

Observations of the “blob” from NANOOS: *info over time and over depth*

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Jonathan C. Allan², Allan H. Devol¹, Craig M. Risien³

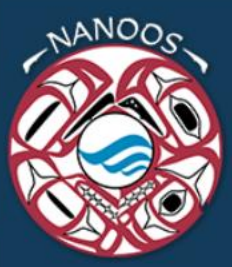
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²*DOGAMI, Newport, OR, USA*

³*Oregon State University, Corvallis, OR, USA*



*5 May 2015
La Jolla, CA*



NANOOS

Welcome to **NANOOS**, the Pacific Northwest regional ocean observing system of IOOS. NANOOS is creating customized information and tools with these areas of emphasis:

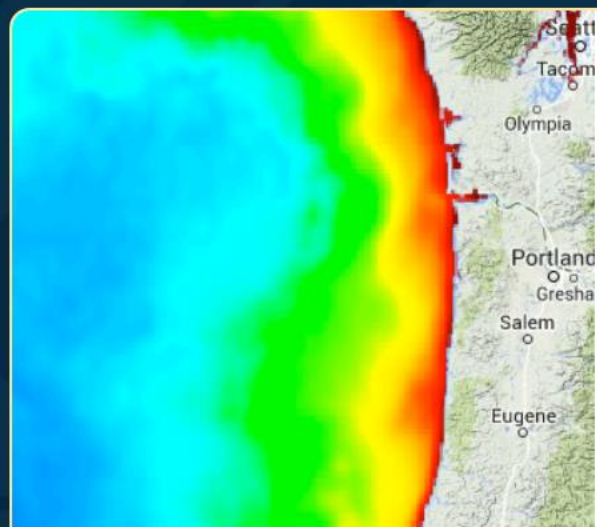
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- Ecosystem Assessment
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Data Exploration

NVS (NANOOS Visualization System) is a web app that provides easy access to observations, forecasts, data, and visualizations.



New NVS Climatology App

To improve our understanding of ocean and atmosphere conditions offshore the Pacific Northwest, a suite of products are now available in the new NVS Climatology App. The new App shows climate (long-term average conditions) and anomalies (present-day departures from average), allowing users to visualize if current conditions are abnormal. Is a warm sea water "blob" present? Check out this cool app!

[View the Announcement](#)

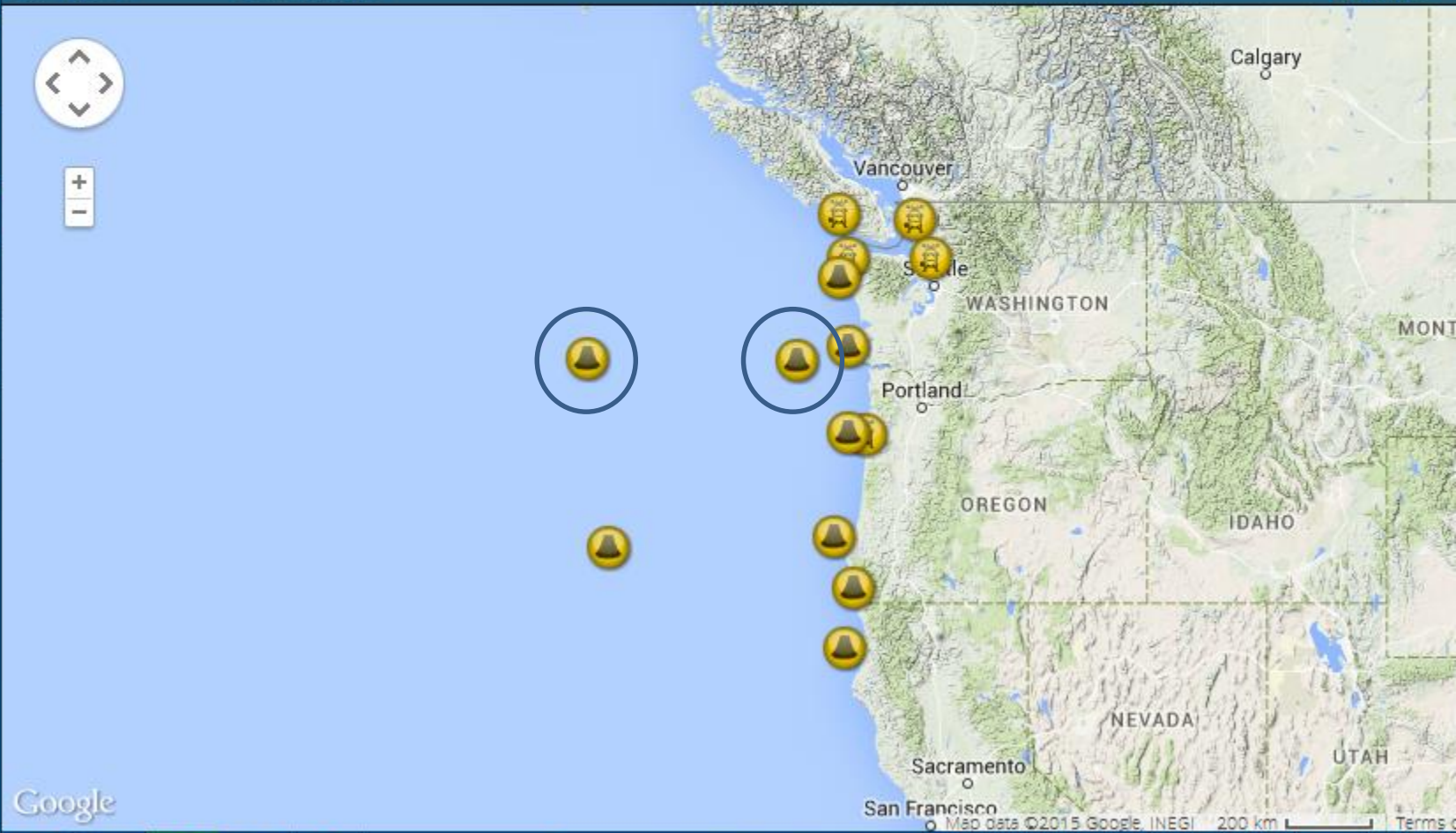


Lat: 44.8714

Lon: -108.5889

Terrain

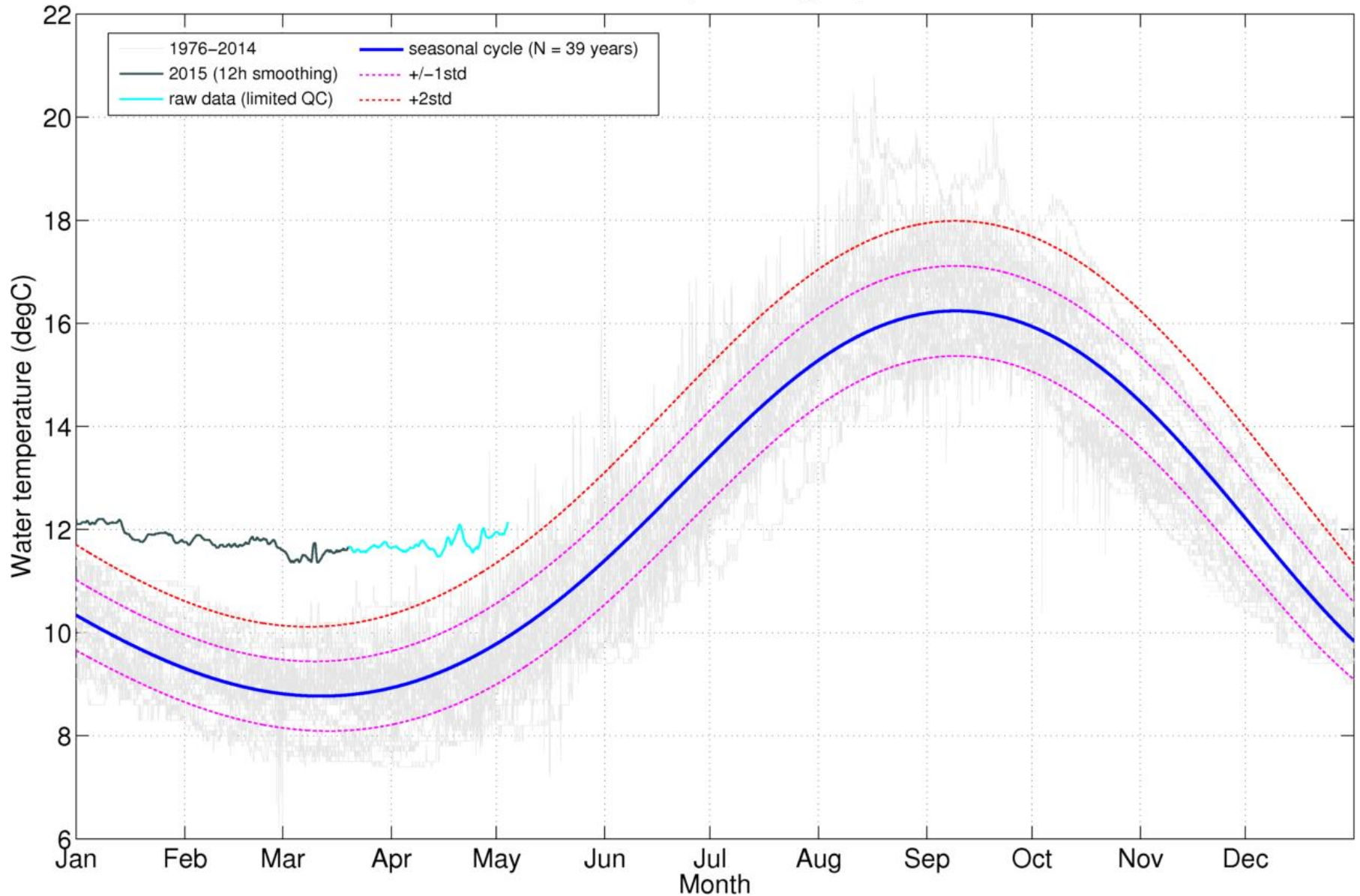
- Map
- Timeline
- Regions
- Sites
- Models
- Remote Sensing
- Legend



Google



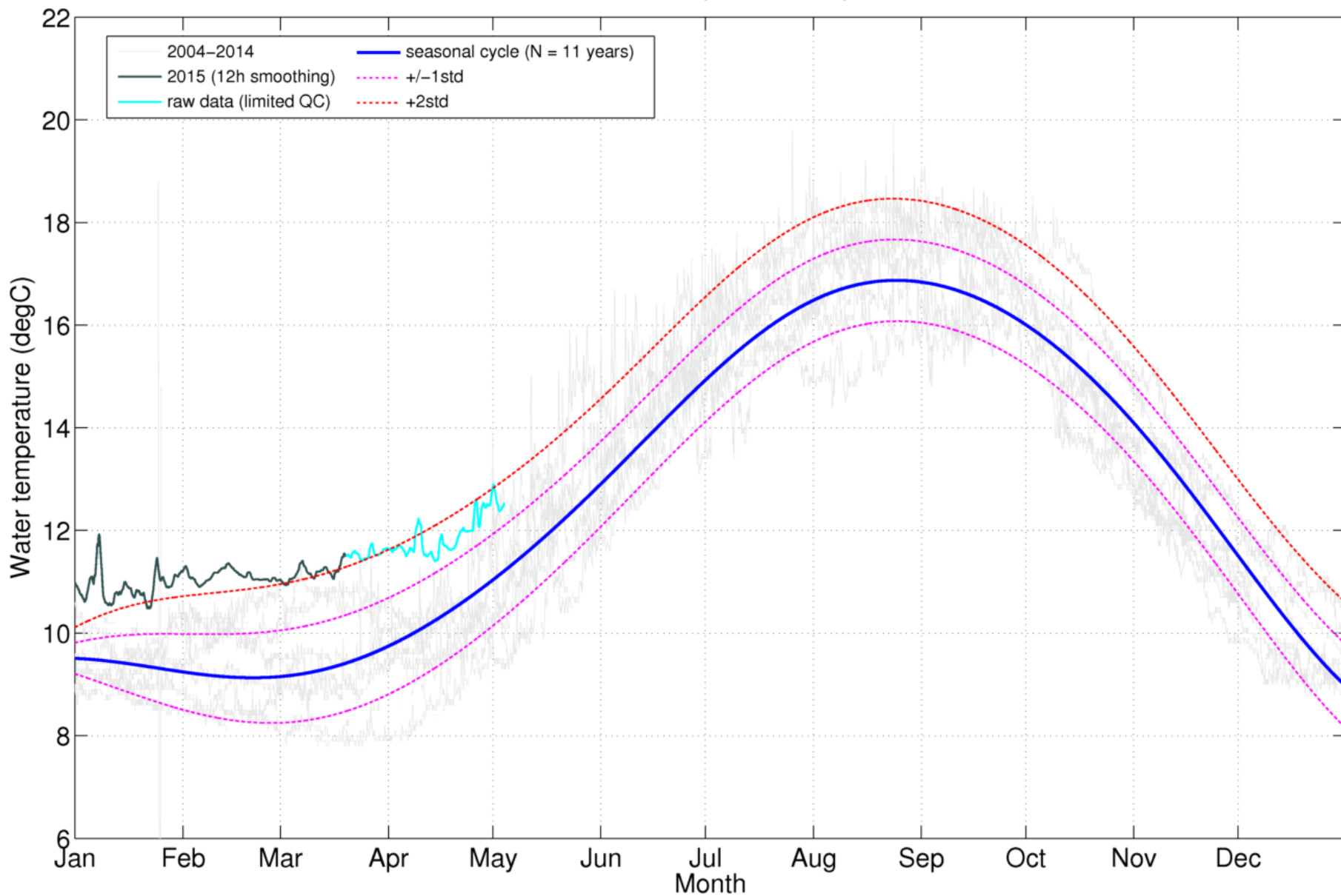
NDBC 46005, Washington, Wa



2015 data



NDBC 46089, Tillamook, Or



Obs

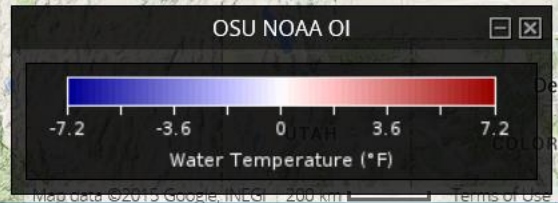
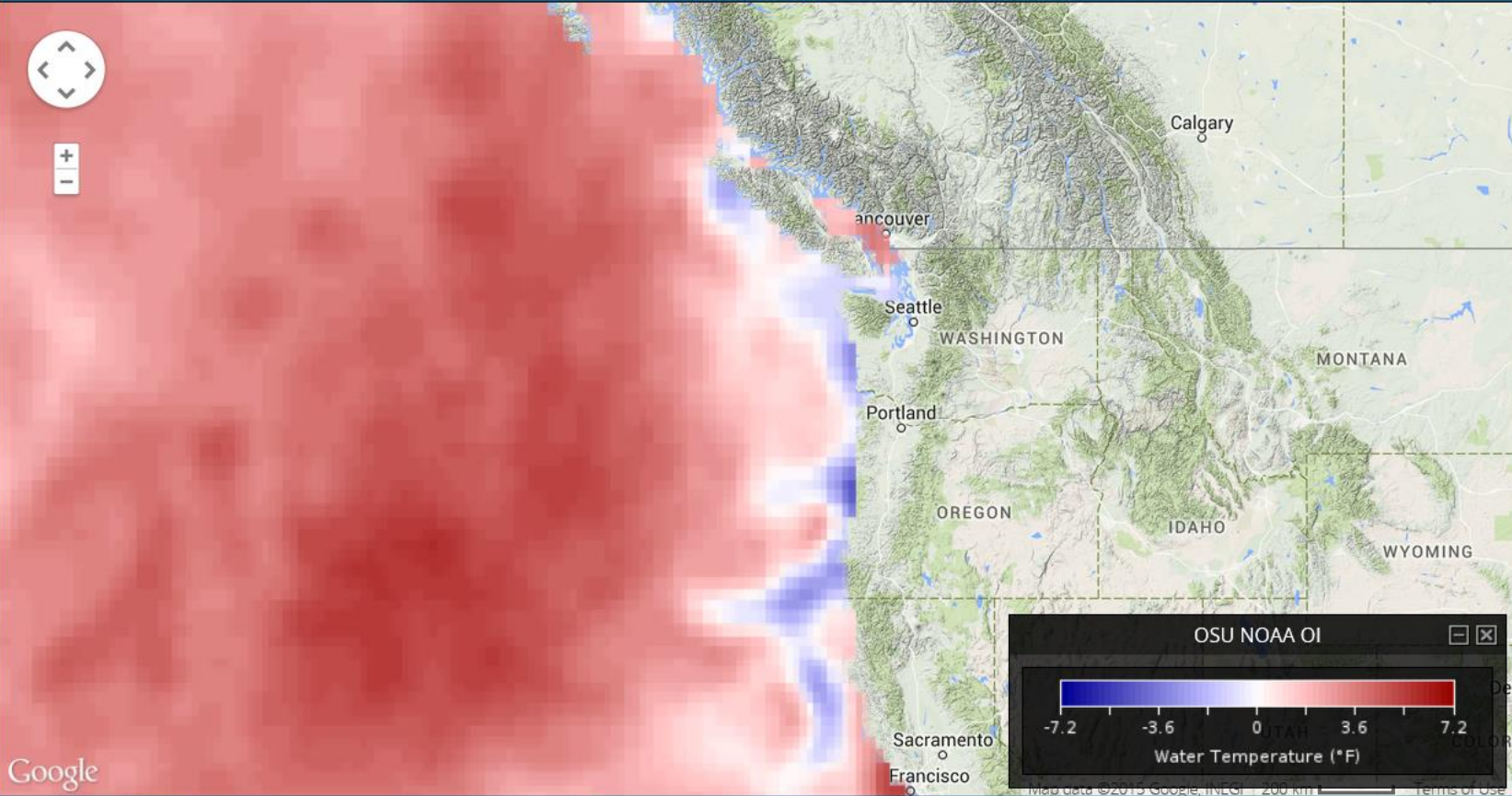
- Blob is hotter offshore
- Blob off PNW did not cool over winter
- Blob is still ~ 2 std deviations above mean
- *Gradient between offshore and onshore*

Aug 2014 anomaly

- Map
- Timeline
- Regions
- Sites
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- Remote Sensing
- Legend

Lat: 47.3626 Lon: -112.6318

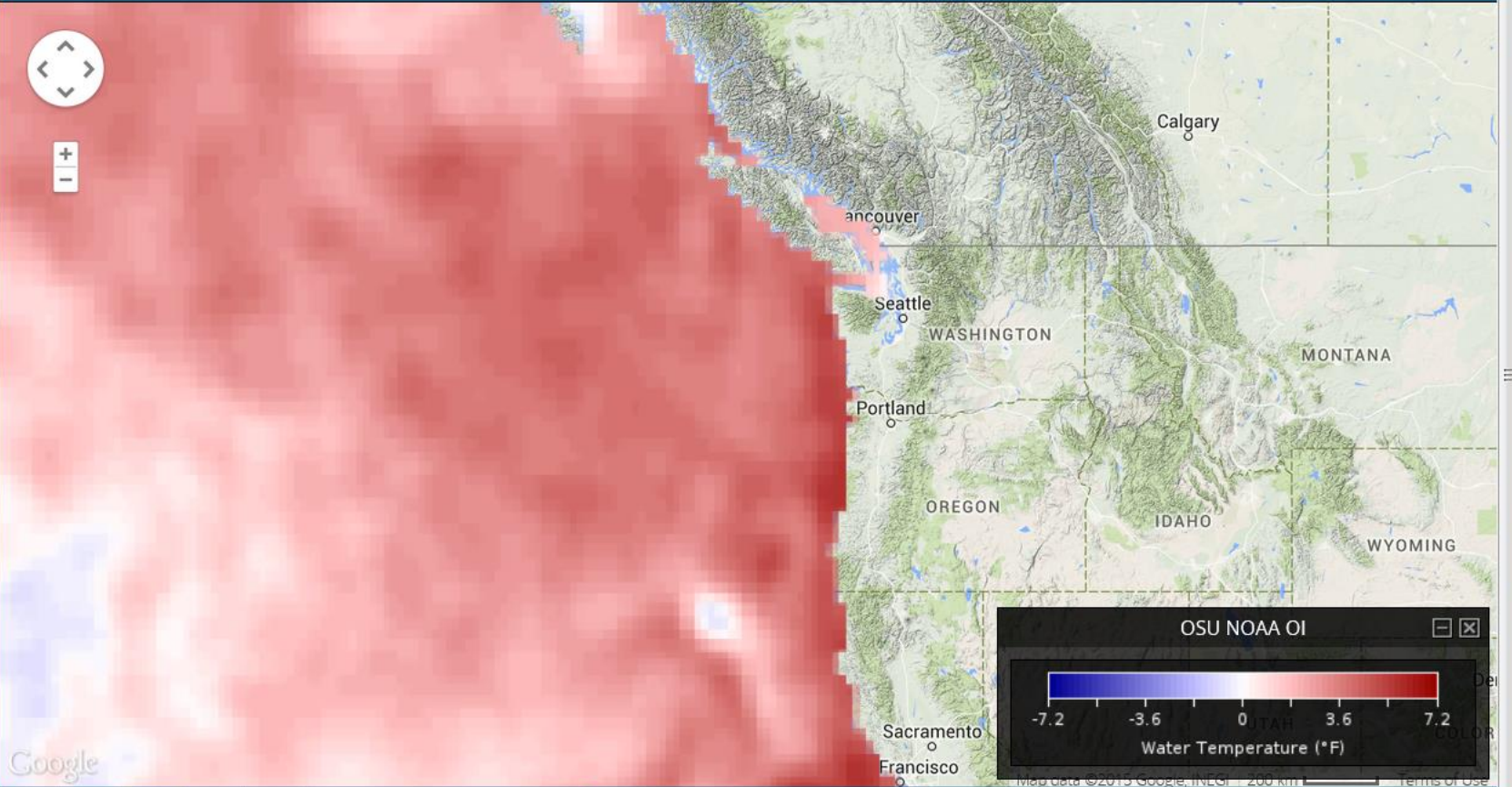
Terrain



Oct 2014 anomaly

- Map
- Timeline
- Regions
- Sites
- Models
- Remote Sensing
- Legend

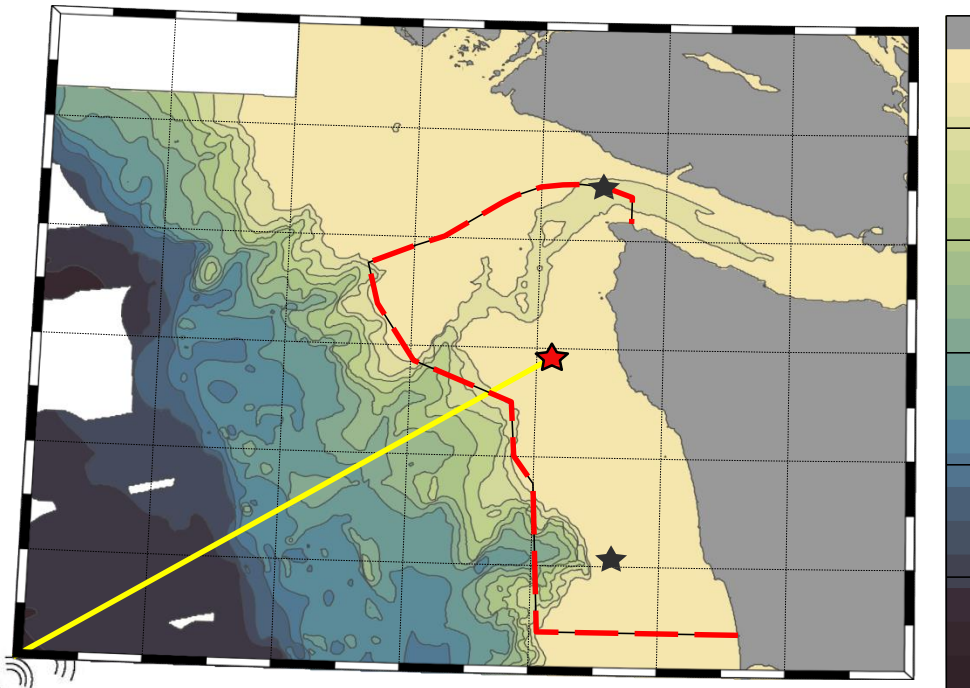
Lat: 49.5195 Lon: -105.7324 Terrain



Obs

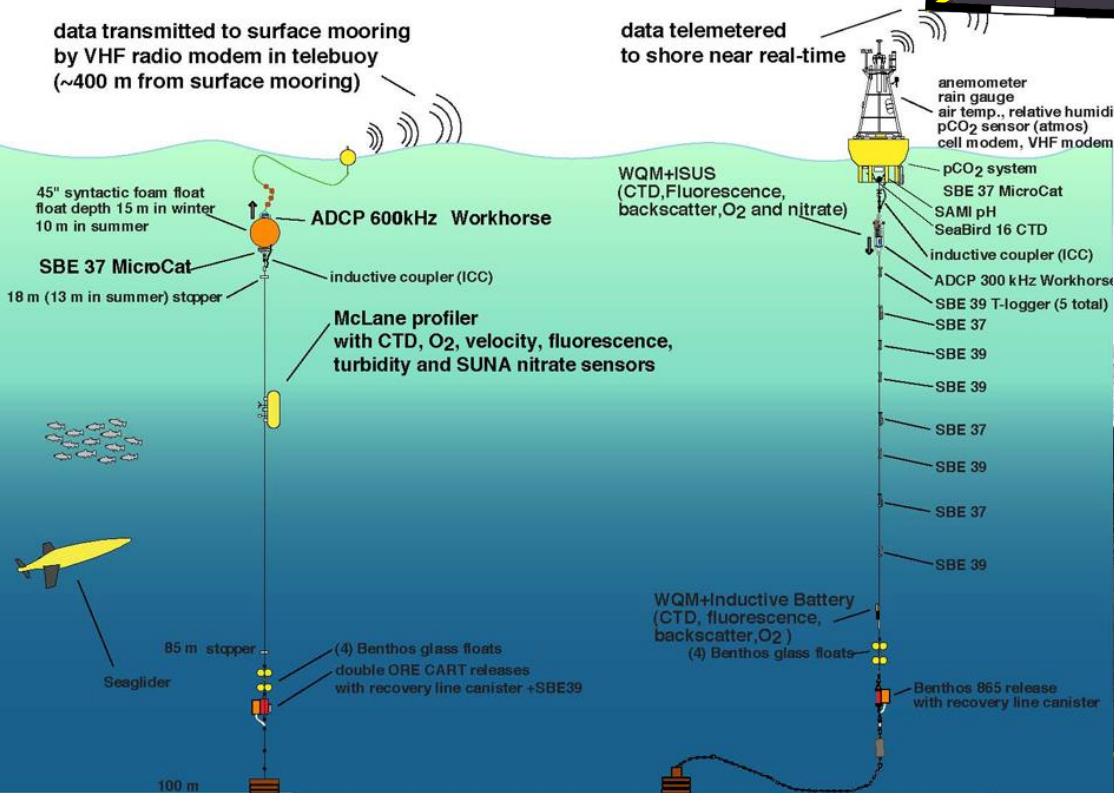
- Blob is hotter offshore
- Blob off PNW did not cool over winter
- Blob is still ~ 2 std deviations above mean
- Last summer, blob was held at bay off shore and upwelling was normal to cooler temps
- *But so far, just looking at the surface...*

Cha'ba Buoy and NEMO profiler, La Push, WA

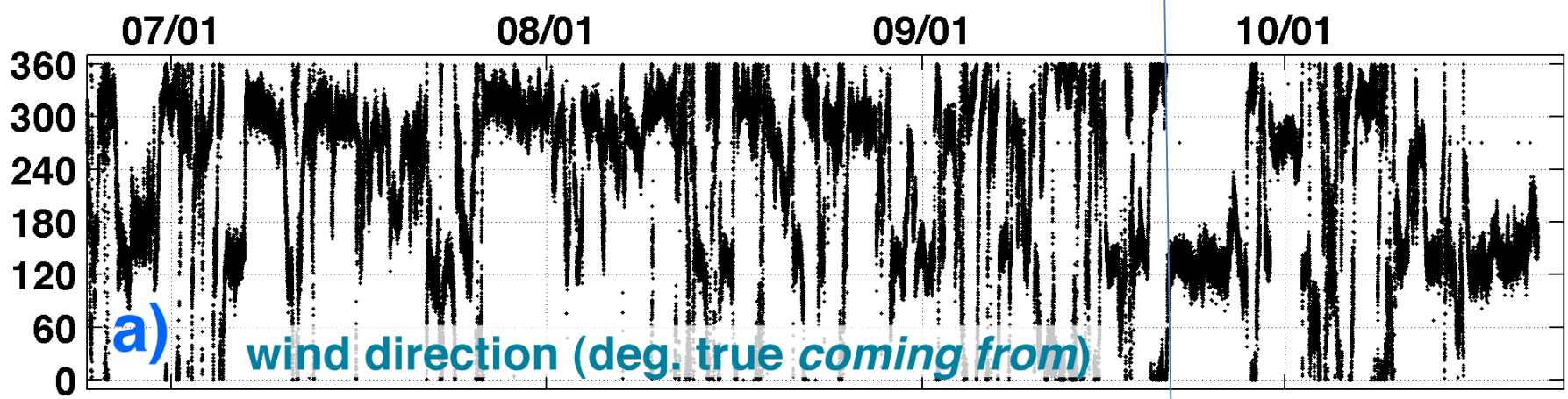


data transmitted to surface mooring by VHF radio modem in telebuoy (~400 m from surface mooring)

data telemetered to shore near real-time



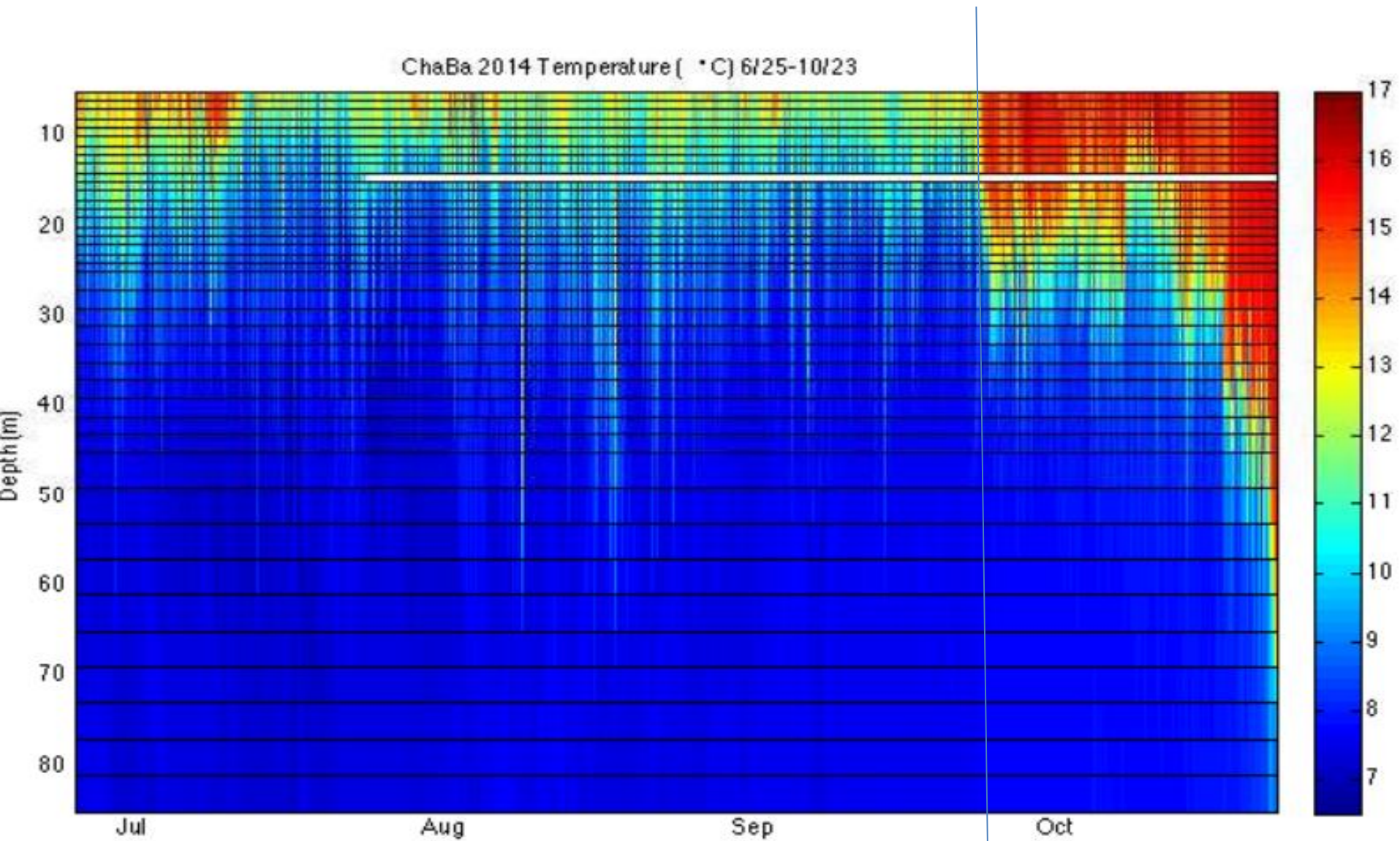
wind direction (deg. T)



UPWELLING WINDS

DOWNWELLING WINDS

2014 SHIFT TO DOWNWELLING CLEARLY EVIDENT !!



Obs

- Dramatic fall transition from upwelling to downwelling brings blob onshore, and warm waters penetrate to 60 m off WA coast
- *What about the inland waters?*



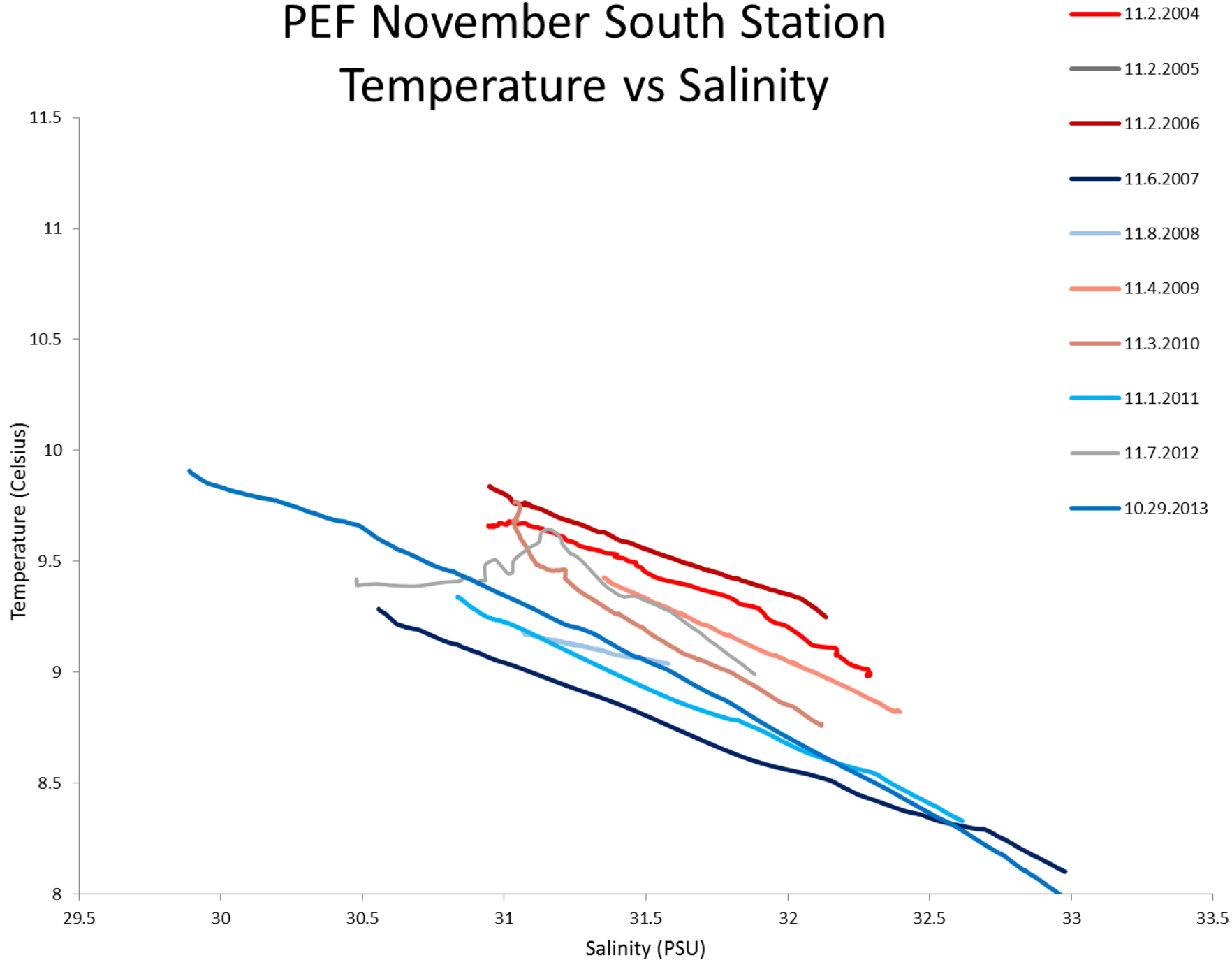
Fraser River

Pacific Ocean

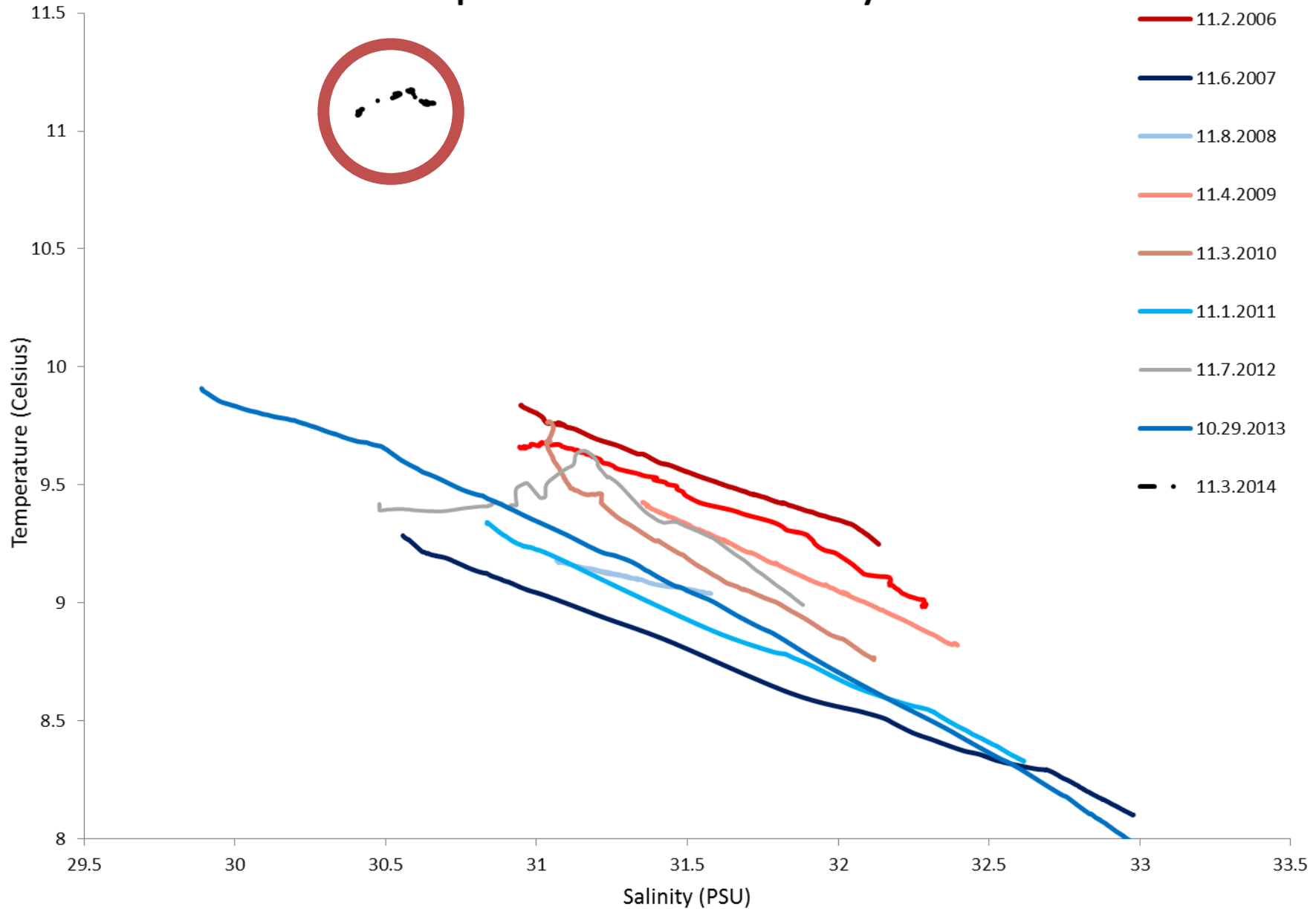
S

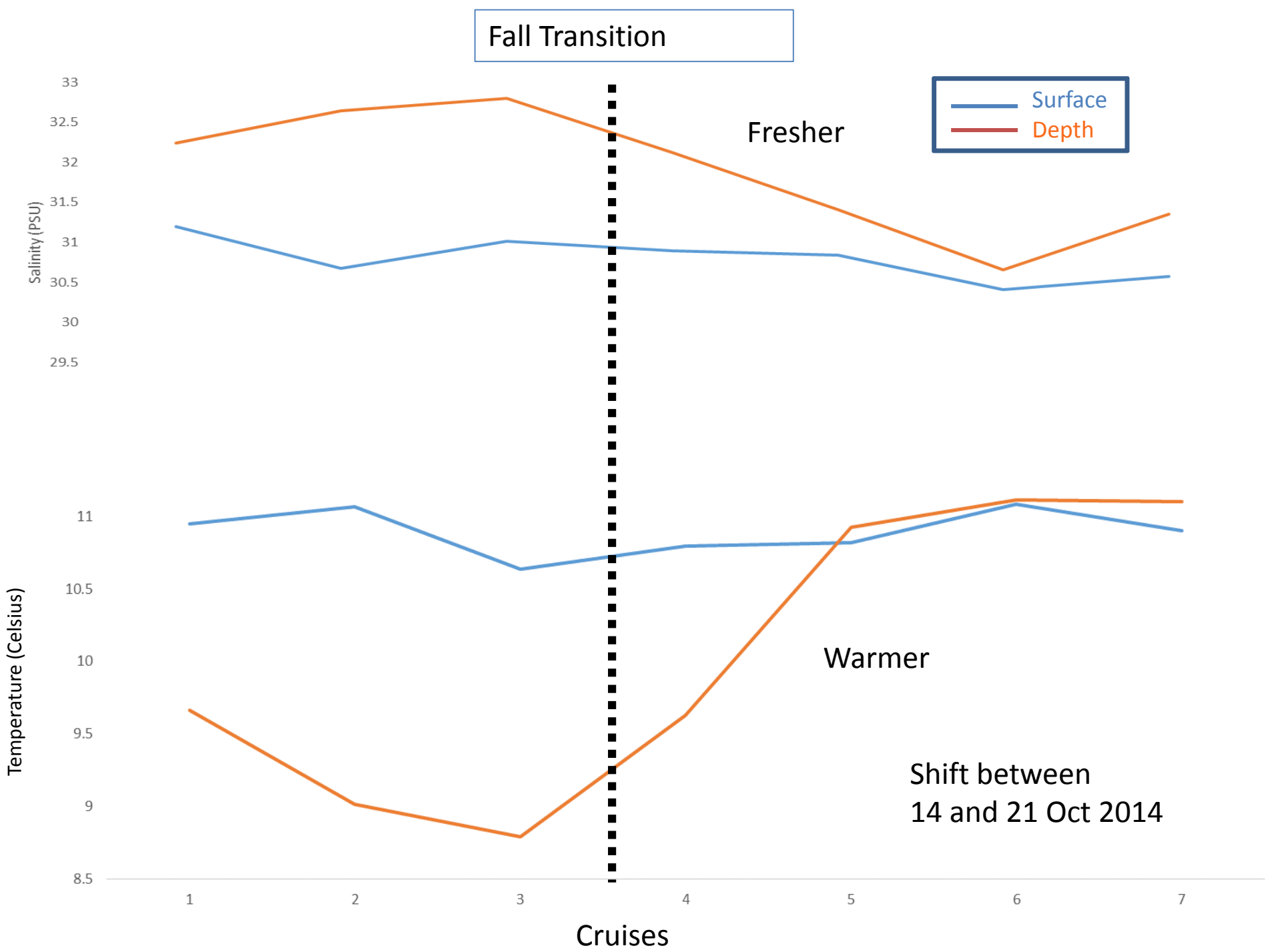
San Juan Archipelago

PEF November South Station Temperature vs Salinity



PEF November South Station Temperature vs Salinity







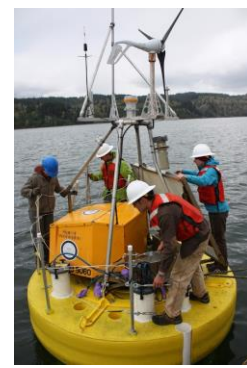
Fraser River

Pacific Ocean

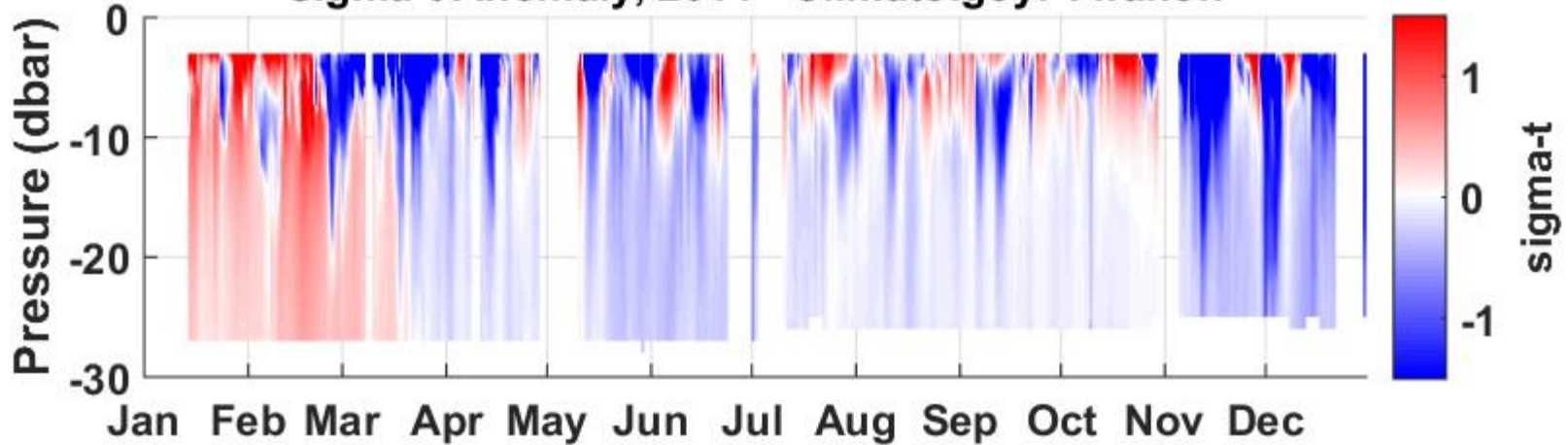
San Juan Archipelago

T

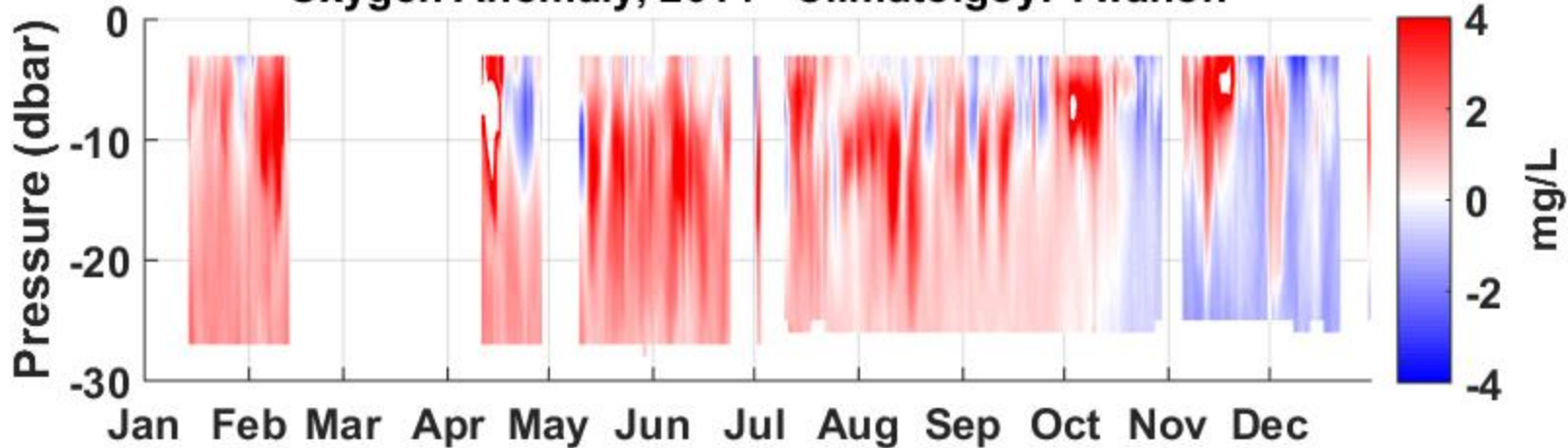
S. Hood Canal Anomalies



Sigma-t Anomaly, 2014 - Climatolgoy: Twanoh



Oxygen Anomaly, 2014 - Climatolgoy: Twanoh



Obs

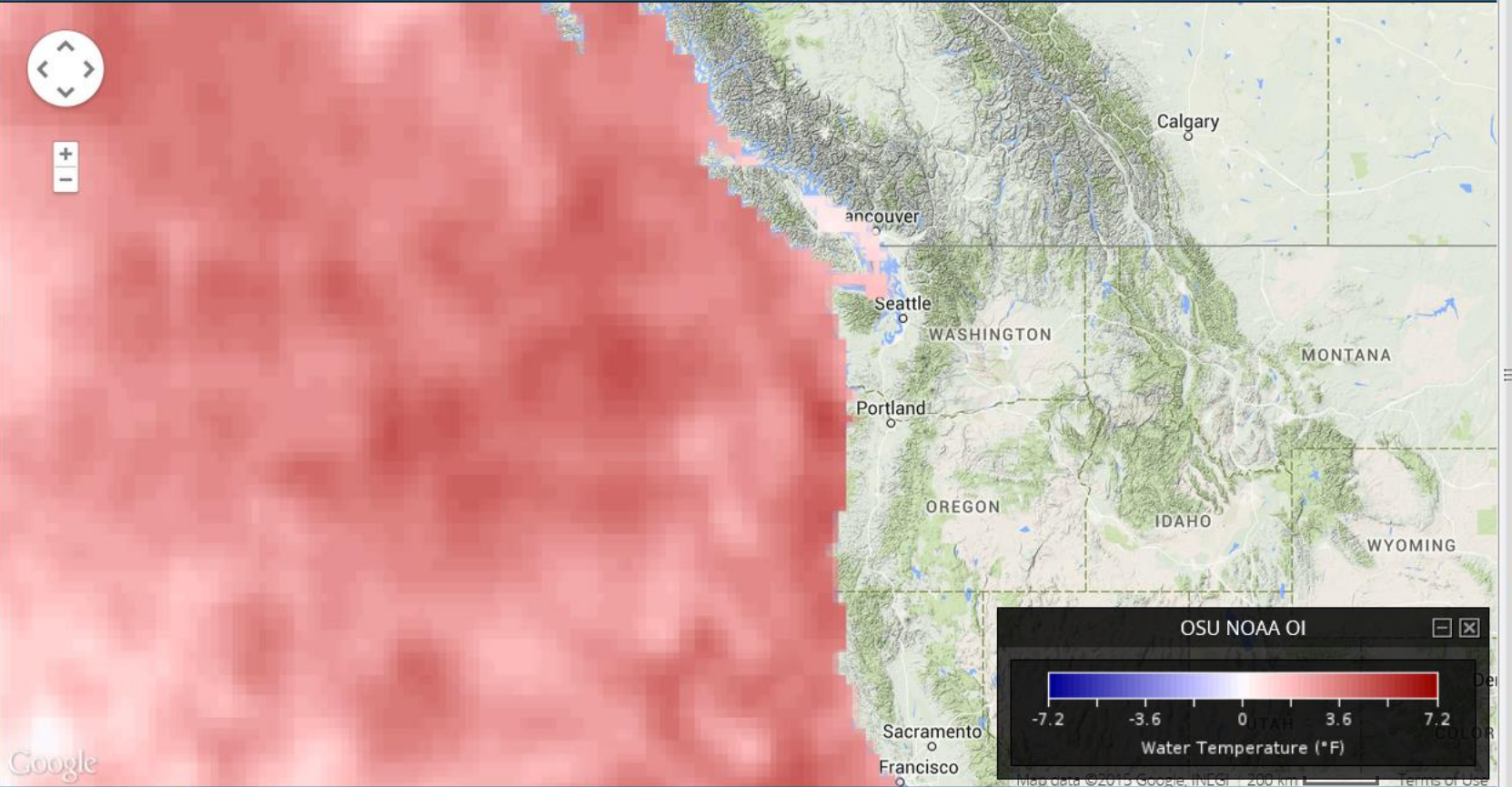
- *What about the inland waters?*
- Inland waters received influx of much warmer than normal waters
- Saw warm waters at depth, due to estuarine circulation
- Some areas did not flush

- *Where are we going now?*
- *How big is the blob?*

Jan 2015 anomaly

- Map
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Lat: 47.3626 Lon: -107.4902 Terrain



January 2015

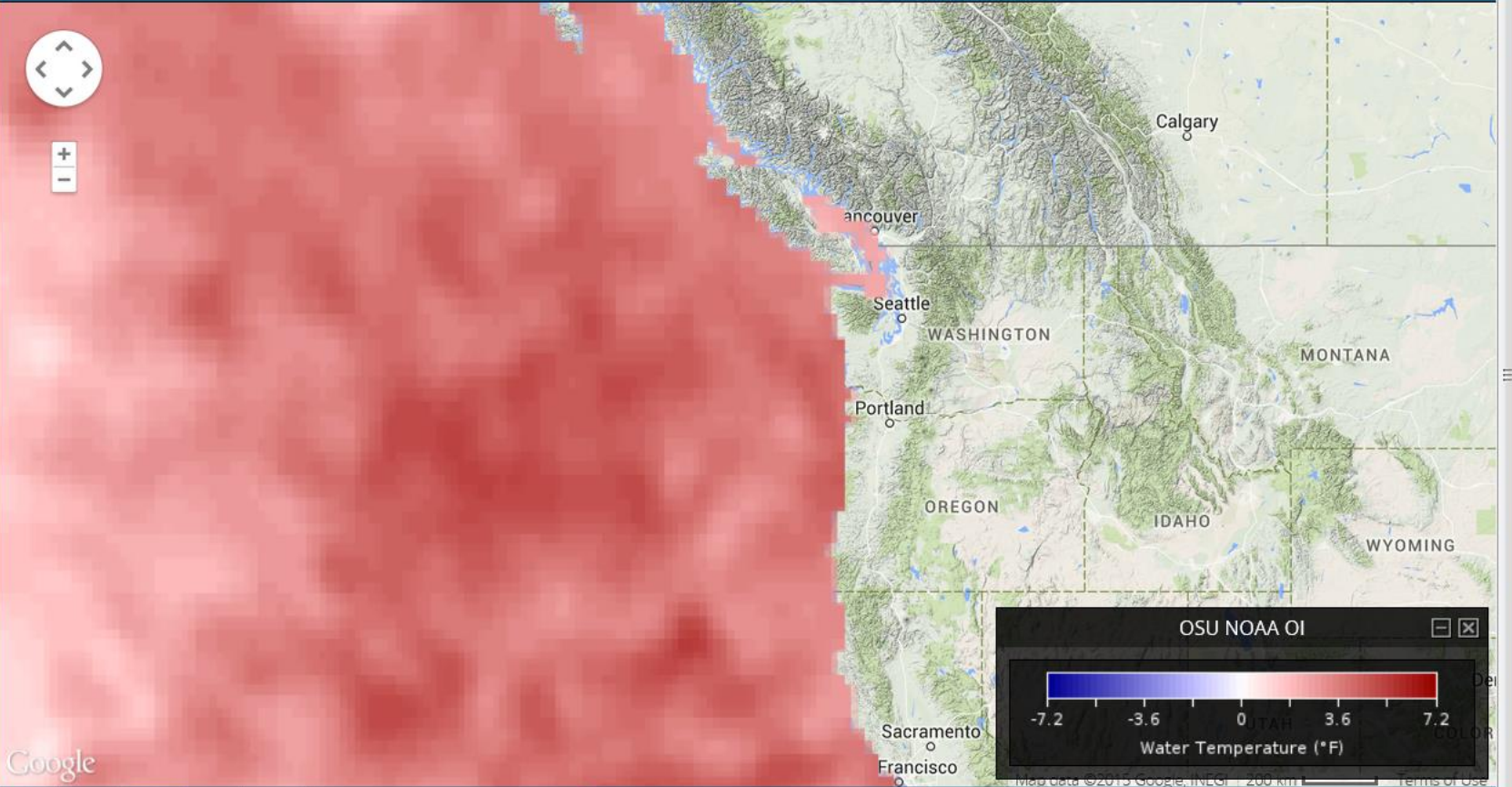
Jan • Feb • Mar • Apr • May • Jun • Jul • Aug • Sep • Oct • Nov • Dec

1993 • 1994 • 1995 • 1996 • 1997 • 1998 • 1999 • 2000 • 2001 • 2002 • 2003 • 2004 • 2005 • 2006 • 2007 • 2008 • 2009 • 2010 • 2011 • 2012 • 2013 • 2014 • 2015 •

Feb 2015 anomaly

- Map
- Timeline
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- Legend

Lat: 51.6398 Lon: -105.4248 Terrain



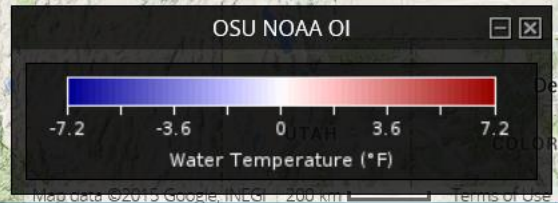
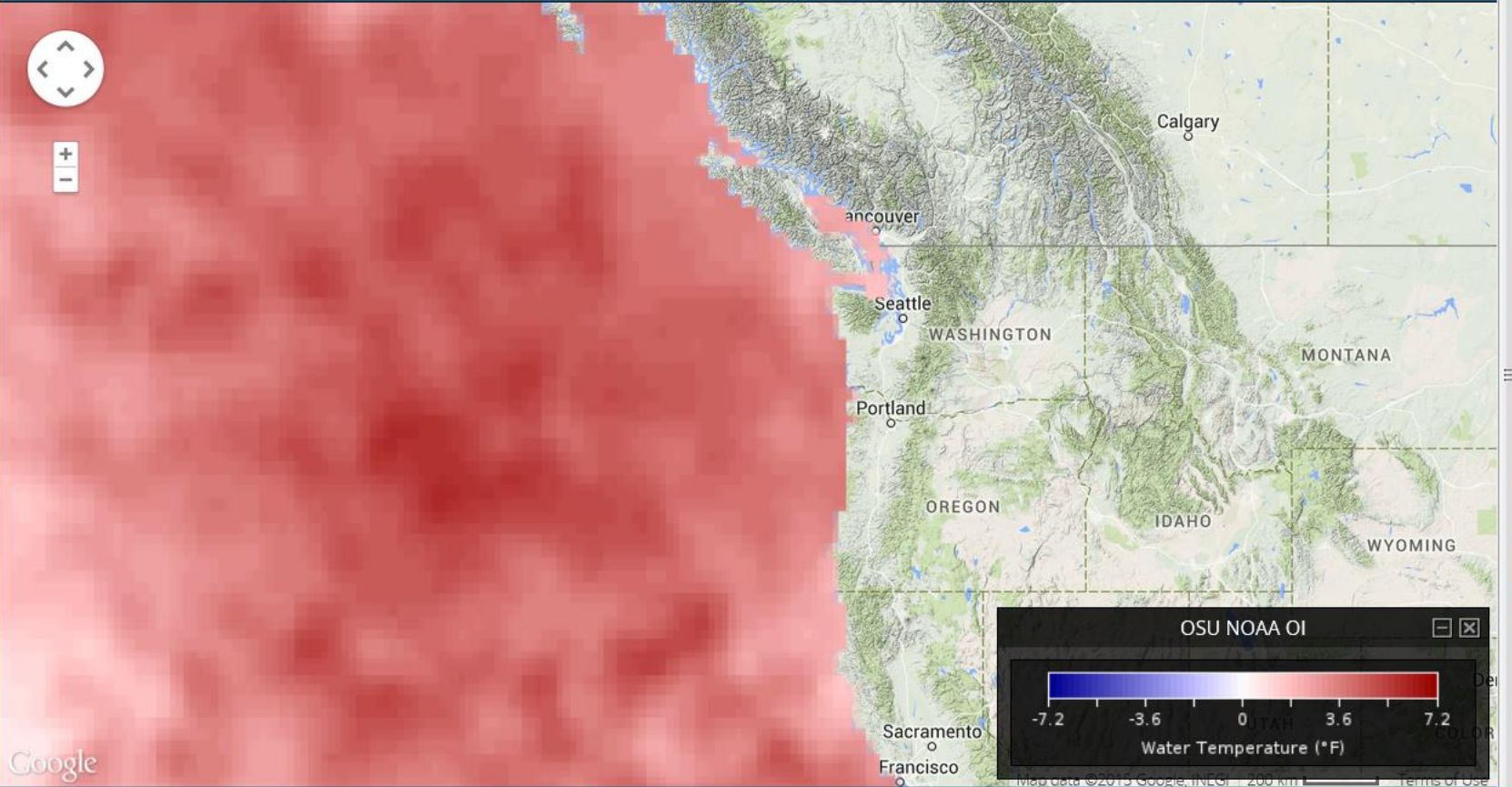
February 2015

- Jan
 - Feb
 - Mar
 - Apr
 - May
 - Jun
 - Jul
 - Aug
 - Sep
 - Oct
 - Nov
 - Dec
- 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

Mar 2015 anomaly

- Map
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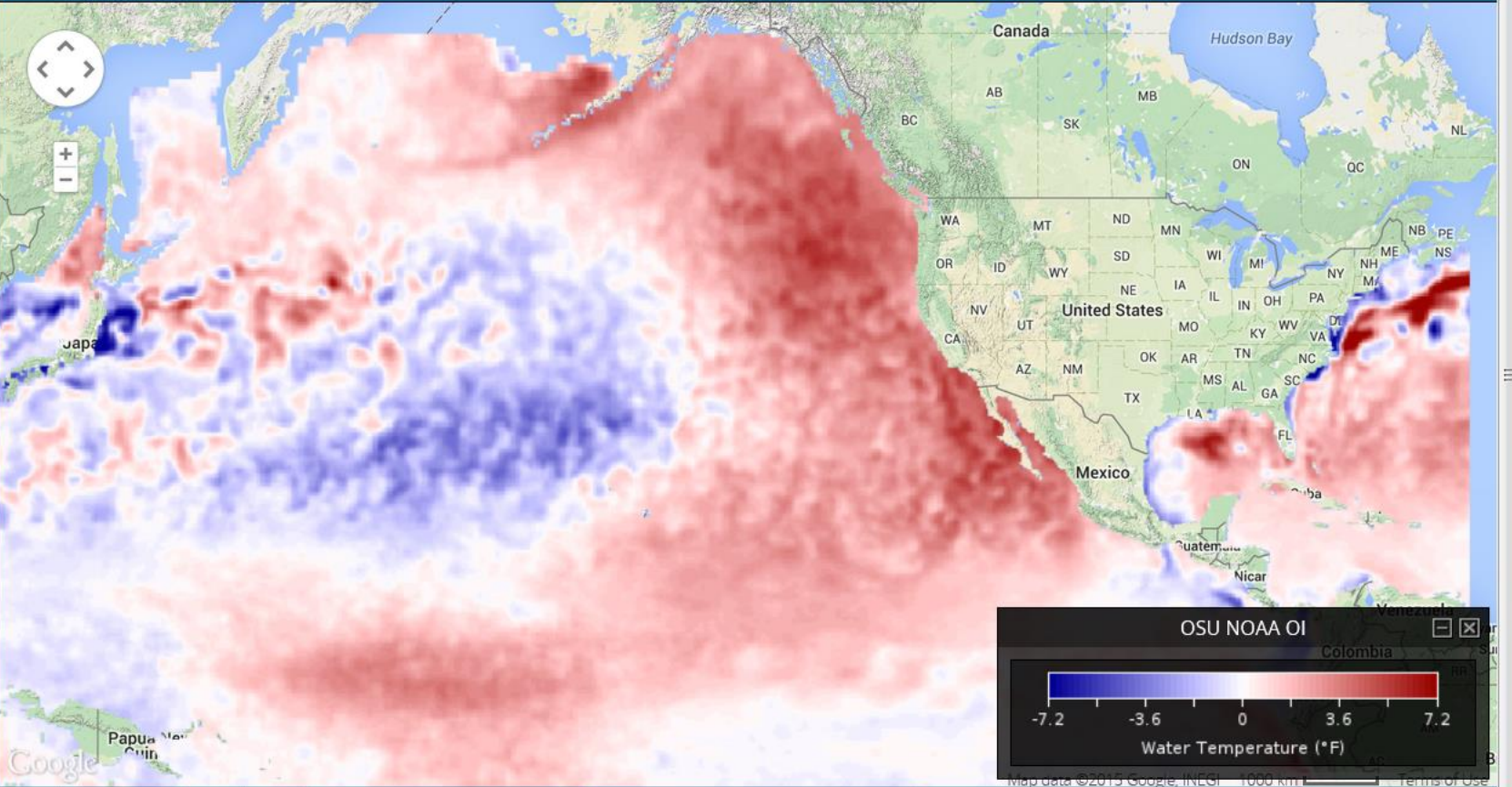
Lat: 47.0641 Lon: -109.1162 Terrain



Mar 2015 anomaly

- Map
- Timeline
- Regions
- Sites
- Models
- Remote Sensing
- Legend

Lat: 45.5587 Lon: -104.4141 Terrain



March 2015

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

Jan 1998 anomaly

Map

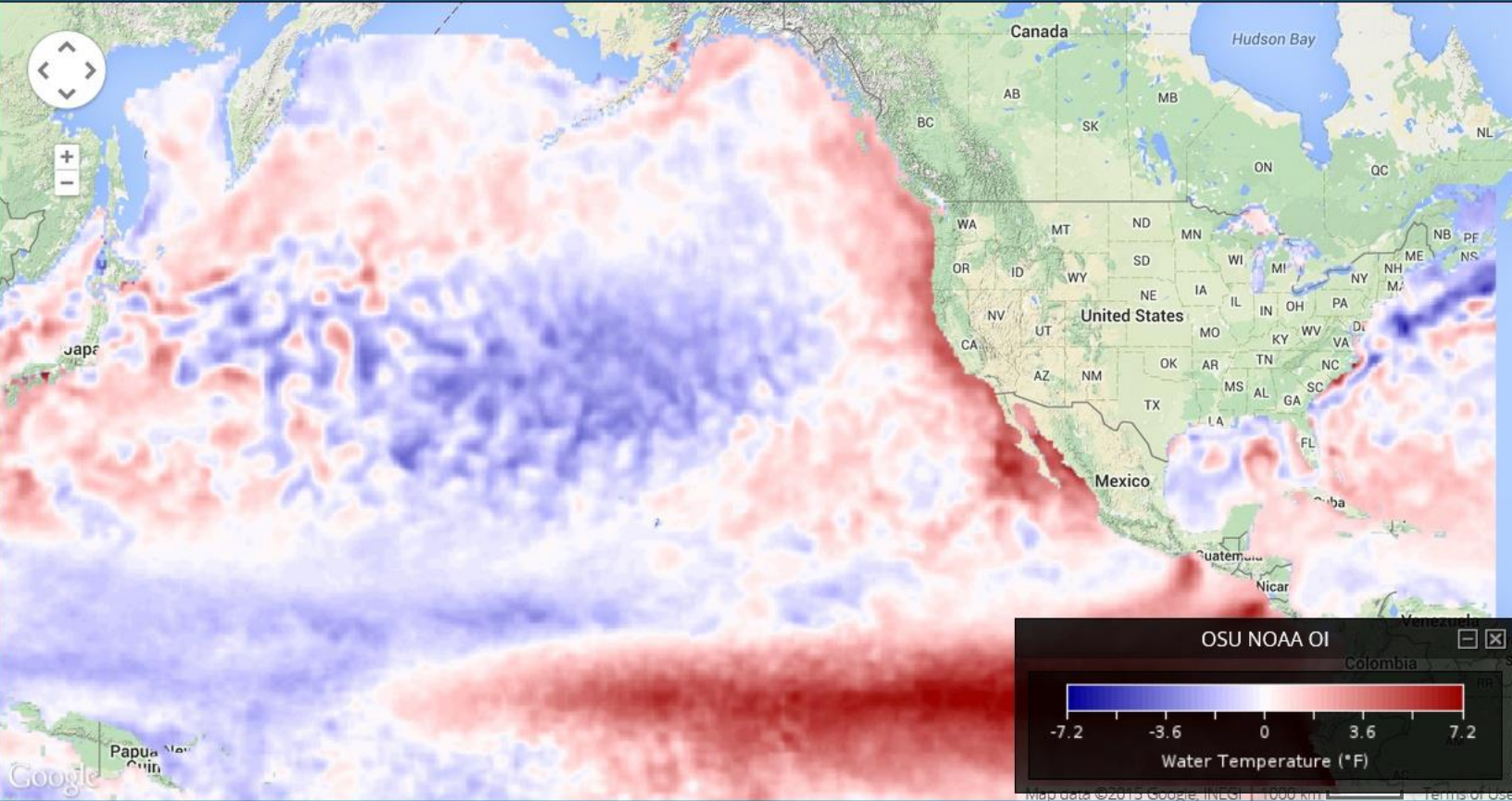
Overview

Help

Lat: 31.3236 Lon: -81.9141

Terrain

- Map
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- Legend



January 1998

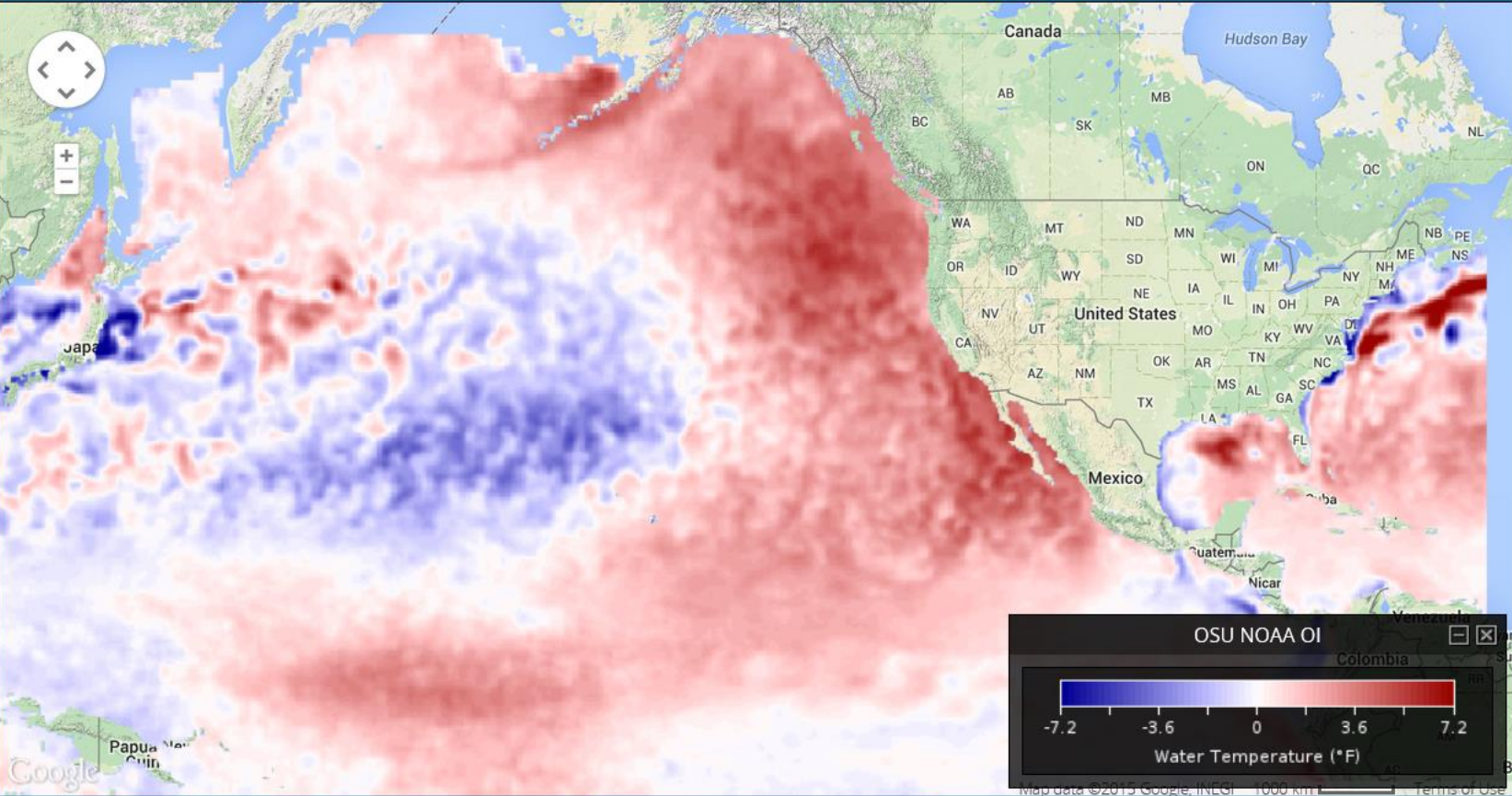
- Jan
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 - Dec
- 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

Mar 2015 anomaly

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Lat: 45.5587 Lon: -104.4141

Terrain



March 2015

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015