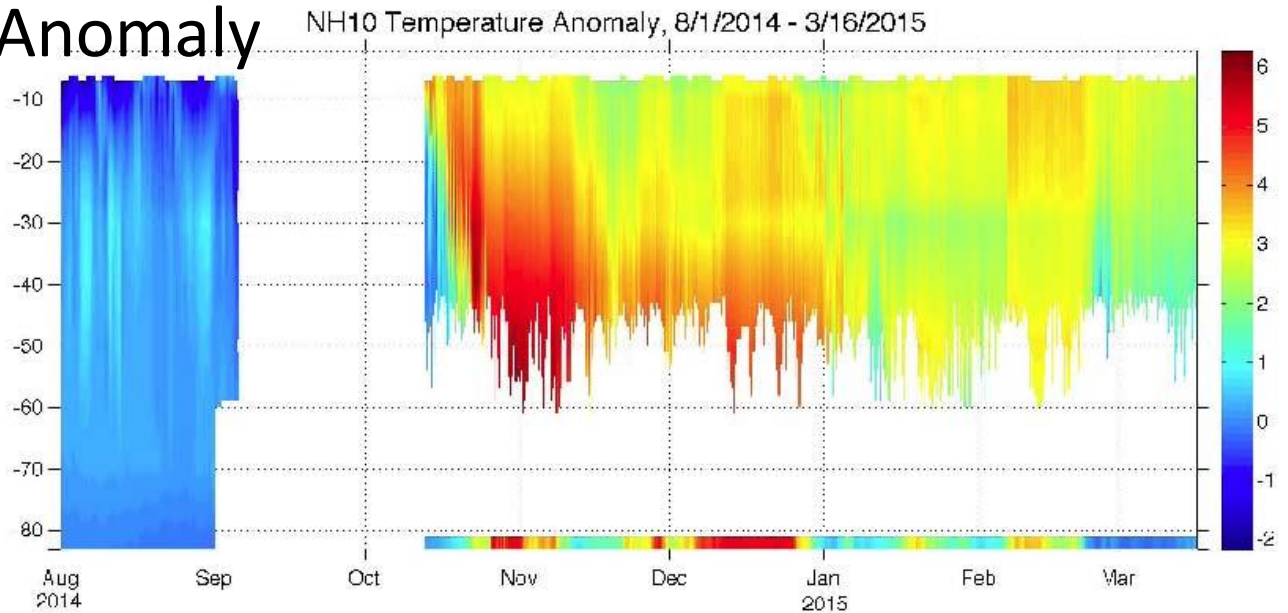
Note however, onshore forcing starts weakly in September at this nearshore location.

NH10 Temperature & Temperature Anomaly, 8/1/2014-3/16/2015

Temperature

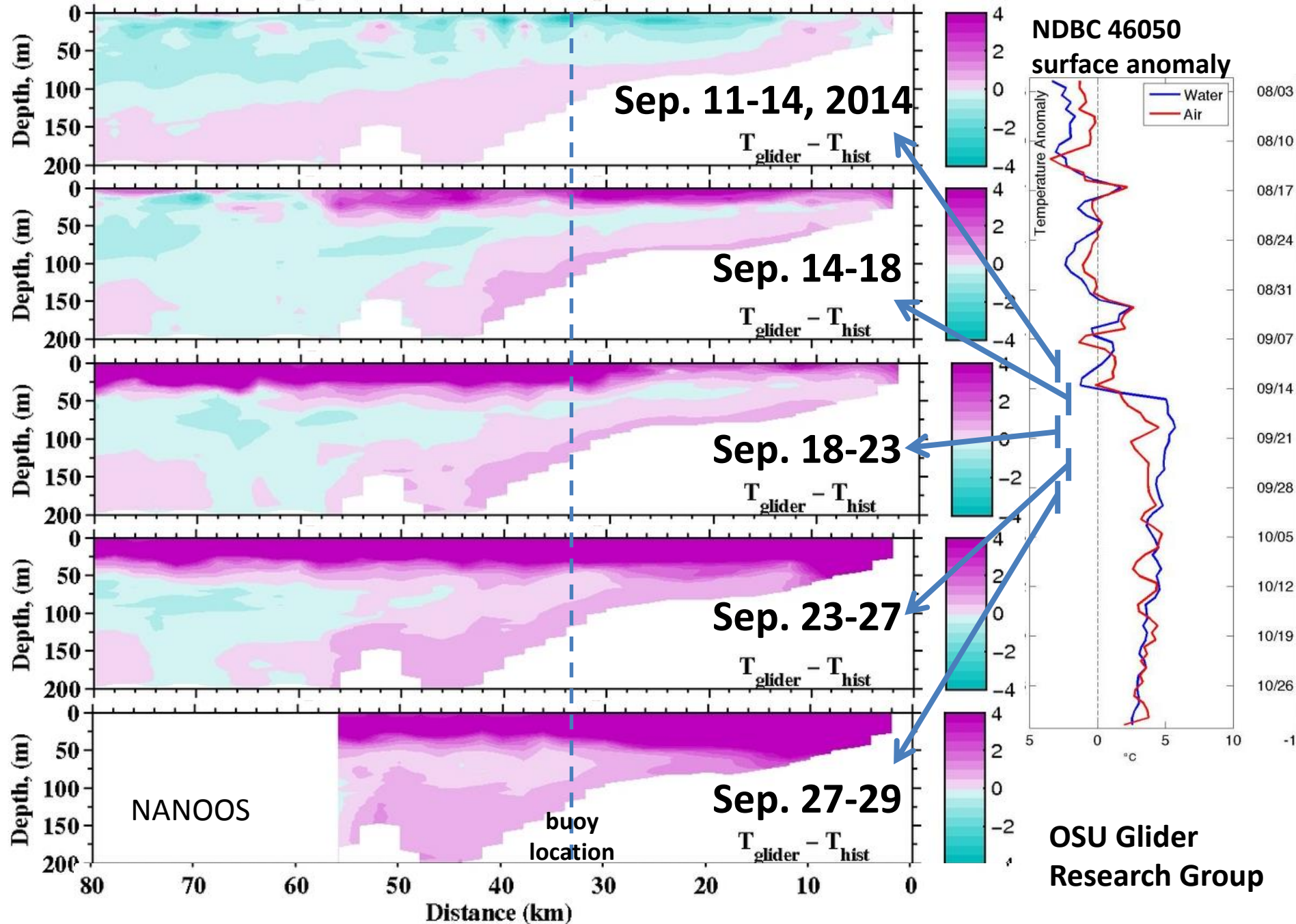


Temp Anomaly

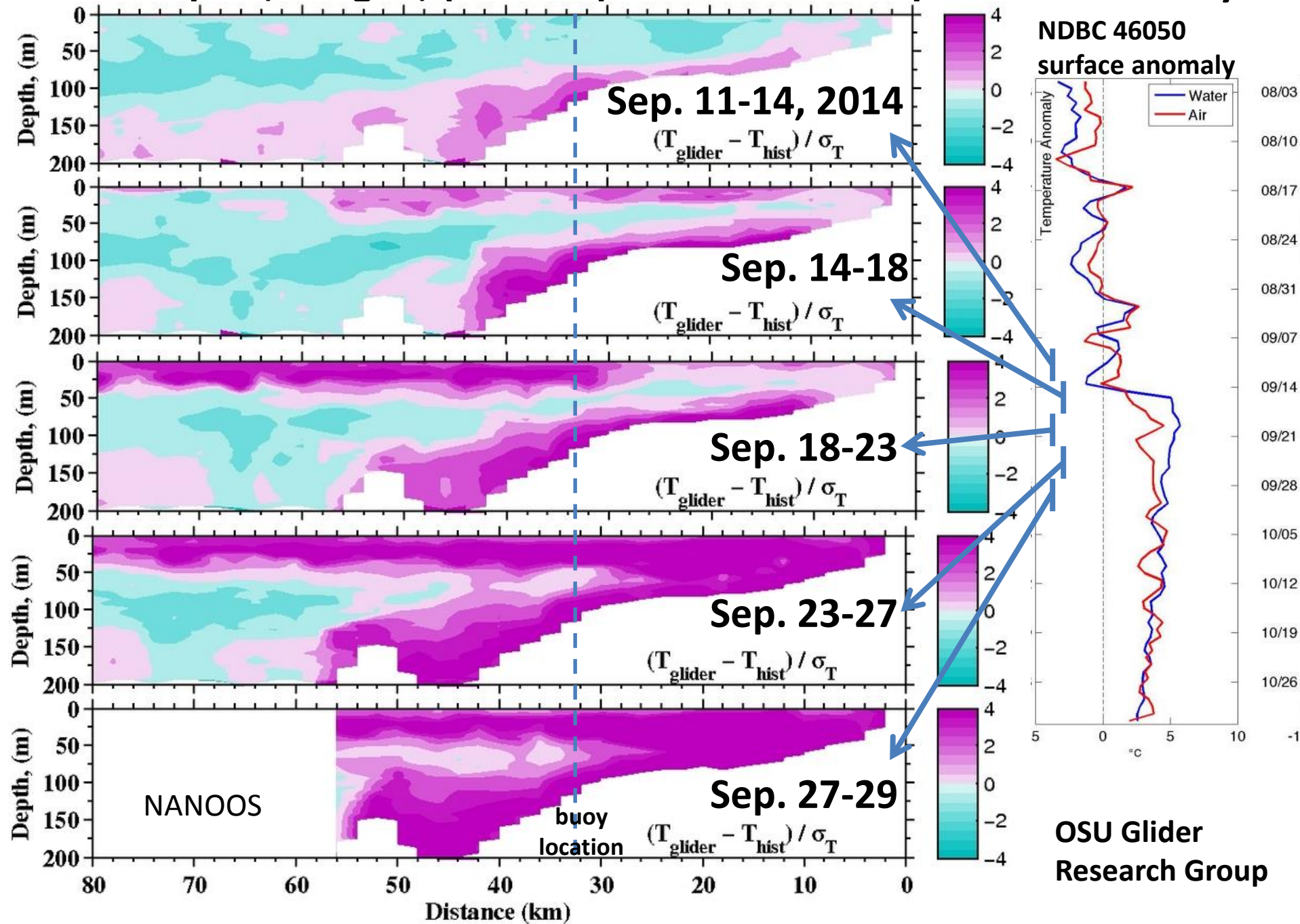


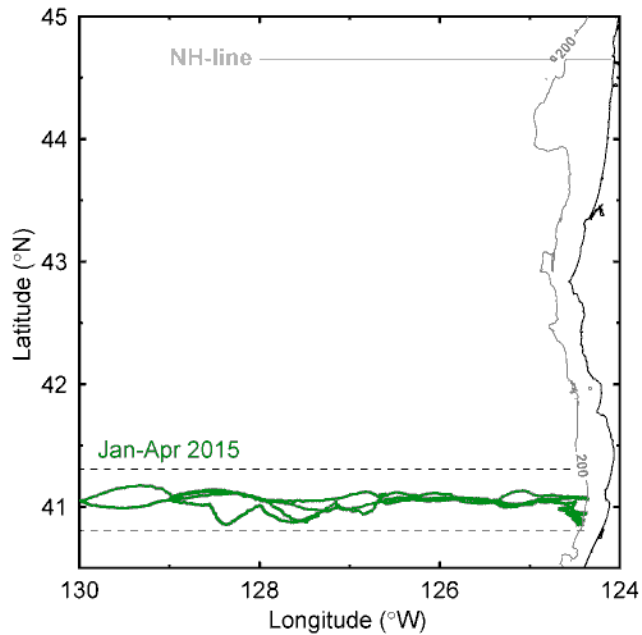
Repeat Glider Transects along the NH10 line
by OSU glider group (Barth, Shearman, & coworkers)

Newport, Oregon, (44.65°N) Temperature Anomaly (°C)

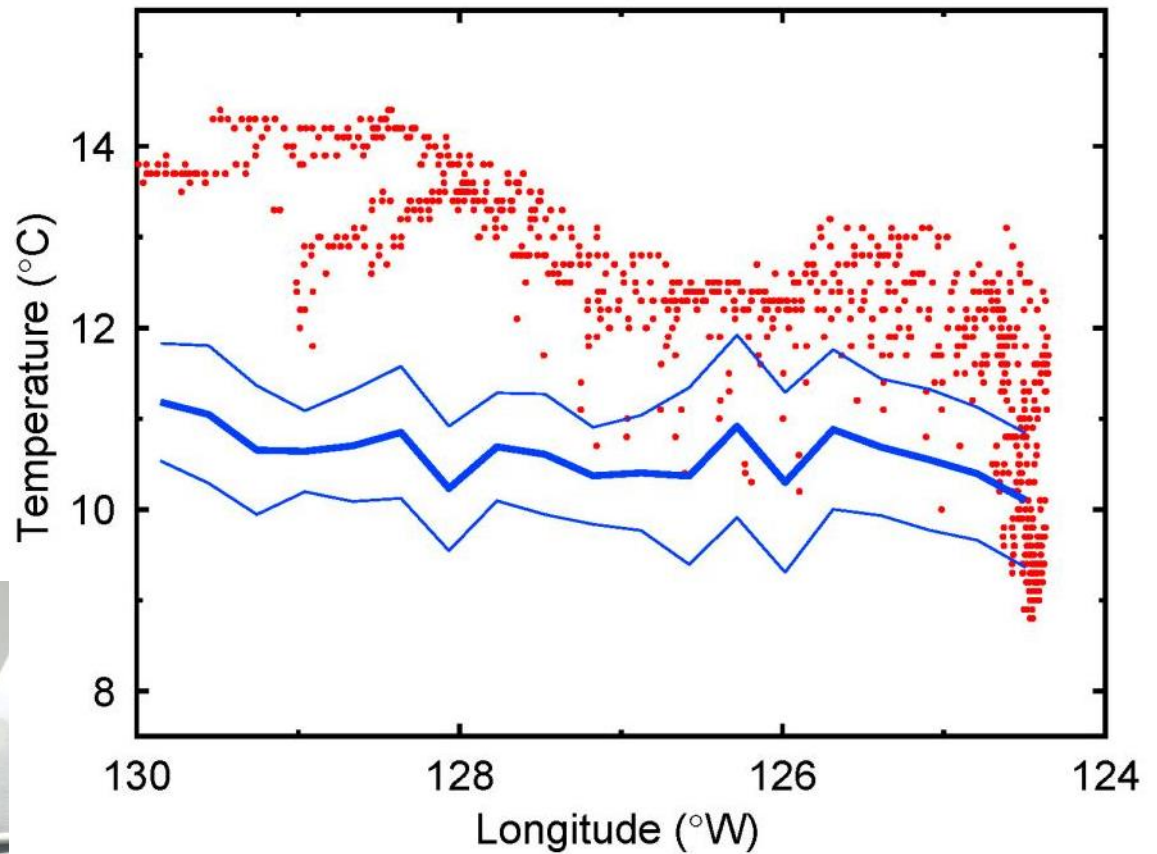


Newport, Oregon, (44.65°N) Normalized Temperature Anomaly





Trinidad Head glider line (41.06 $^{\circ}$ N)
(Oregon State, CeNCOOS, NANOOS)



- **Jan-Apr 2015 glider-measured temperatures at 50m**
- **Jan-Apr historical (1944-2013) 50m temperature, with one std. dev. envelope, from NODC search**

New coastal satellite altimetry product (incorporates coastal tide gauges)
Craig Risien, Ted Strub, using data from AVISO (alt) and NOS-CoOPS (tide gauges).

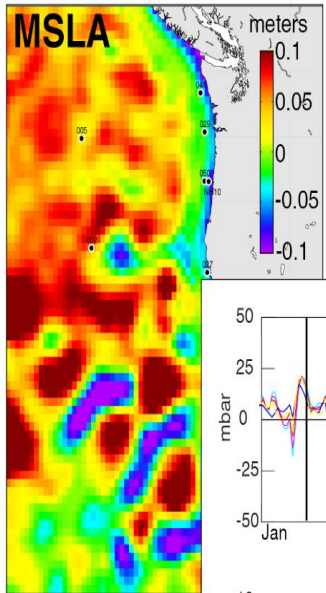
Also shown are anomalies at 6 NDBC buoys in:

- Barometric Pressure

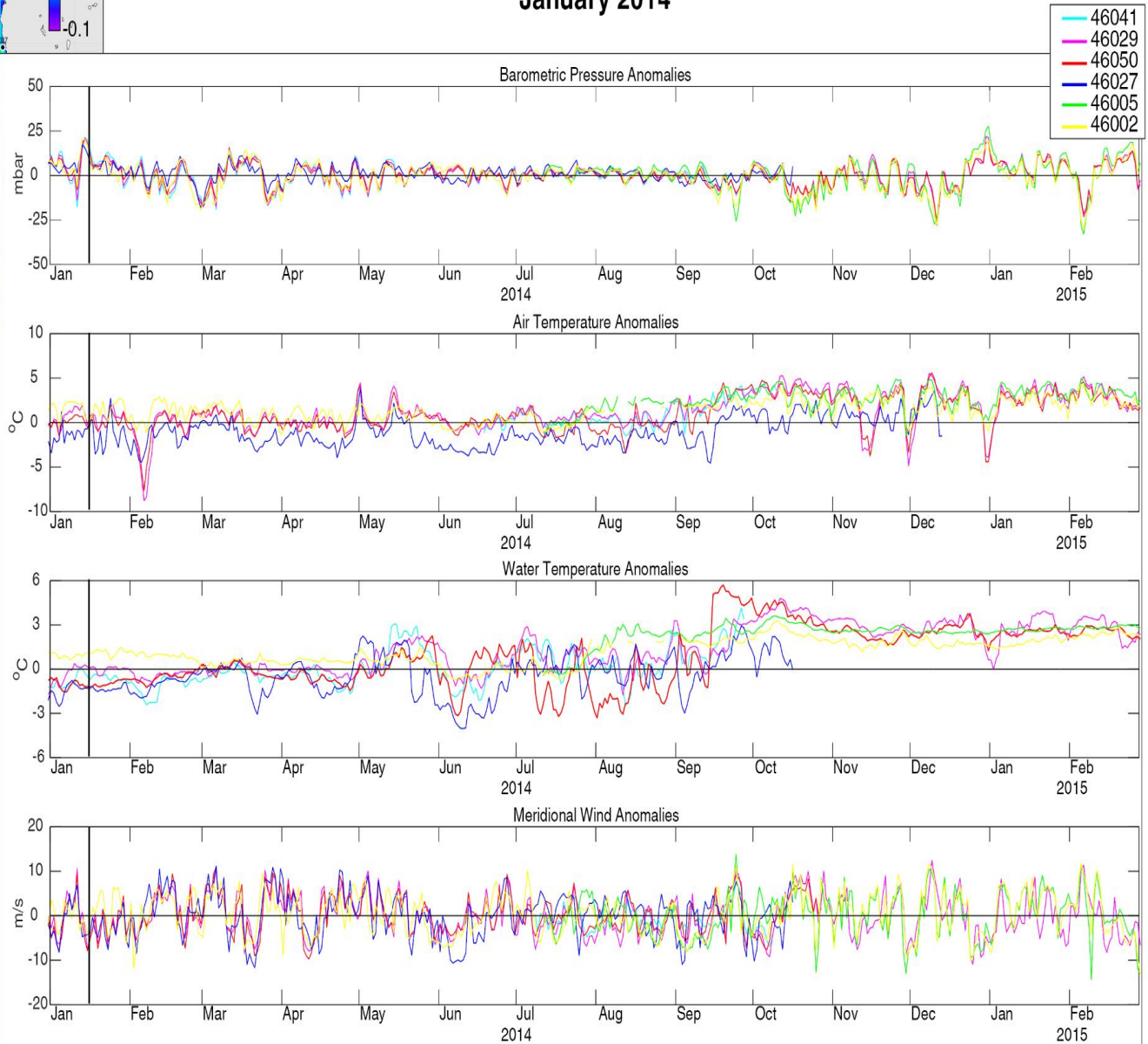
- Air Temperature

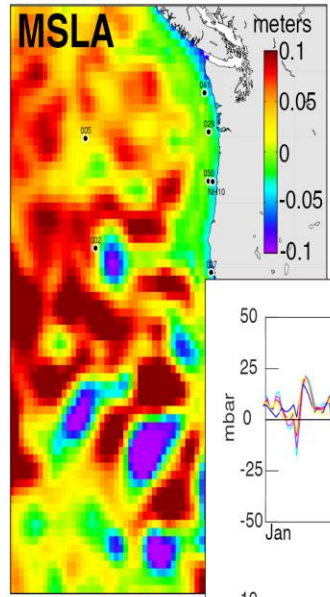
- Water Temperature

- Meridional wind speed

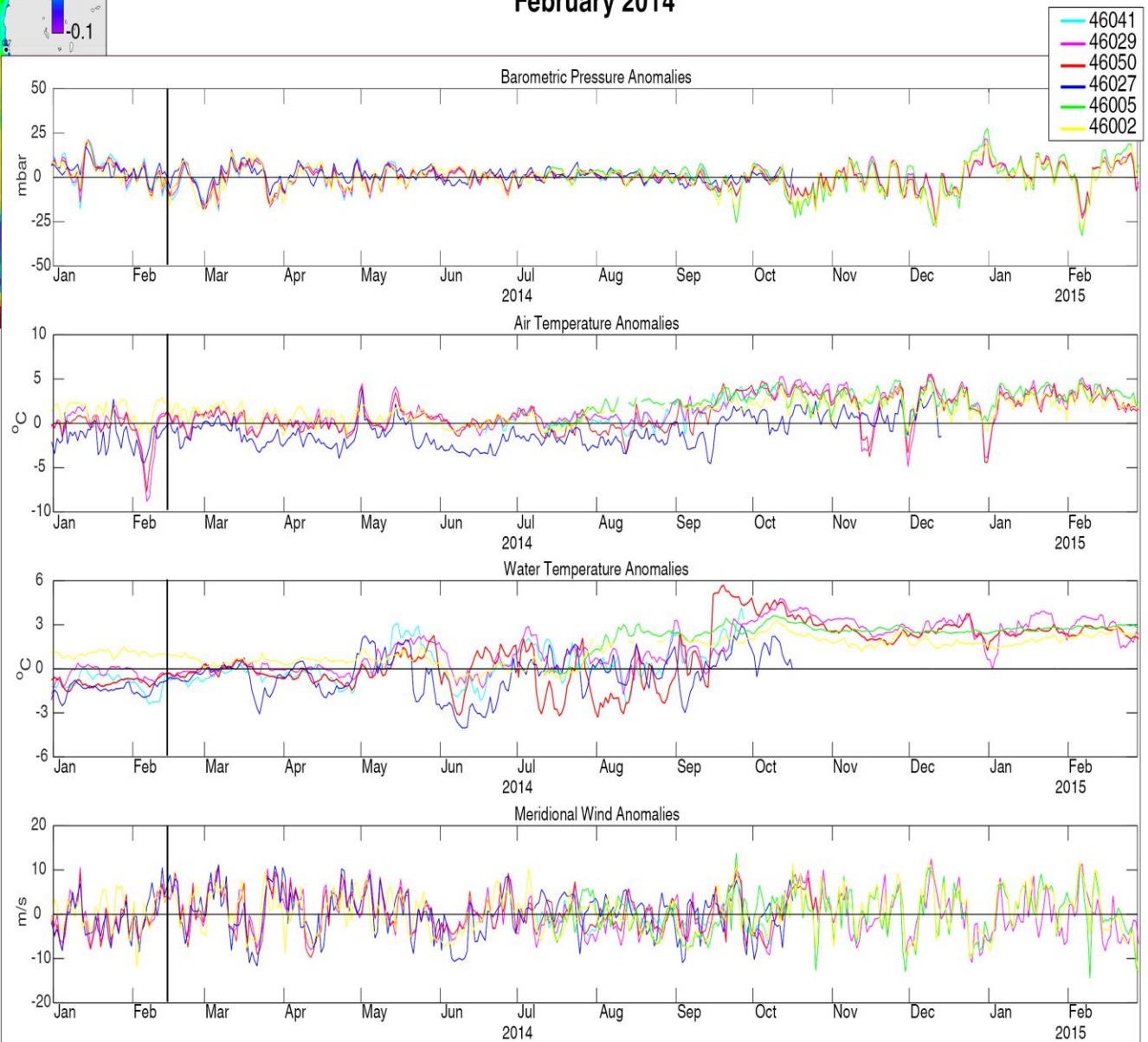


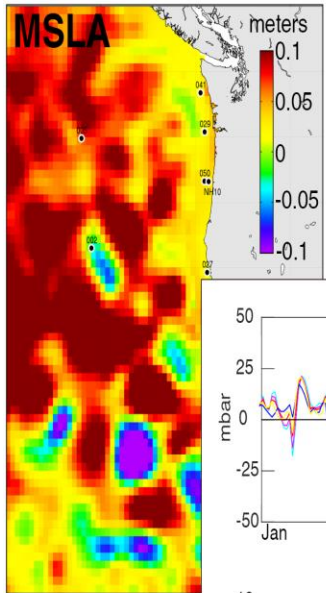
January 2014



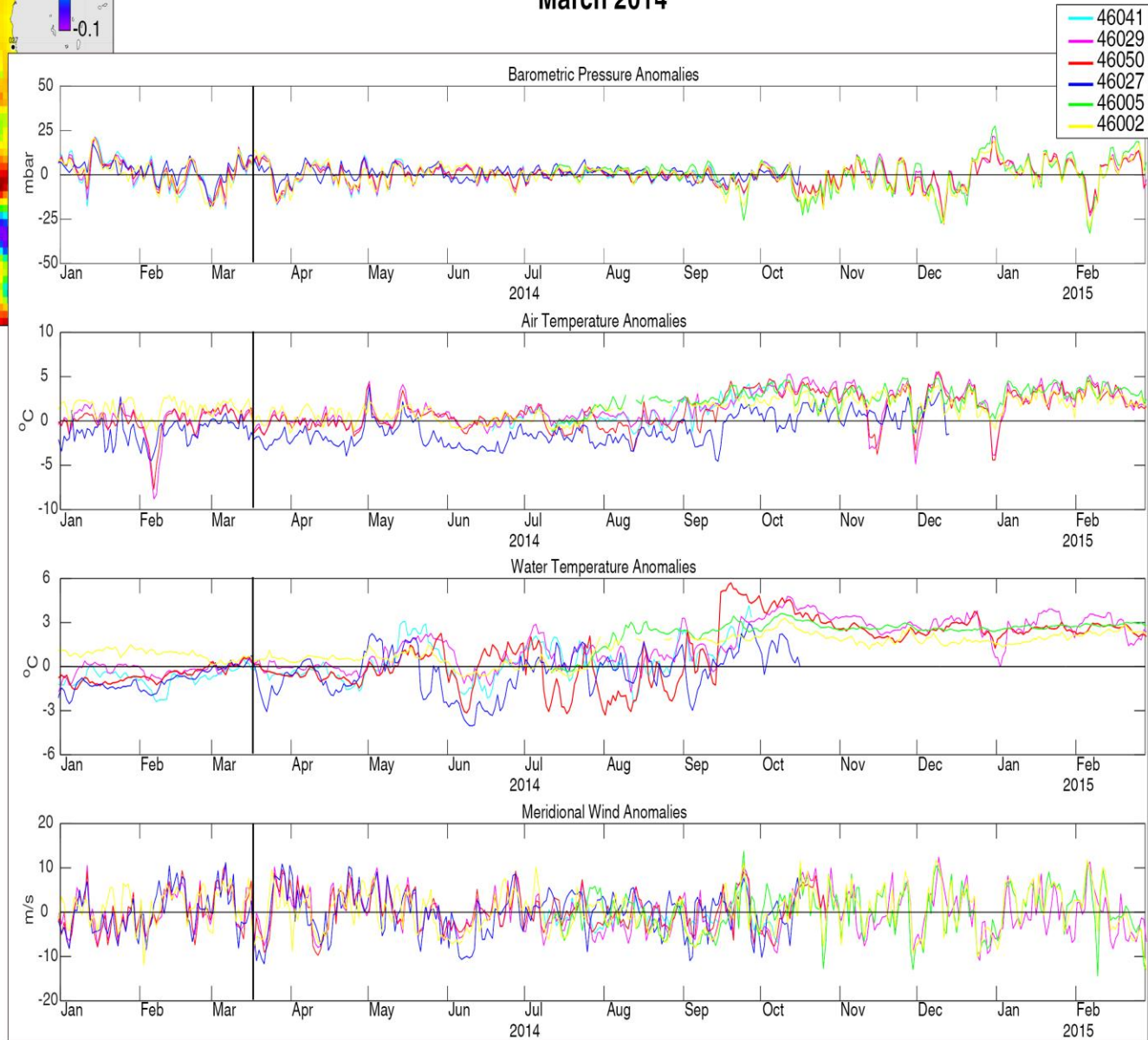


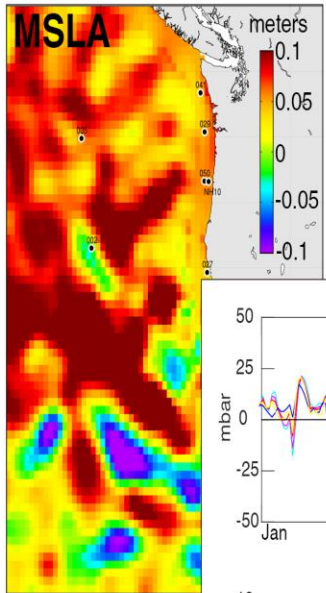
February 2014



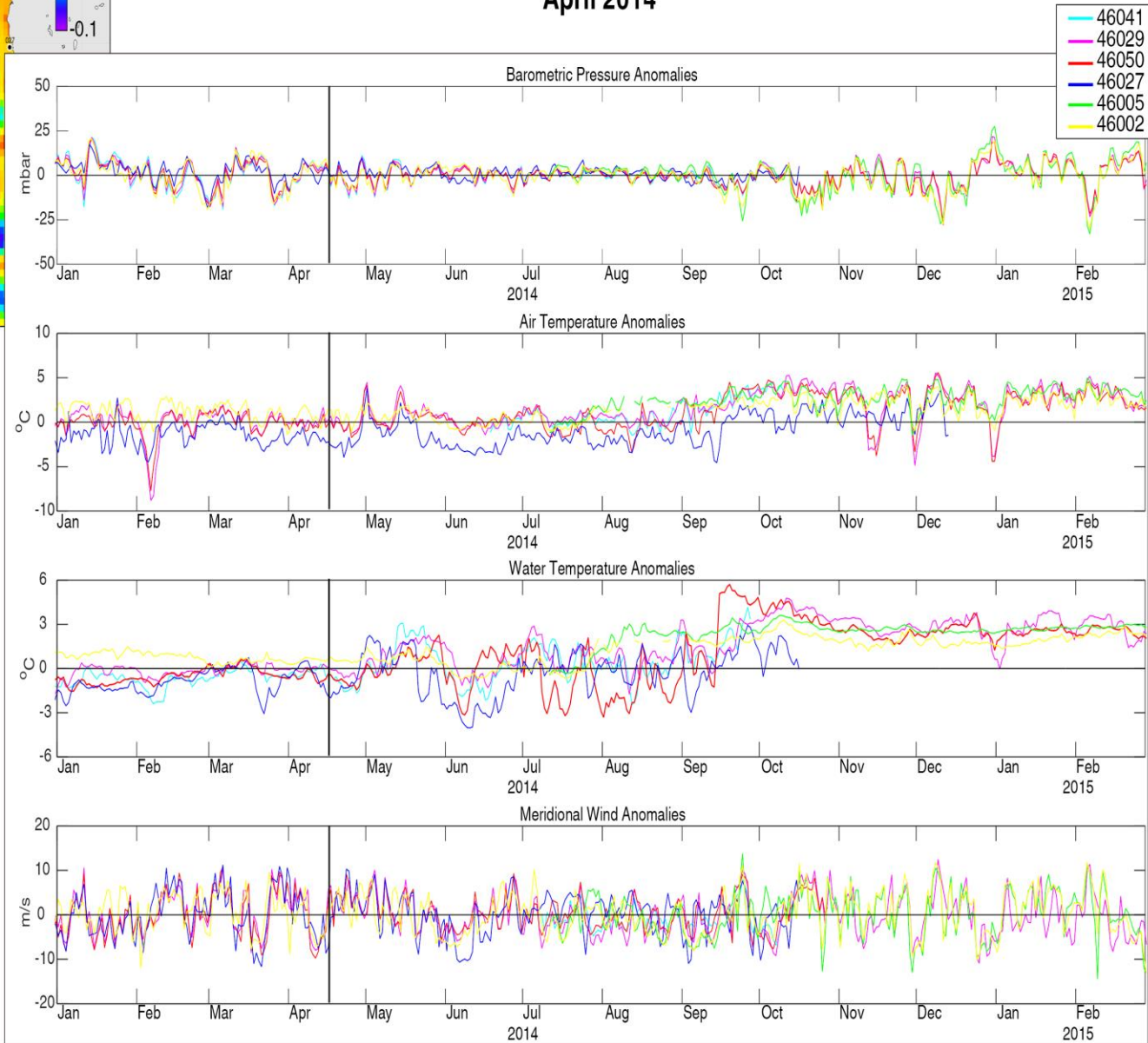


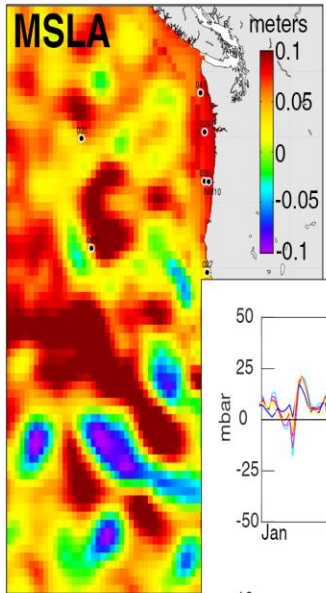
March 2014



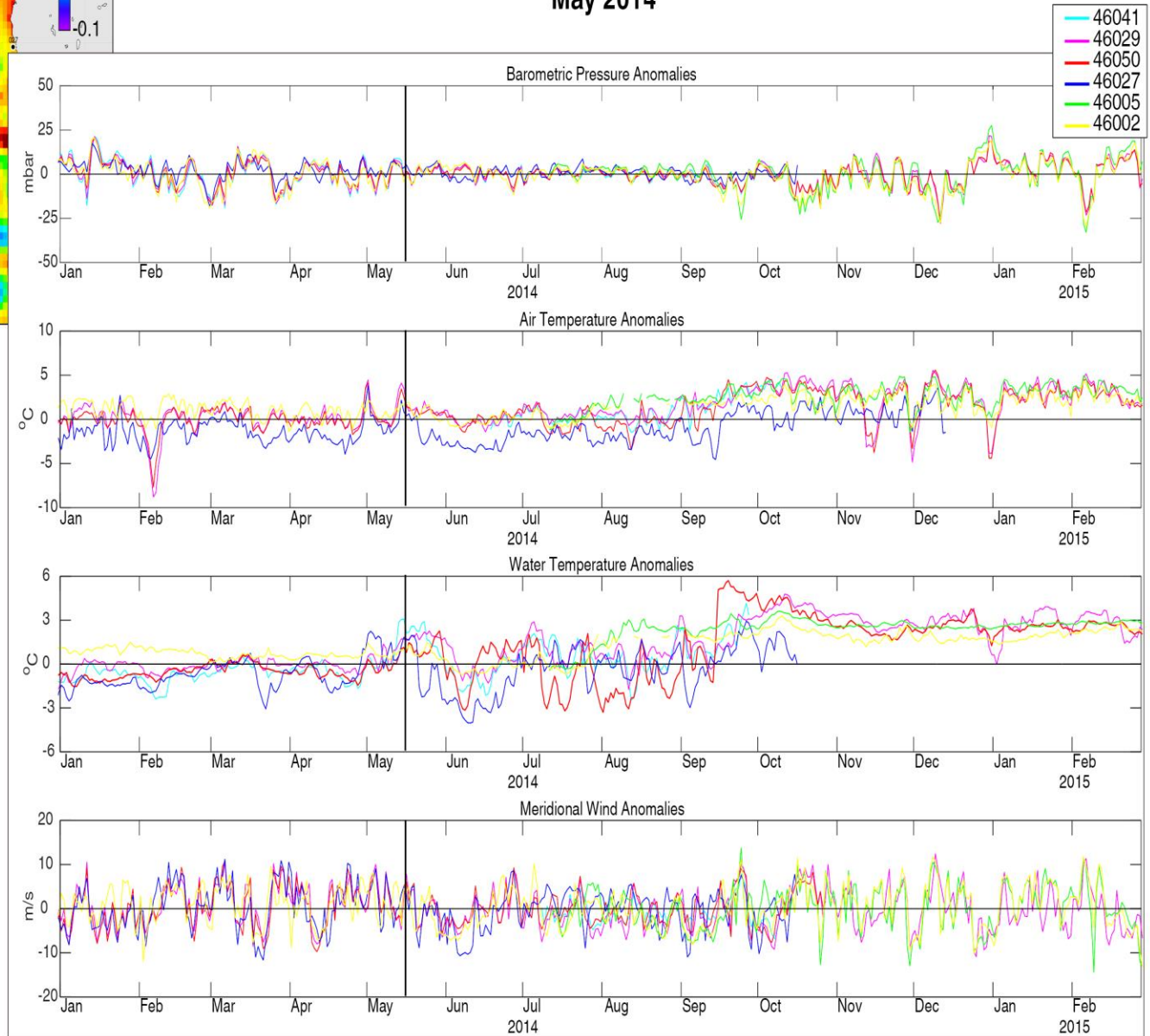


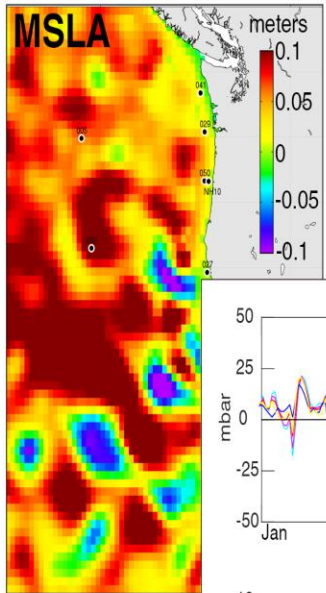
April 2014



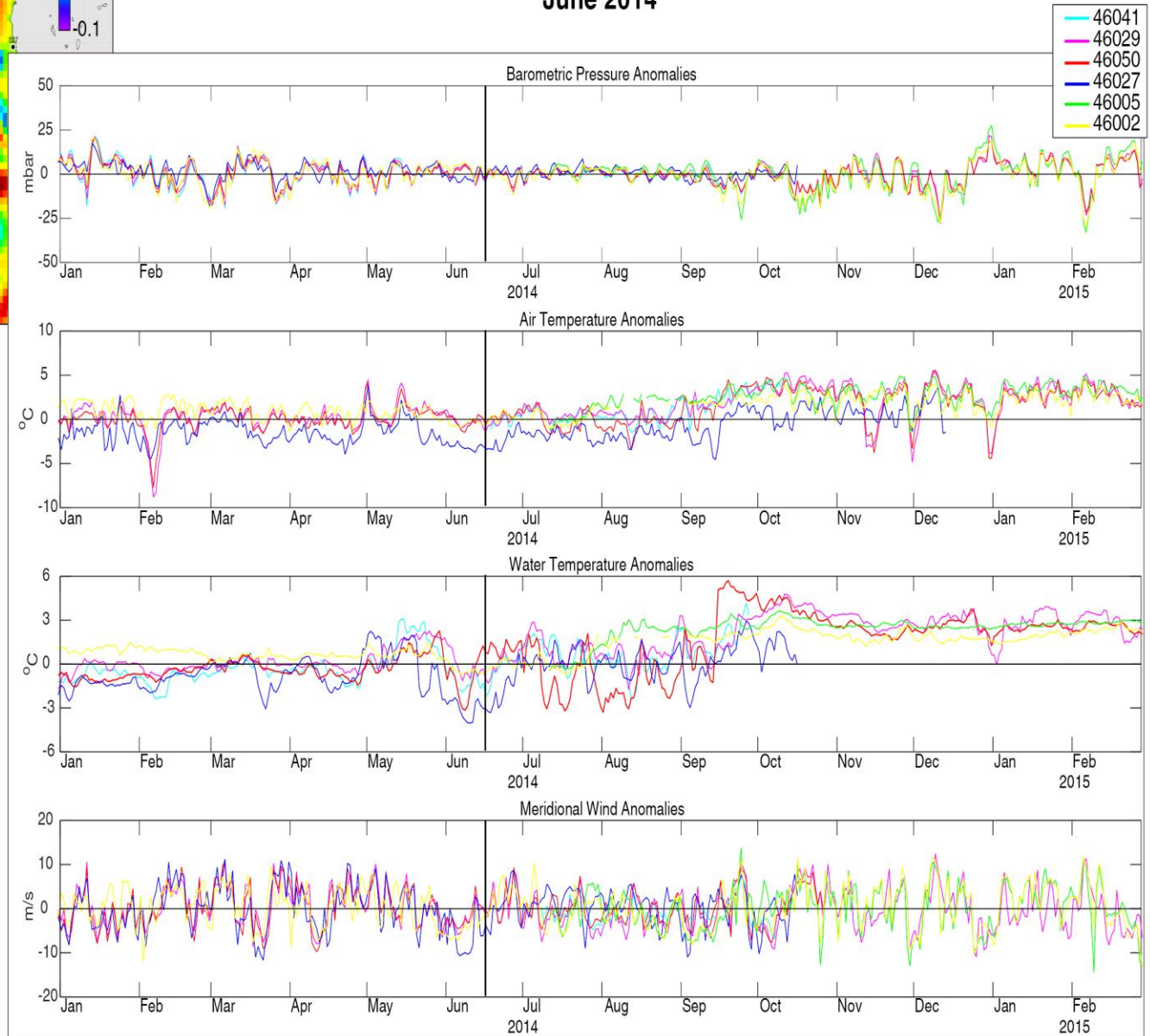


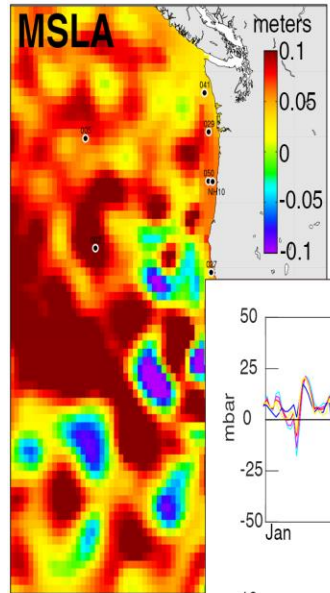
May 2014



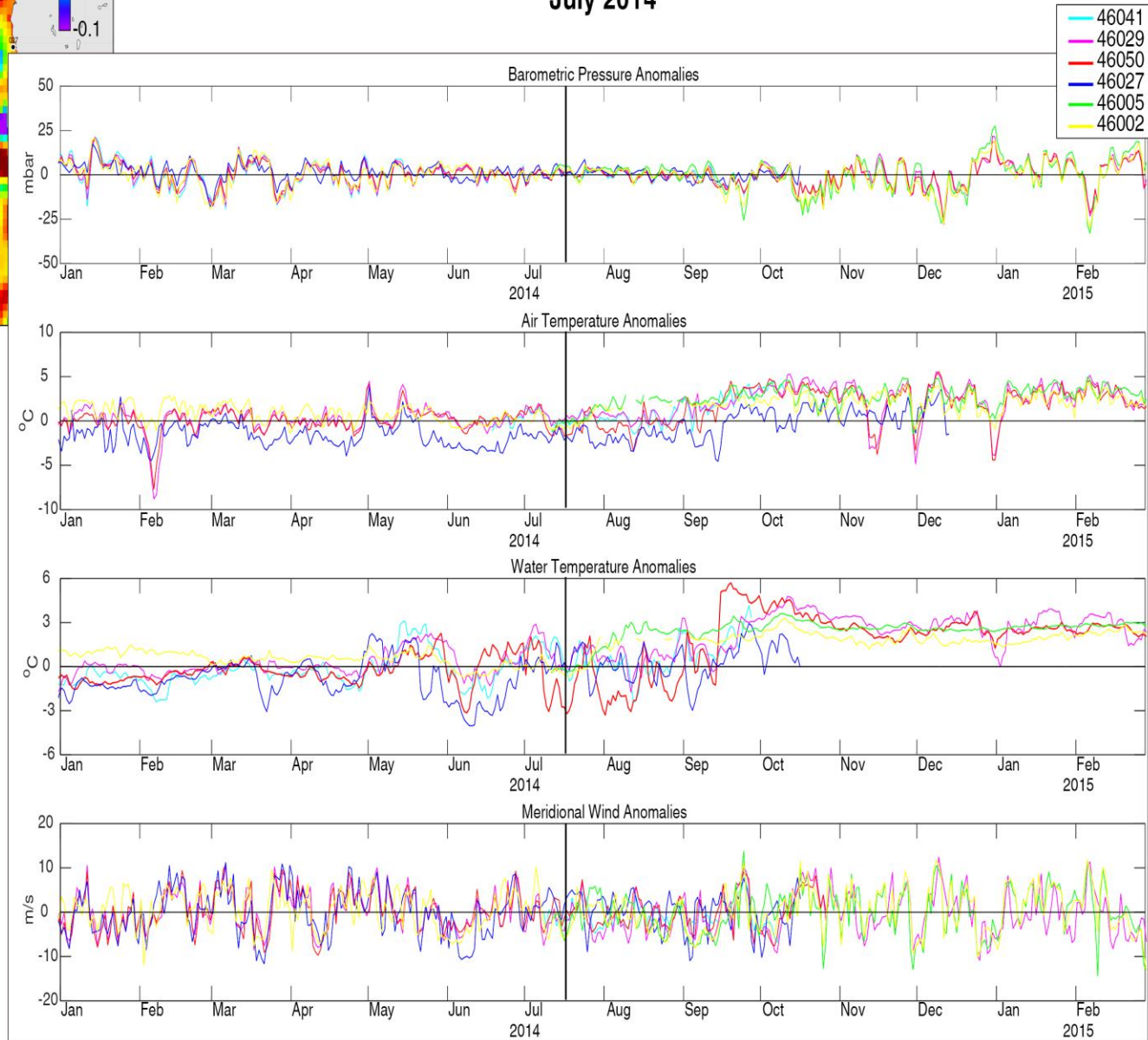


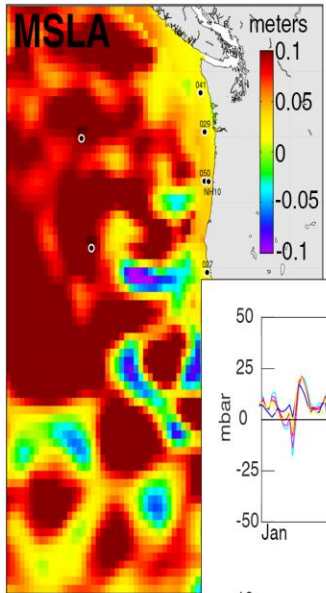
June 2014



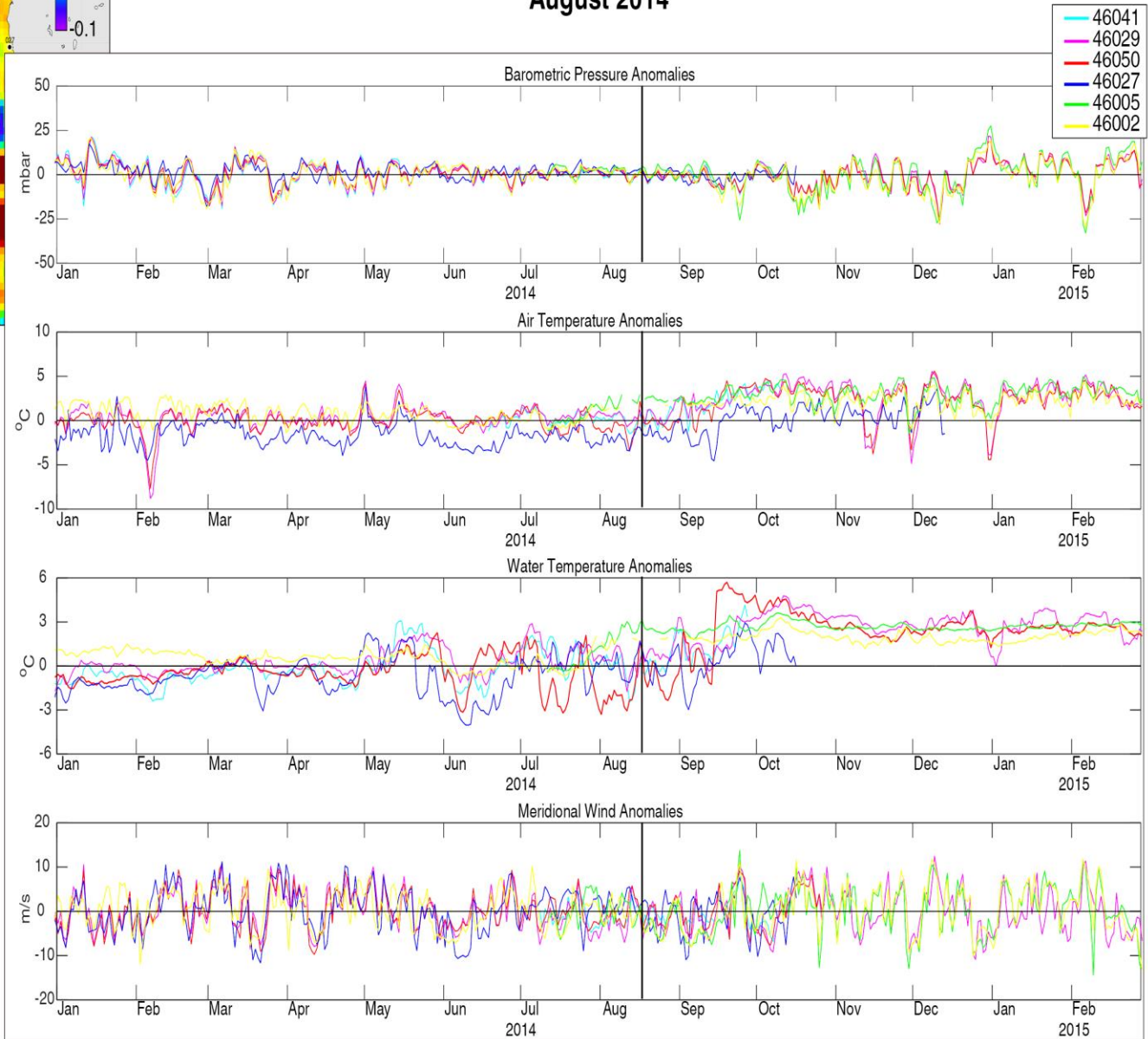


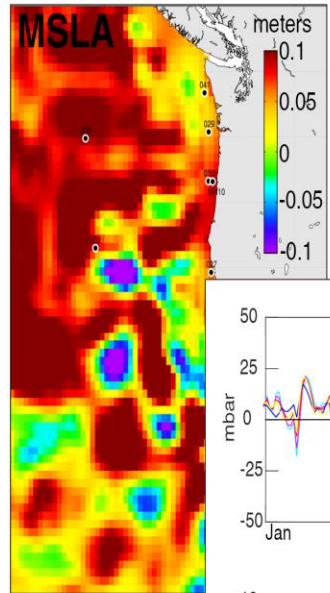
July 2014



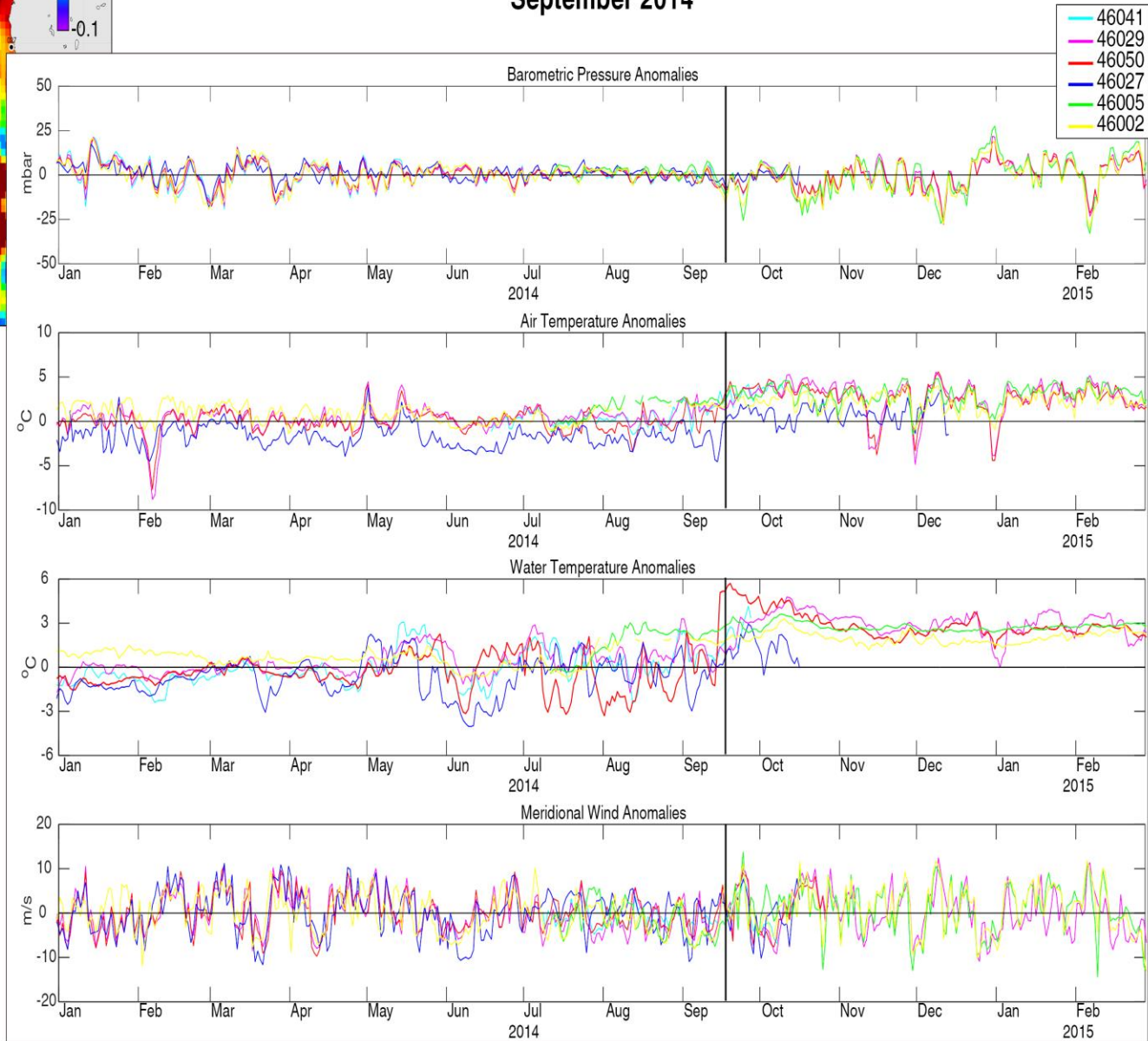


August 2014





September 2014



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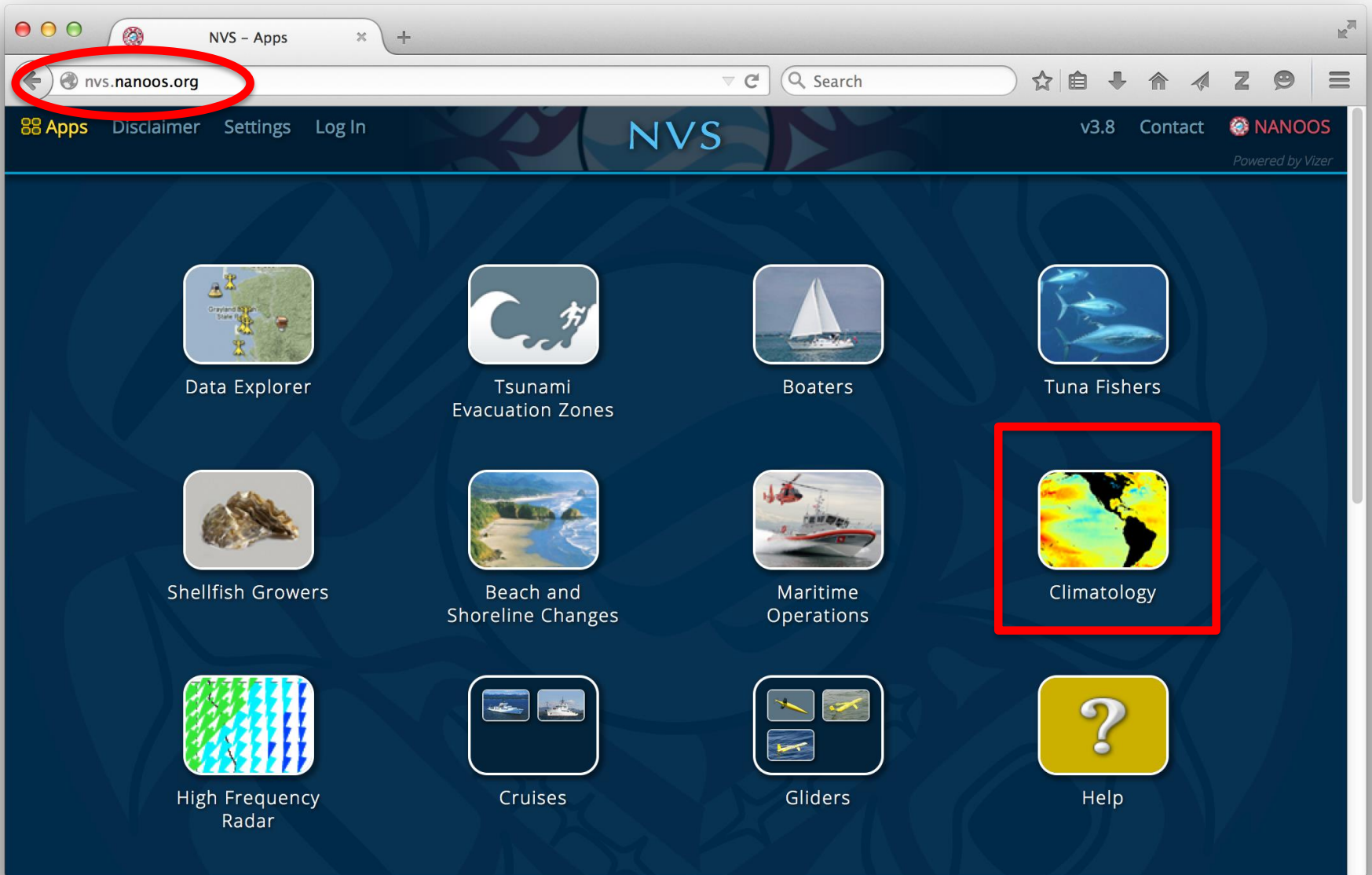
Climatology

High Frequency Radar

Cruises

Gliders

Help

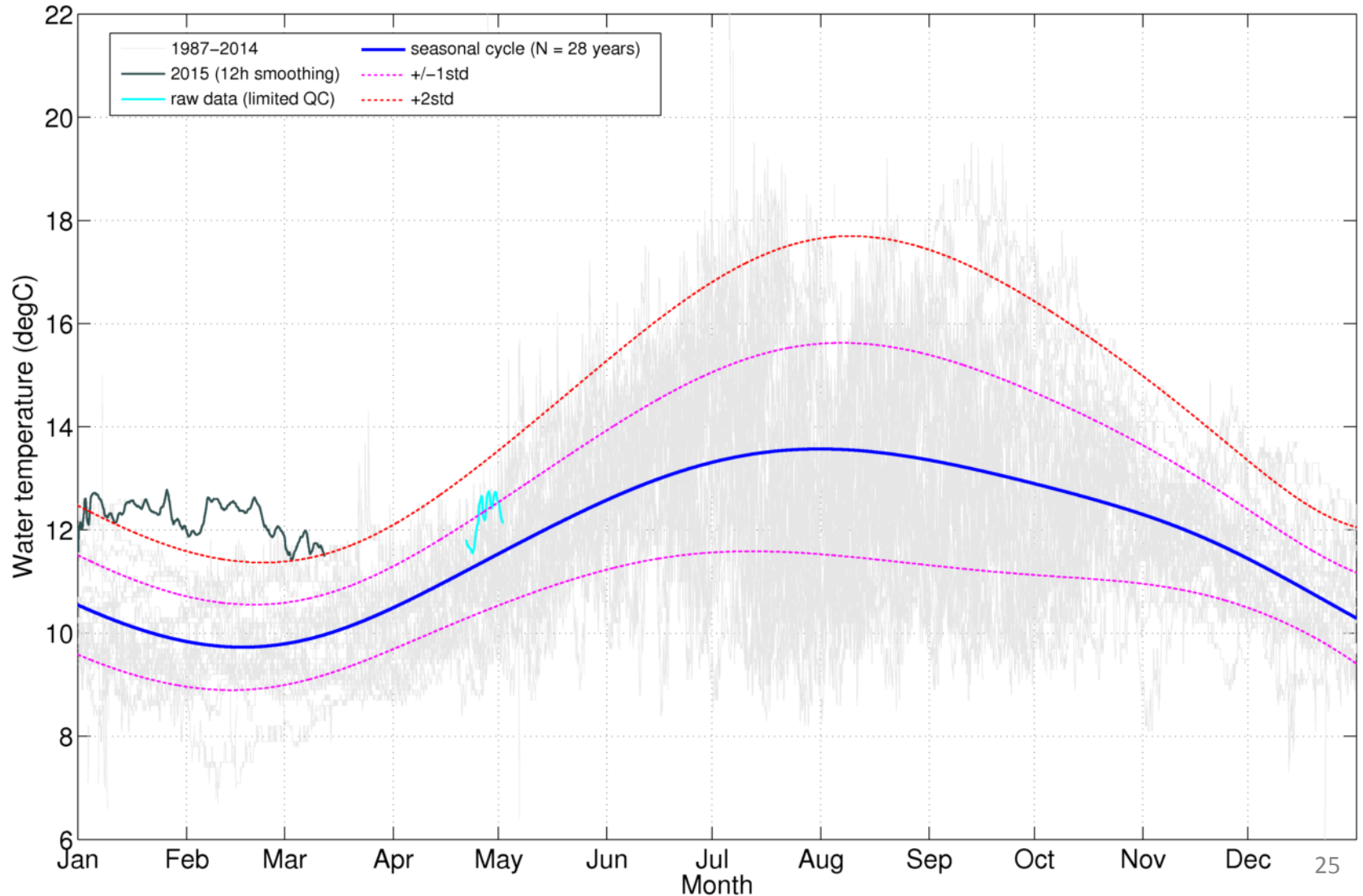


NDBC Buoy Climatologies.

Older data in gray. Seasonal cycle, plus 1 & 2 std devs marked

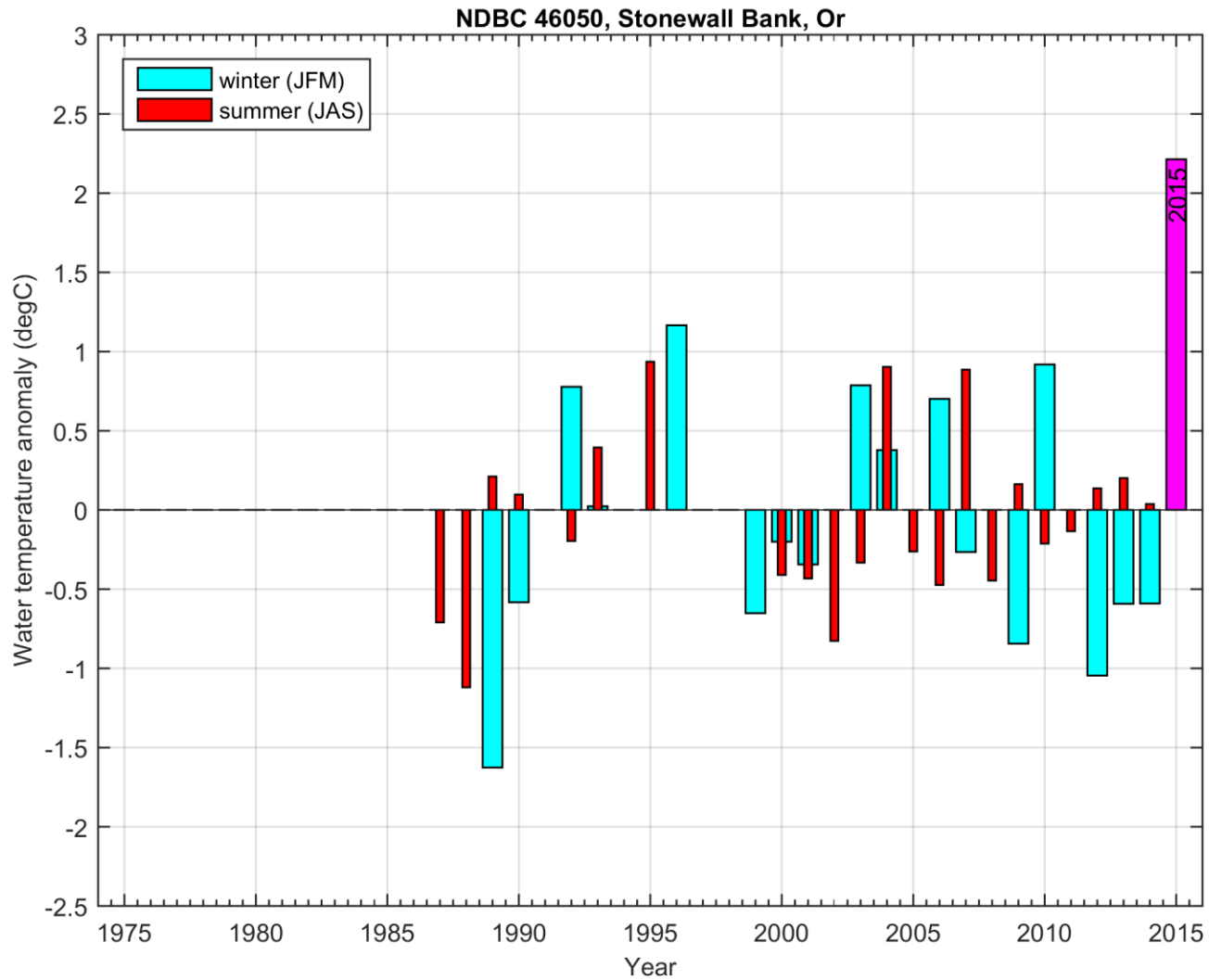
Recent data highlighted

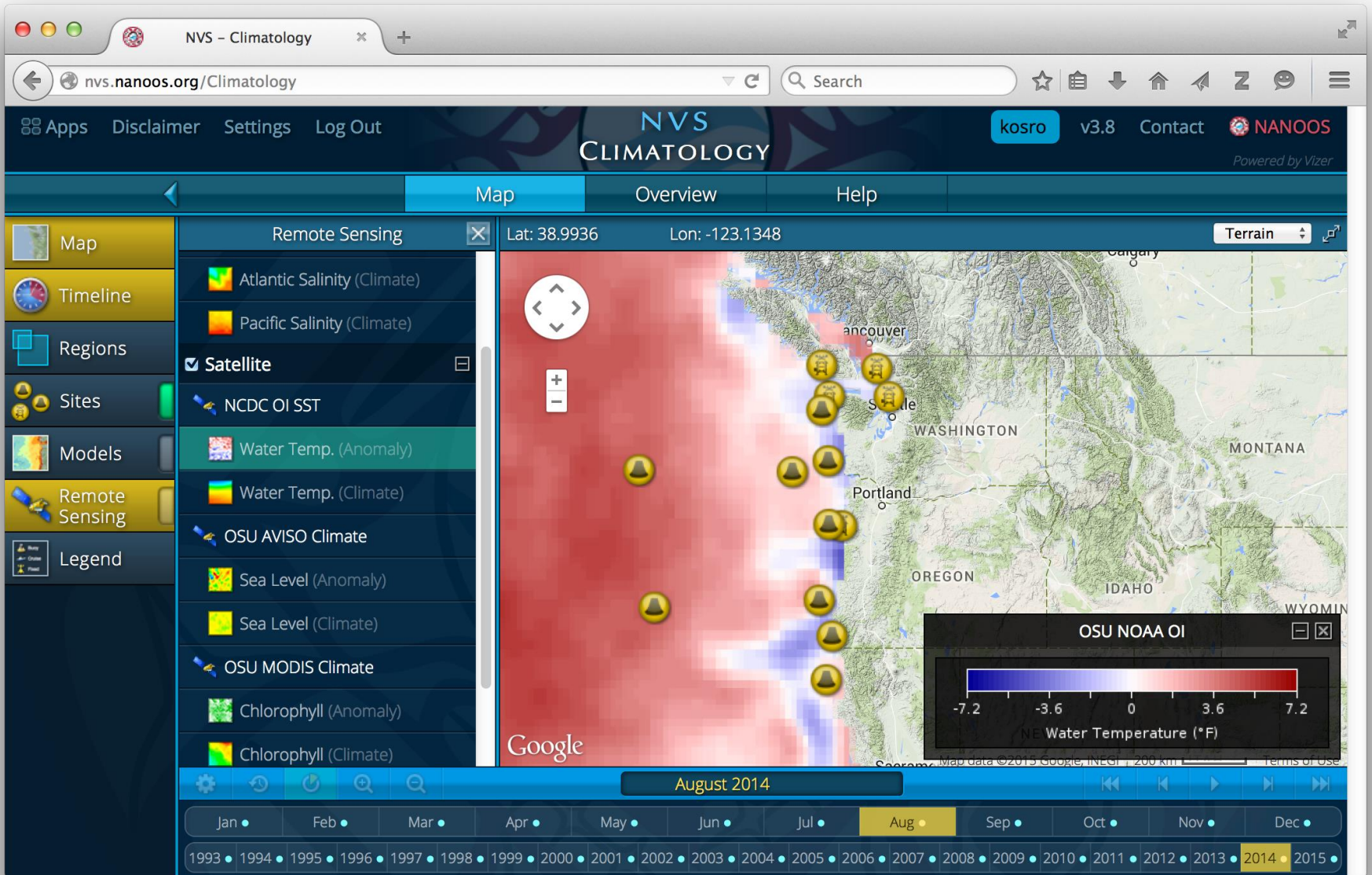
NDBC 46050, Stonewall Bank, Or

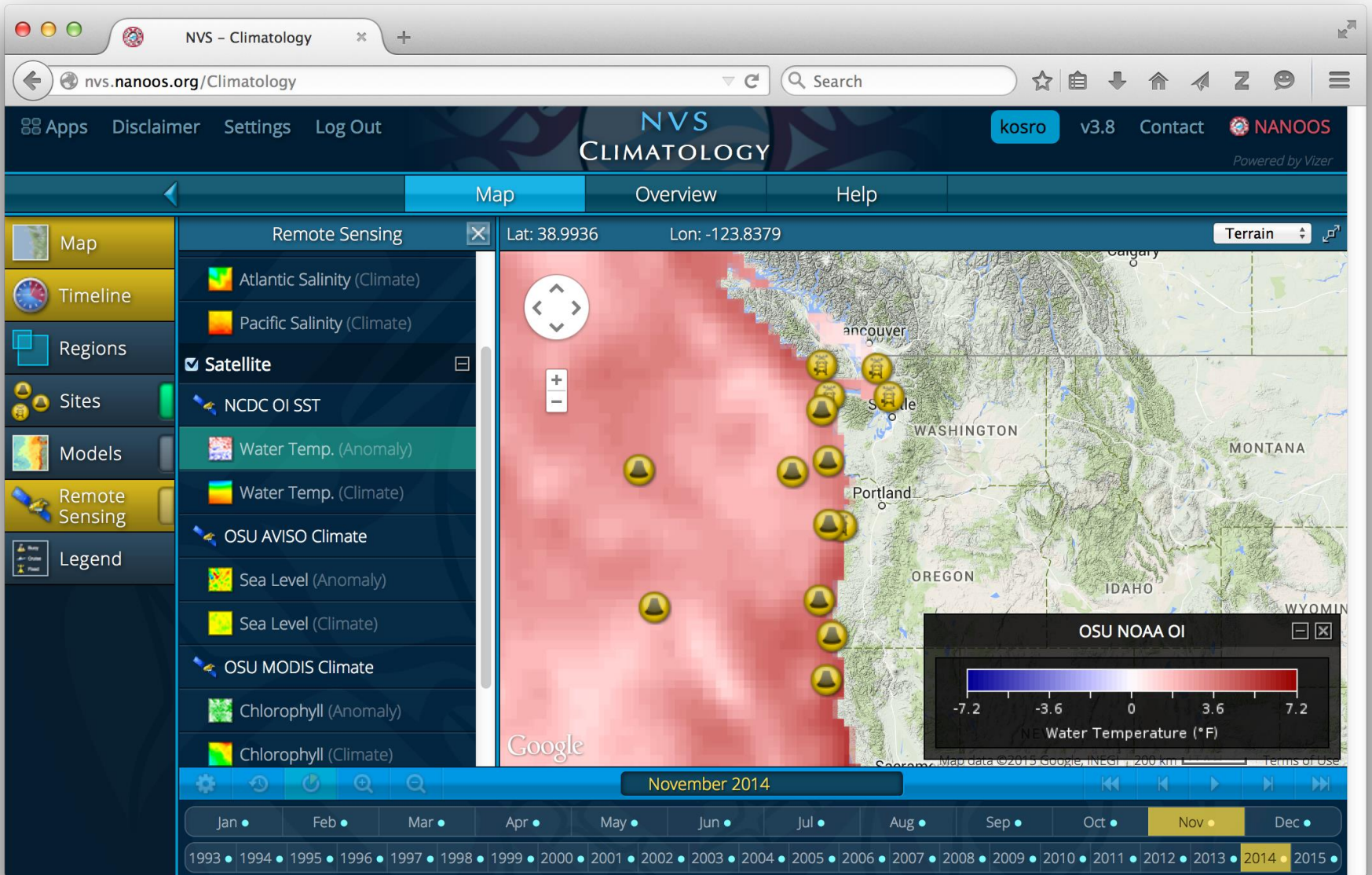


NDBC Buoy Climatologies.

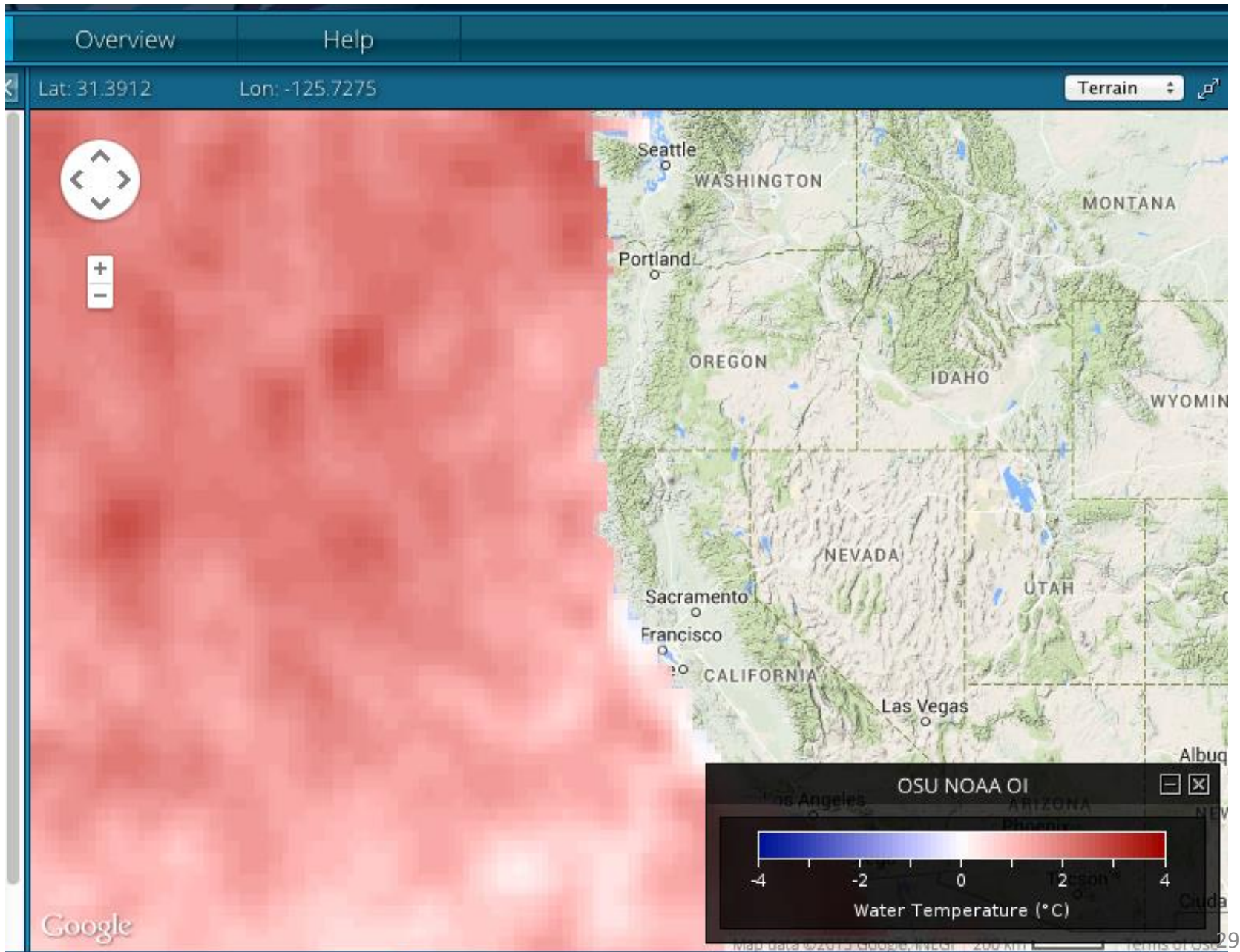
Seasonal Anomalies (Here is SST; many other fields available)



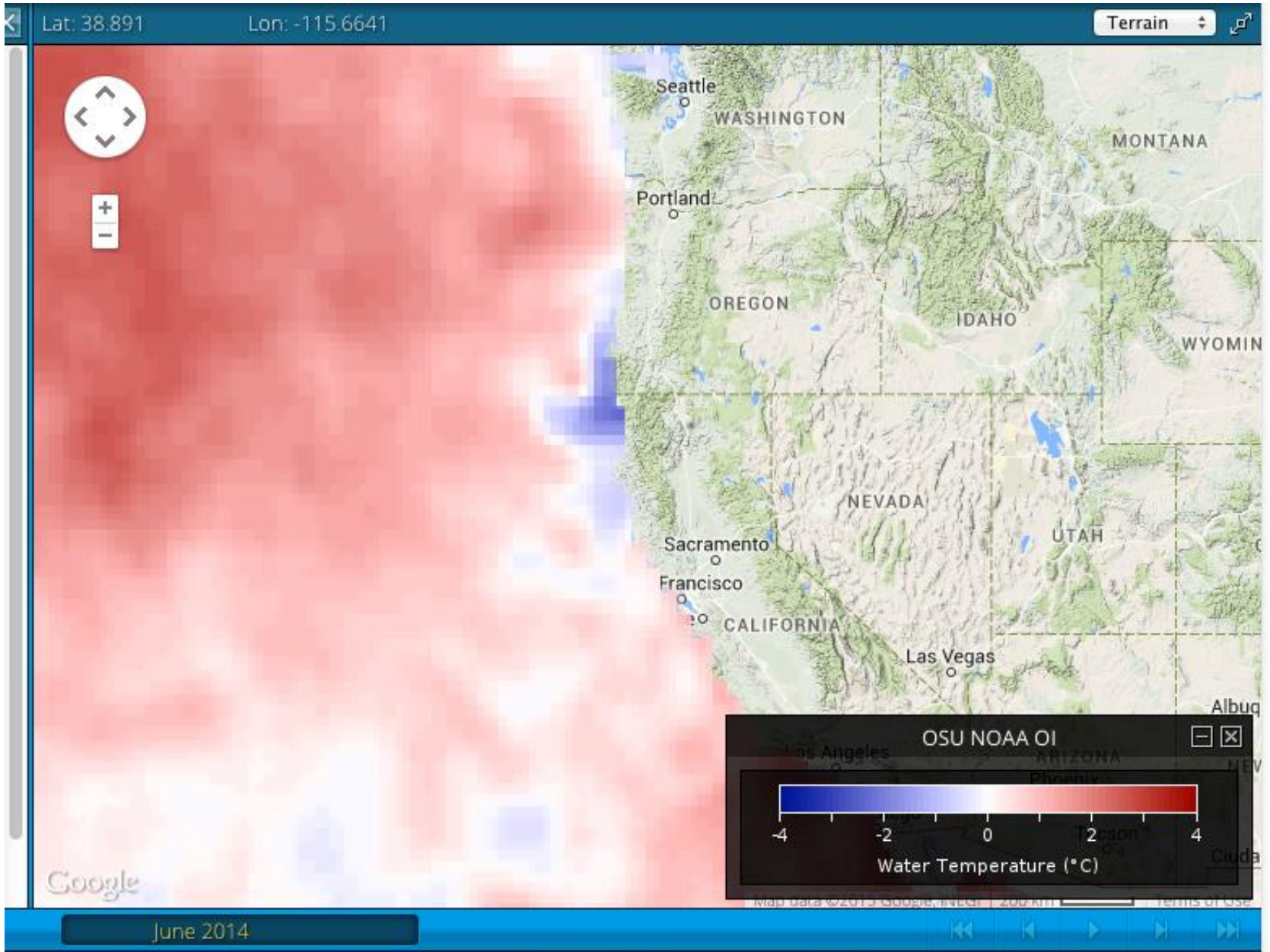




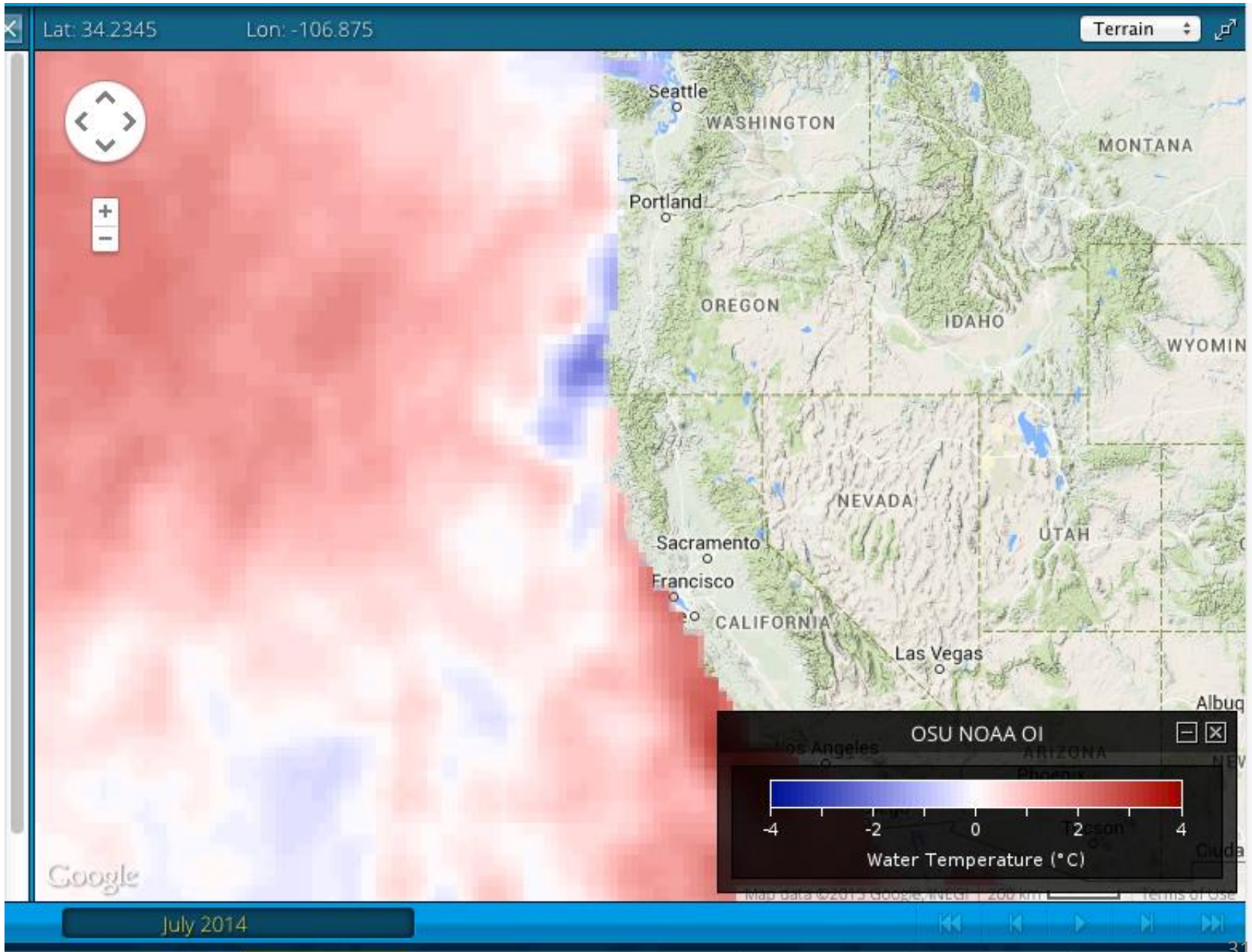
2014/ 05



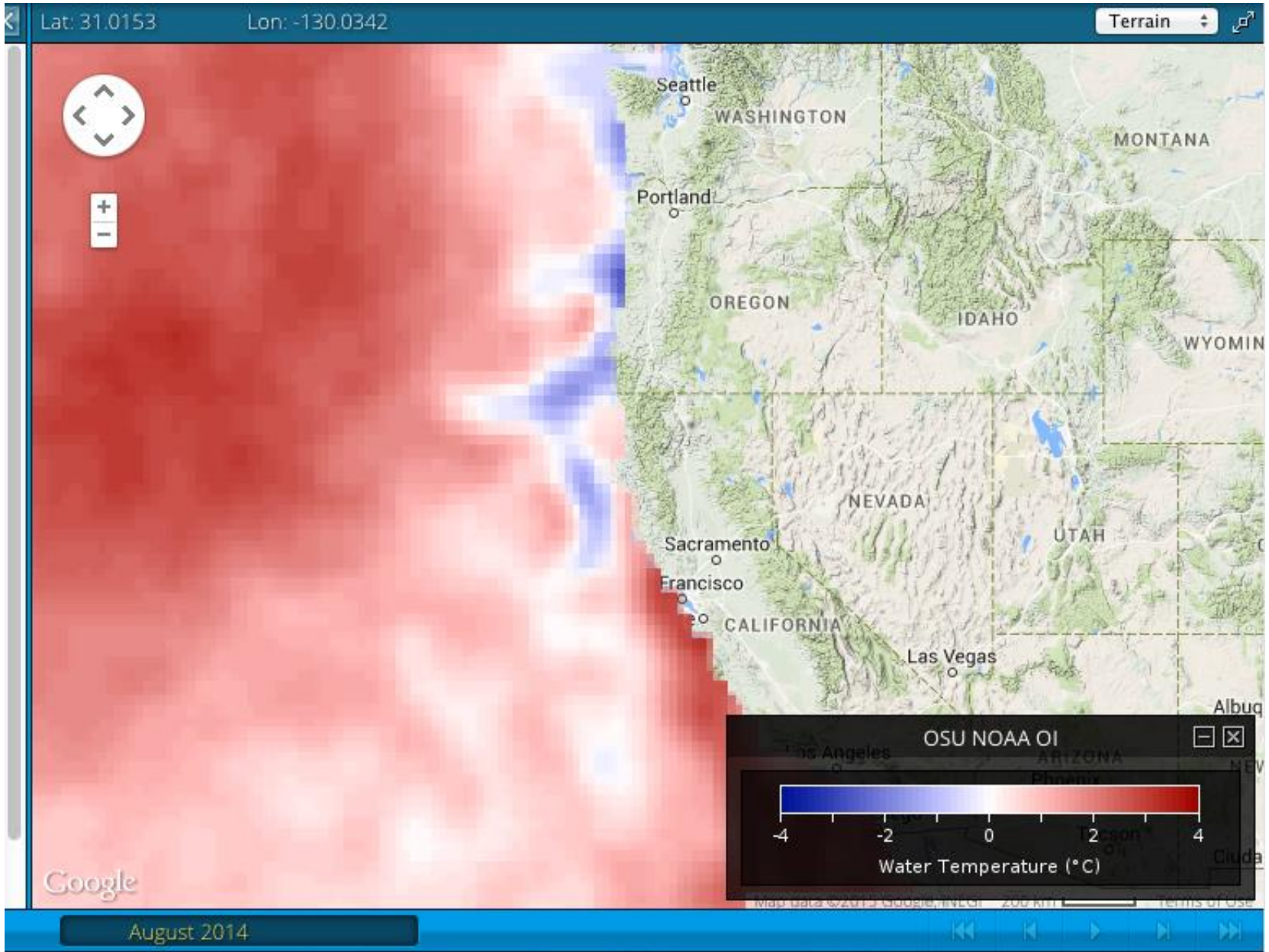
2014/ 06



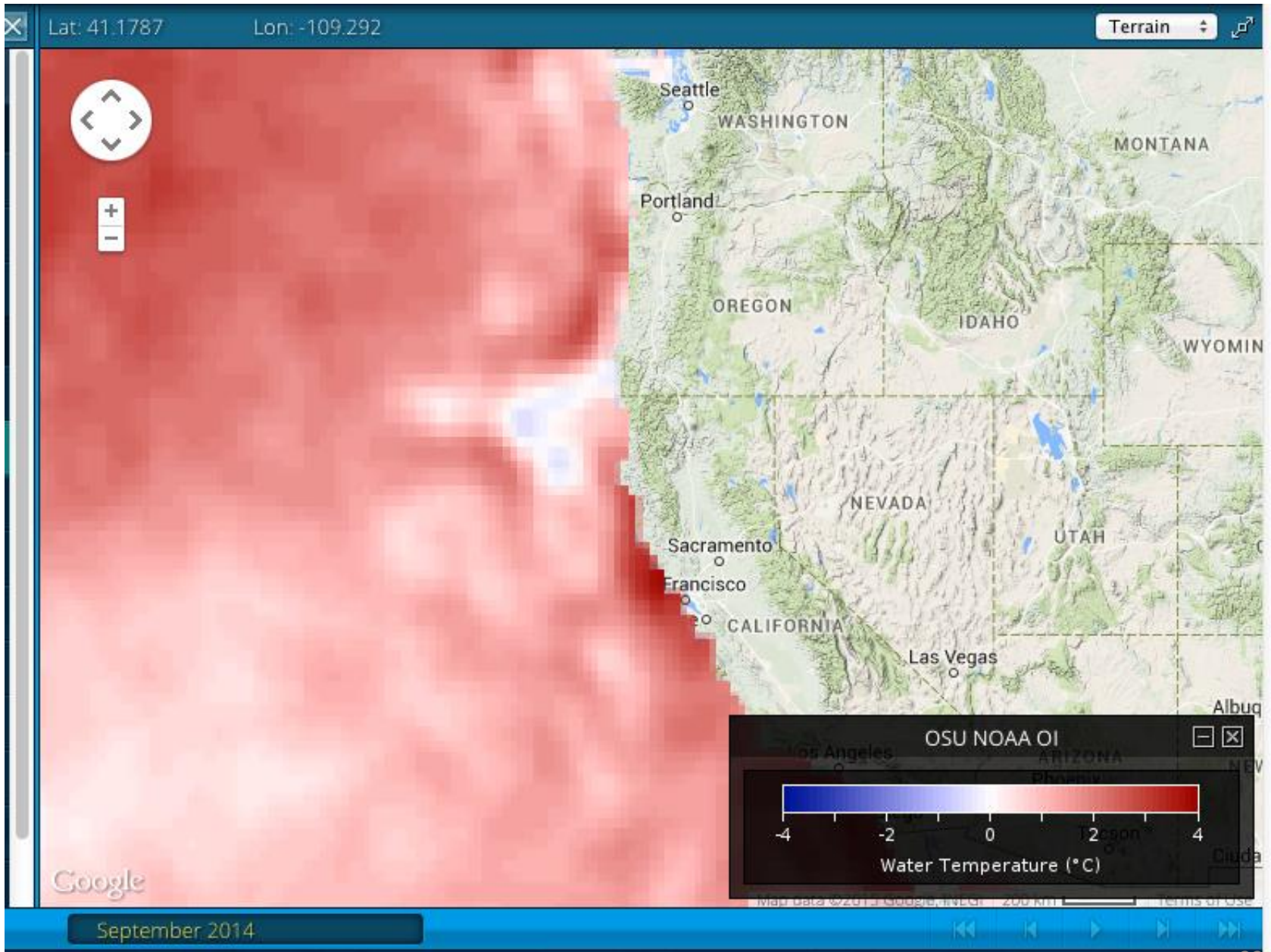
2014/ 07



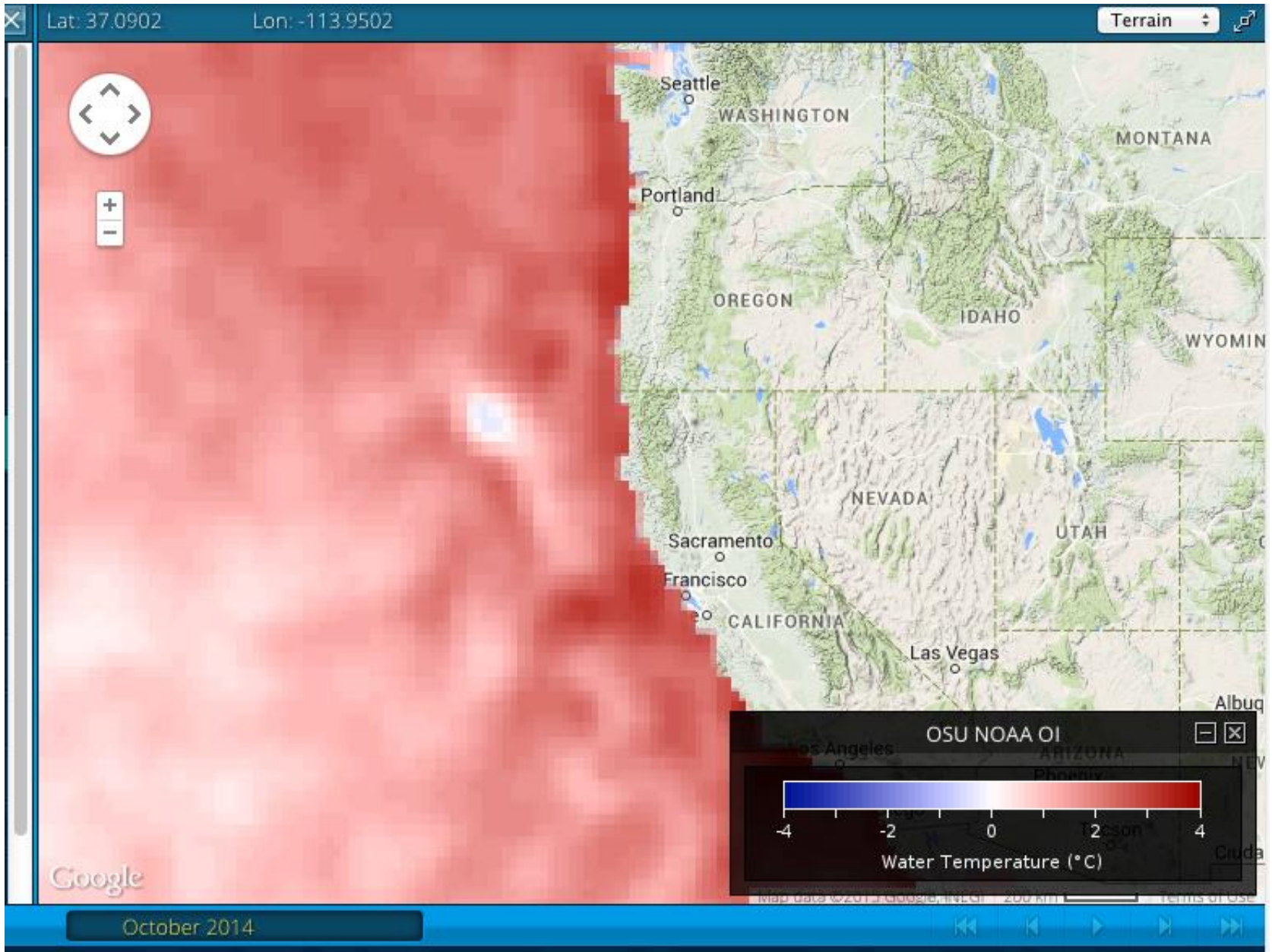
2014/08



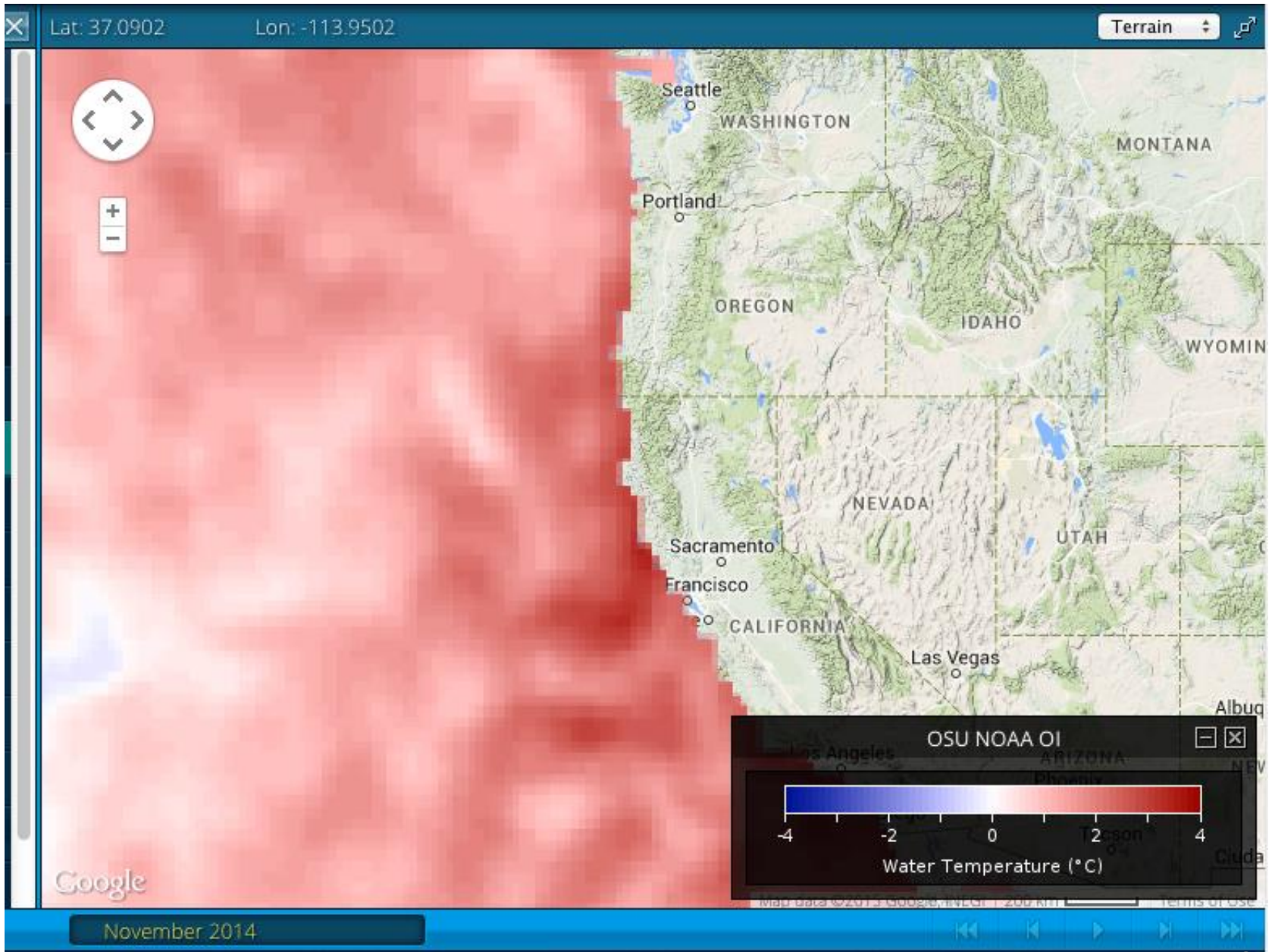
2014/ 09



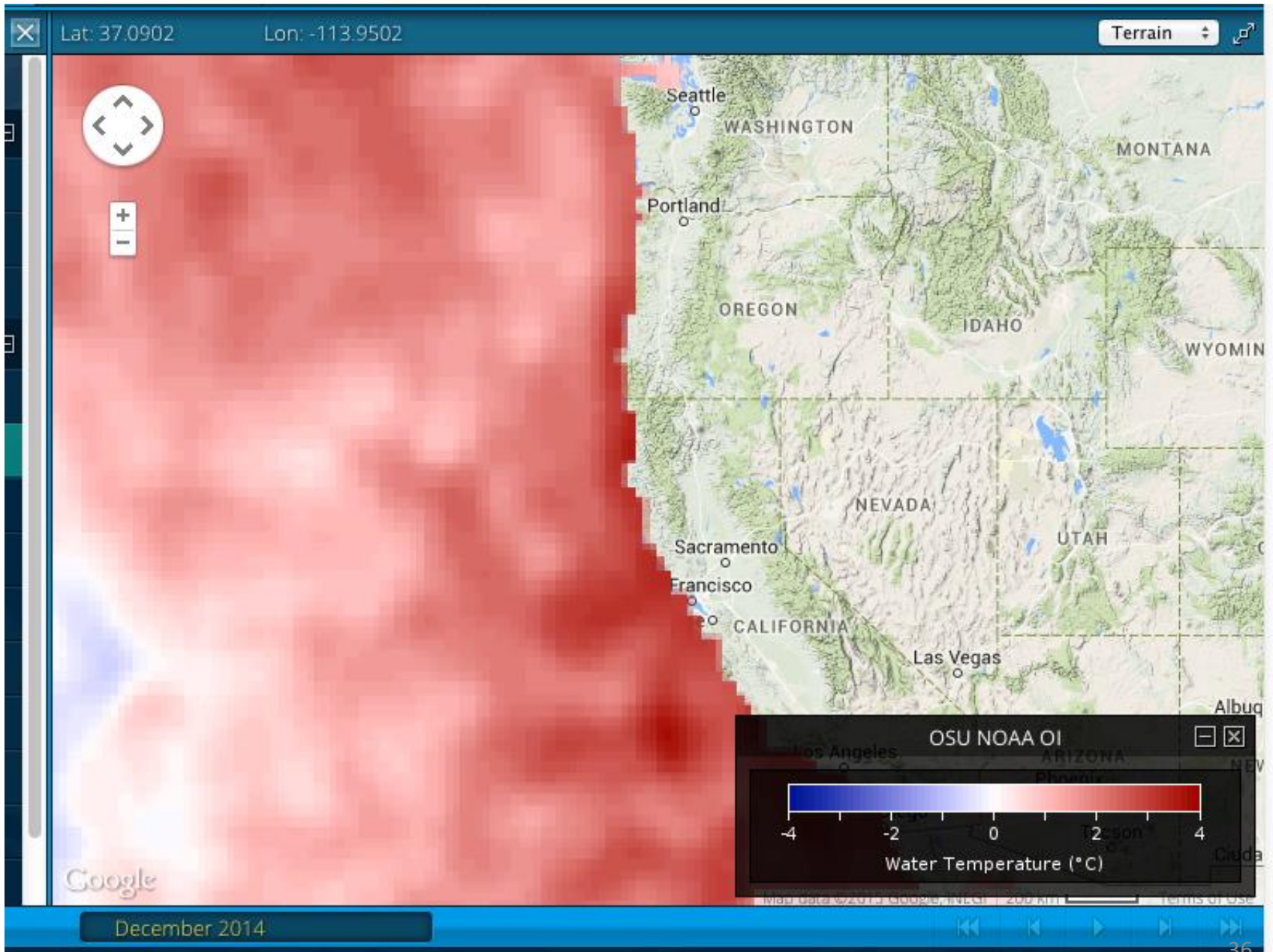
2014/ 10



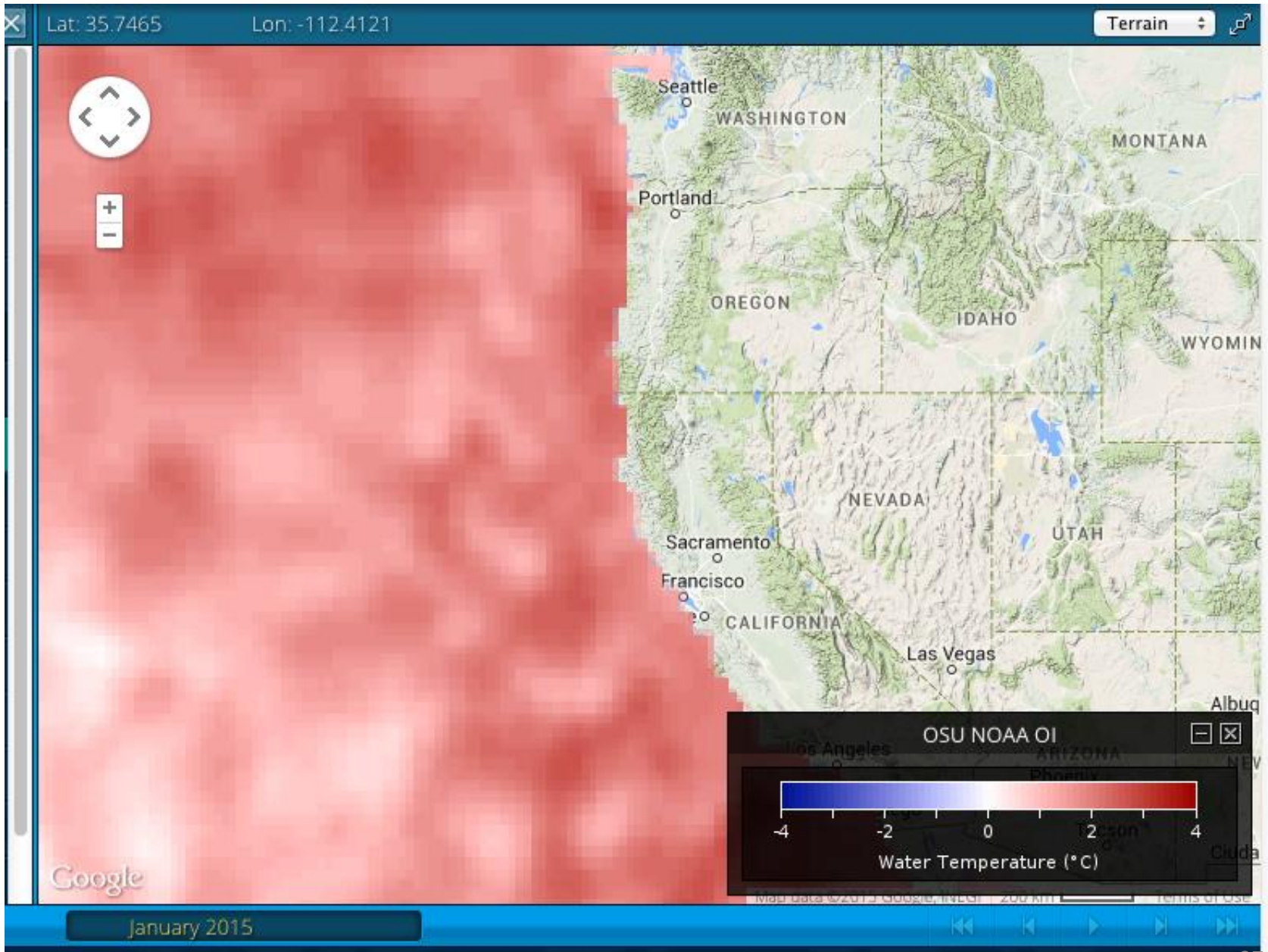
2014/ 11



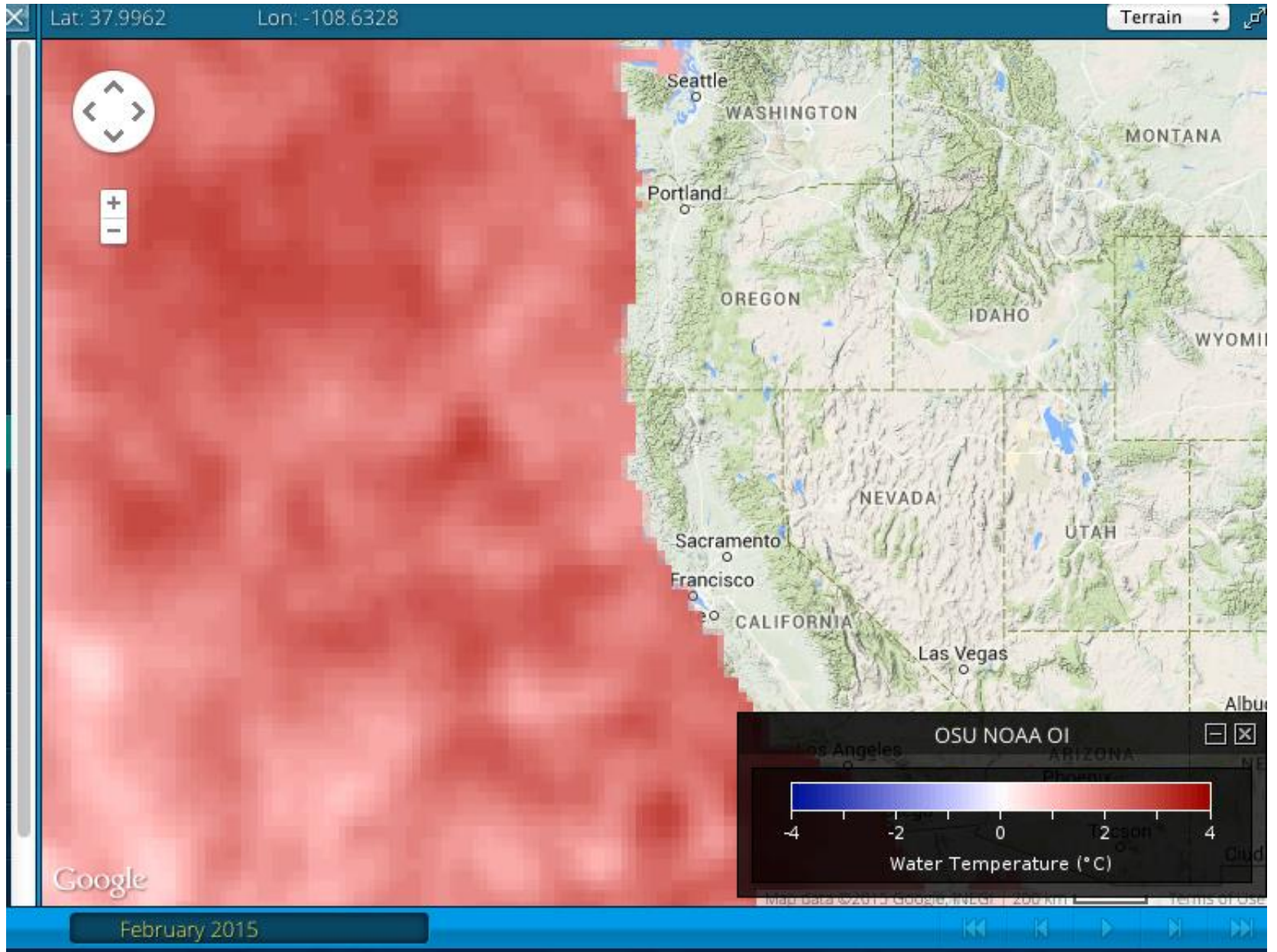
2014/ 12



2015/ 01



2015/ 02



2015/ 03

