



NOAA West Watch

*Reporting Regional Environmental
Conditions & Impacts in the West*

January 7, 2020

Call Agenda



- **Project Recap & Updates (Dan McEvoy)**
- Regional Climate and ENSO brief (Dan McEvoy)
- IOOS Nearshore Conditions brief (Beth Curry, Alex Harper, Megan Hepner-Medina)
- Discussion - Environmental conditions and impacts reporting (All)
 - Additional impacts to share?

Project Recap and Updates



- NOAA West Watch webinars are run by the Western Regional Climate Center, in partnership with the NOAA Western Regional Collaboration Team (NOAA West) with standing contributions from the three Integrated Ocean Observing System Regional Associations.
- Project Goals:
 - Serve as forum for bring together NOAA staff and partners from across the agency and region to share information about regional scale environmental observations and impacts on human systems.
 - Help facilitate interdisciplinary connections and the exchange of information among agency staff and partners on regional climatic and oceanic conditions, particularly departures from normal.

These webinars are not formal public releases of data.

Project Recap and Updates



- NOAA West provided funding to the Western Regional Climate Center to offer three webinars in Fiscal Year 2019 (November, January & September).
- The Western Regional Climate Center has agreed to provide funding to support a quarterly NOAA West Watch in 2020 in January, April, July, and October. The NOAA West Watch will be reassessed again at the end of 2020.
- Request: If you find these webinars helpful, or if you have ideas of in-region entities that may be open to taking on this webinar please let me know: (mcevoyd@dri.edu).

Call Agenda



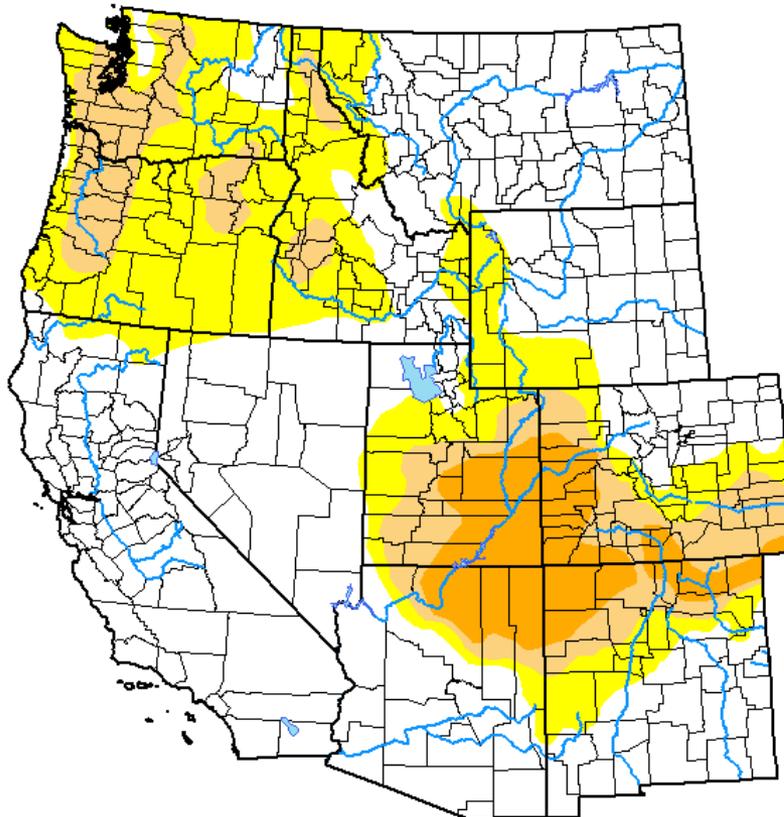
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Current US Drought Monitor



U.S. Drought Monitor West

December 31, 2019
(Released Thursday, Jan. 2, 2020)
Valid 7 a.m. EST



Intensity:

-  None
-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

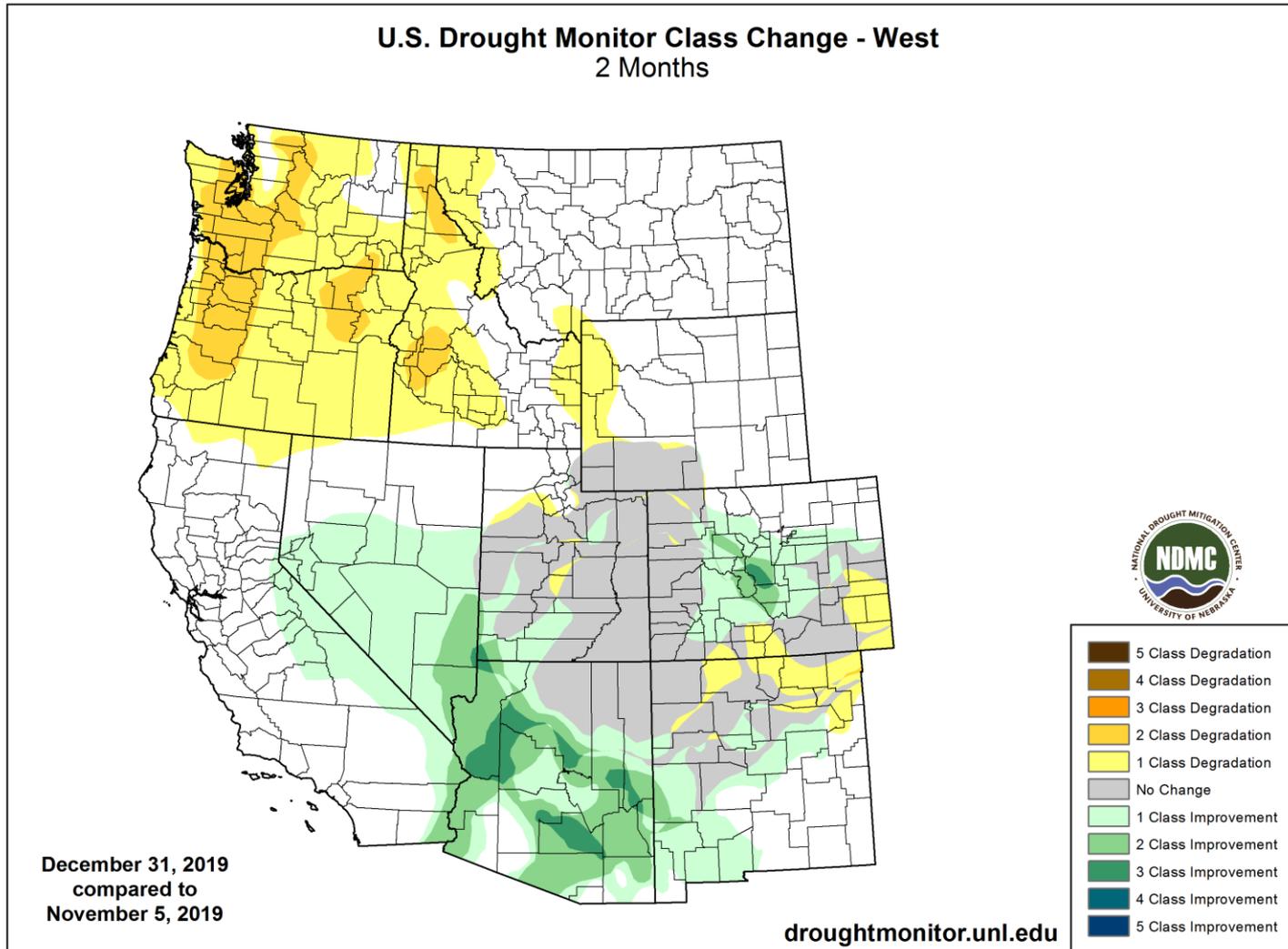
Author:

Brad Pugh
CPC/NOAA



droughtmonitor.unl.edu

US Drought Monitor 2 Month Change Map



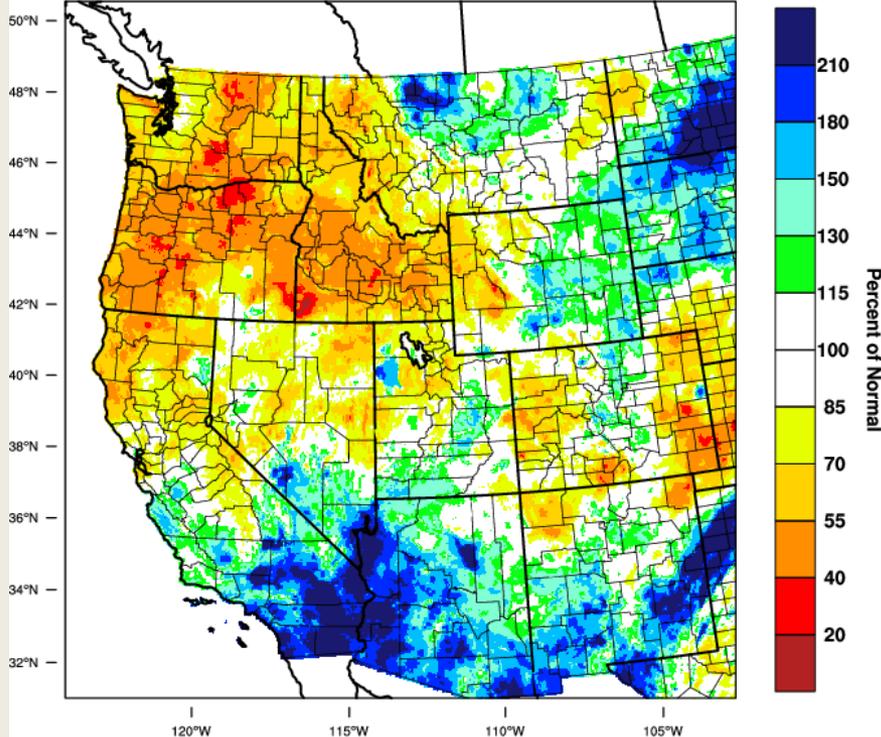
October-December Precipitation and Temperature



Precipitation % of Normal October-December, 2019

Western United States - Precipitation

October-December 2019 Percent of 1981-2010 Normal

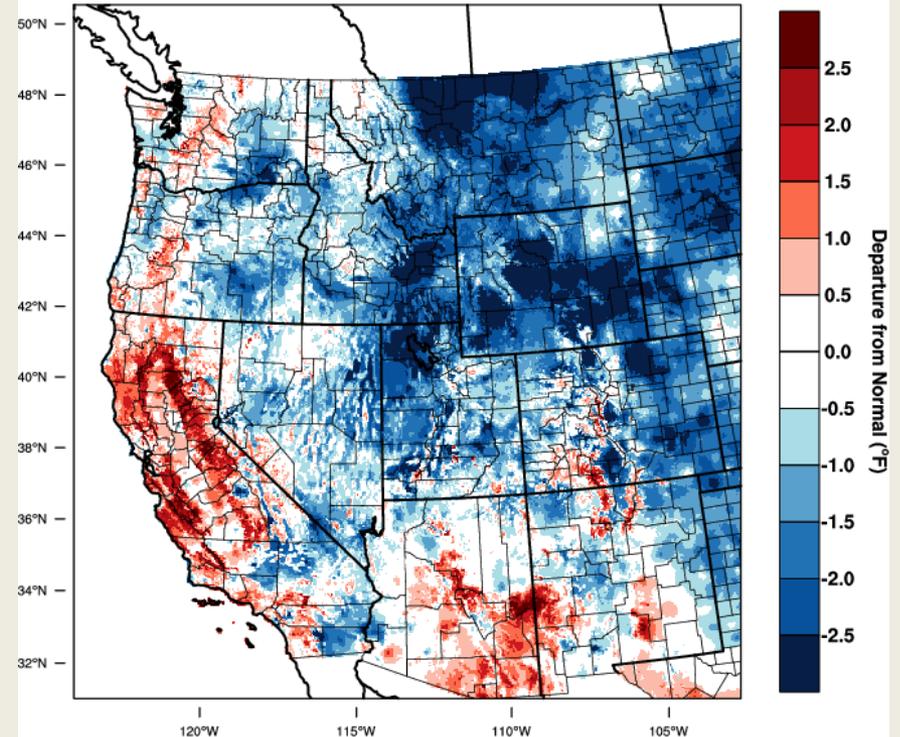


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 2 JAN 2020

Temperature Anomaly October-December, 2019

Western United States - Mean Temperature

October-December 2019 Departure from 1981-2010 Normal



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 2 JAN 2020

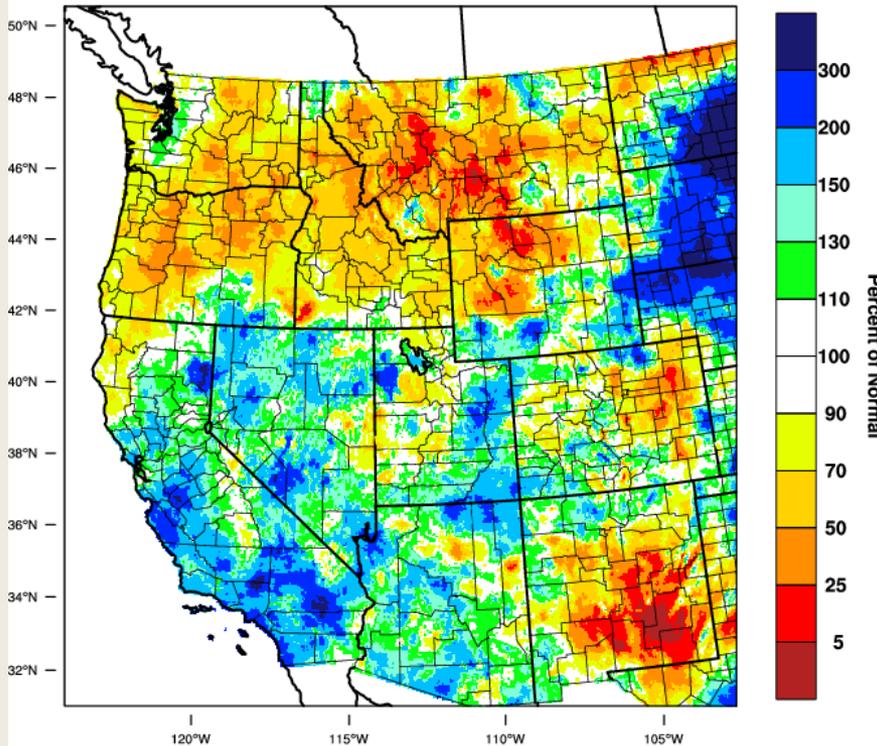
December Precipitation and Temperature



Precipitation % of Normal December, 2019

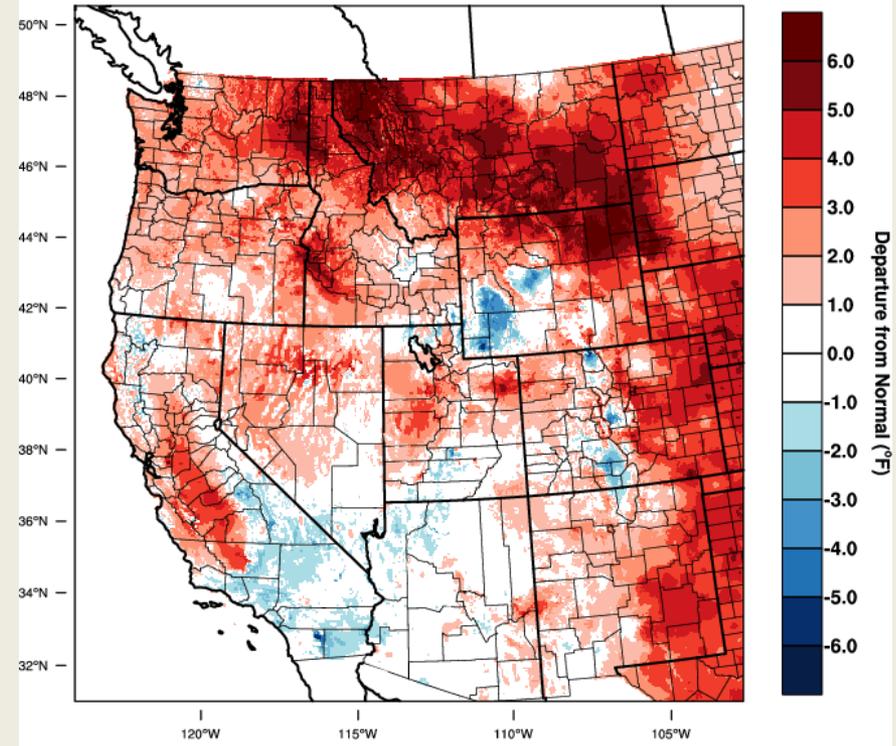
Temperature Anomaly December, 2019

Western United States - Precipitation
December 2019 Percent of 1981-2010 Normal



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 2 JAN 2020

Western United States - Mean Temperature
December 2019 Departure from 1981-2010 Normal

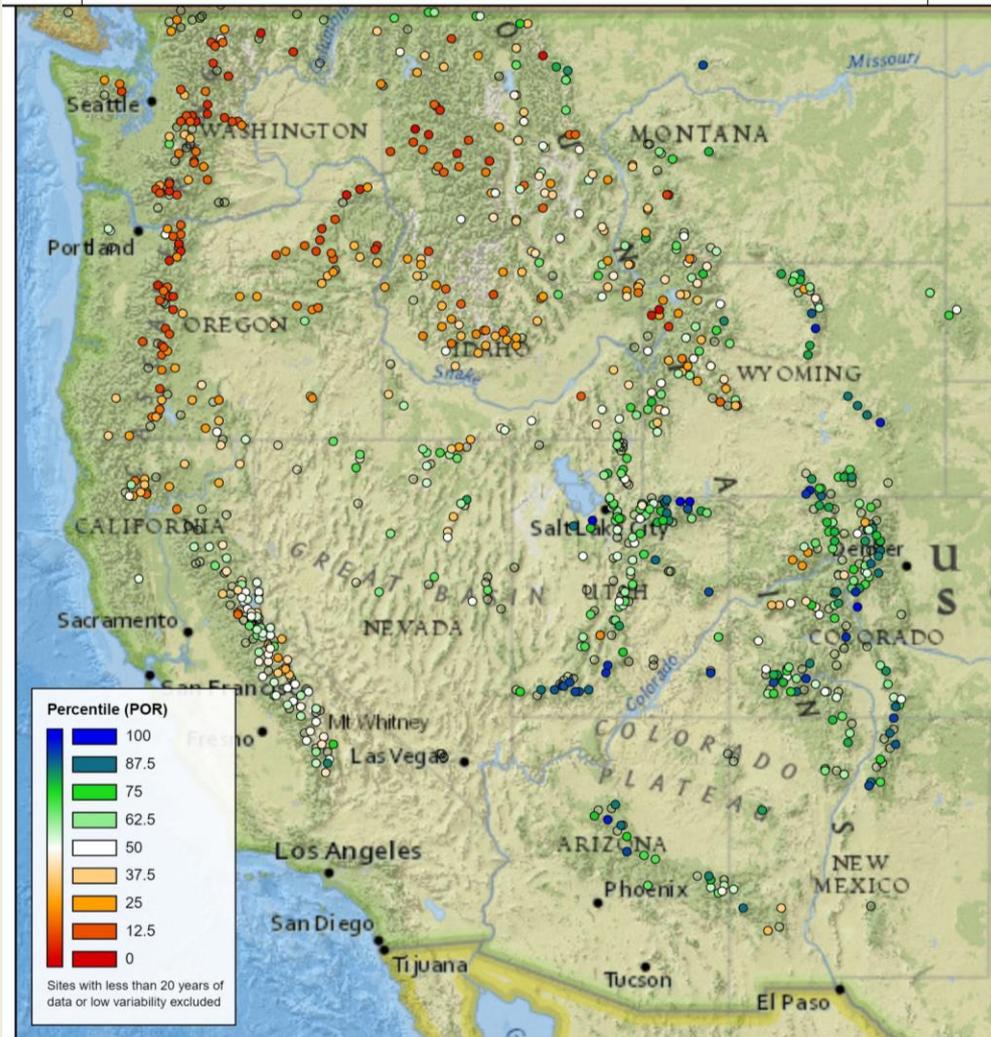


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 2 JAN 2020

Pacific Northwest Snow Drought



January 4 Snow Water Equivalent Percentiles



- Pacific Northwest:
 - Well below normal
 - Rapid improvements occurring this week
- Sierra Nevada:
 - Near normal
 - Dry stretch since mid-December with locations falling slightly below normal
- Four Corners:
 - Above normal

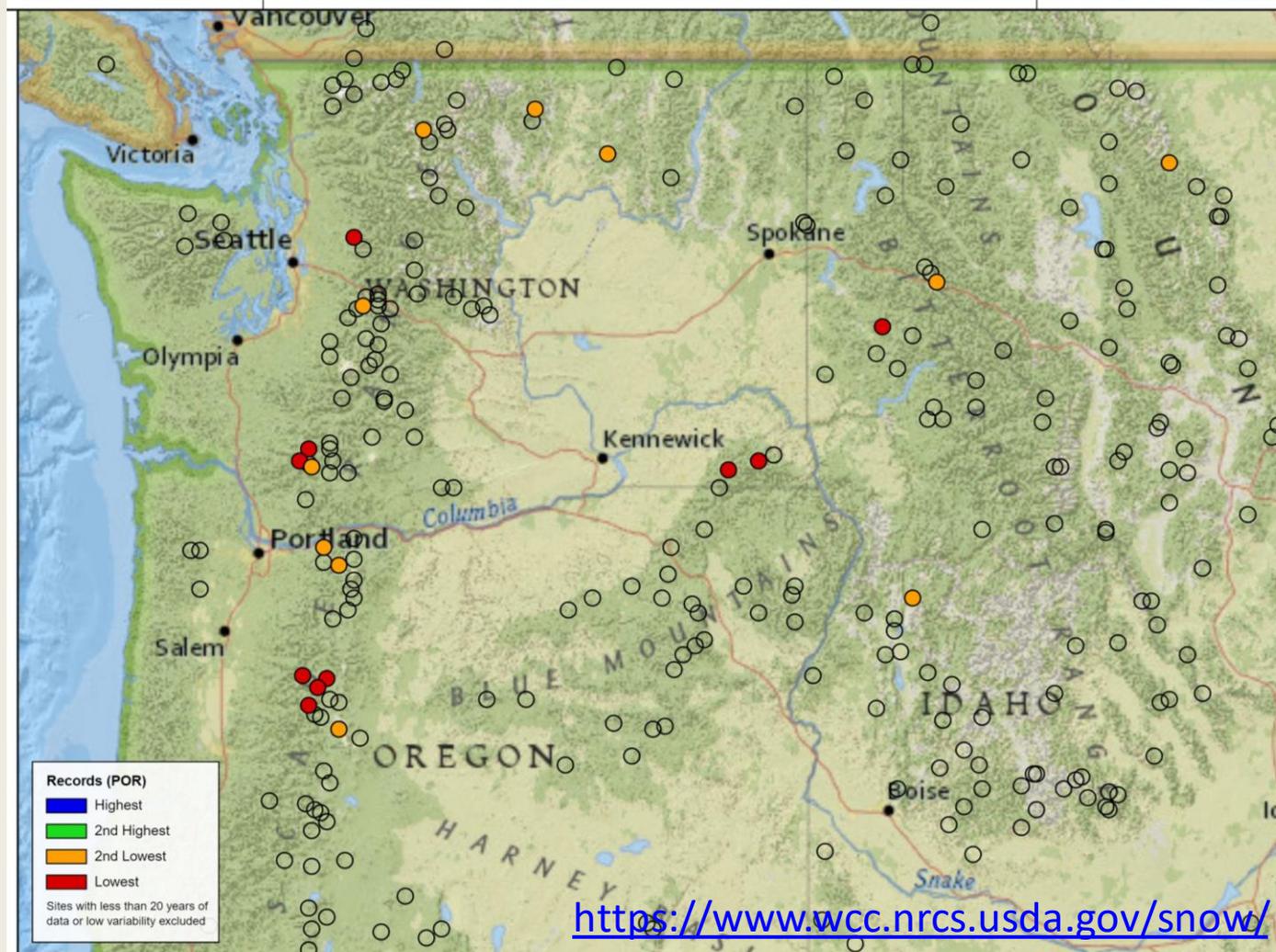
<https://www.wcc.nrcs.usda.gov/snow/>

Pacific Northwest Snow Drought



End of Day January 3 Snow Water Equivalent Records

Record Low, 2nd Lowest

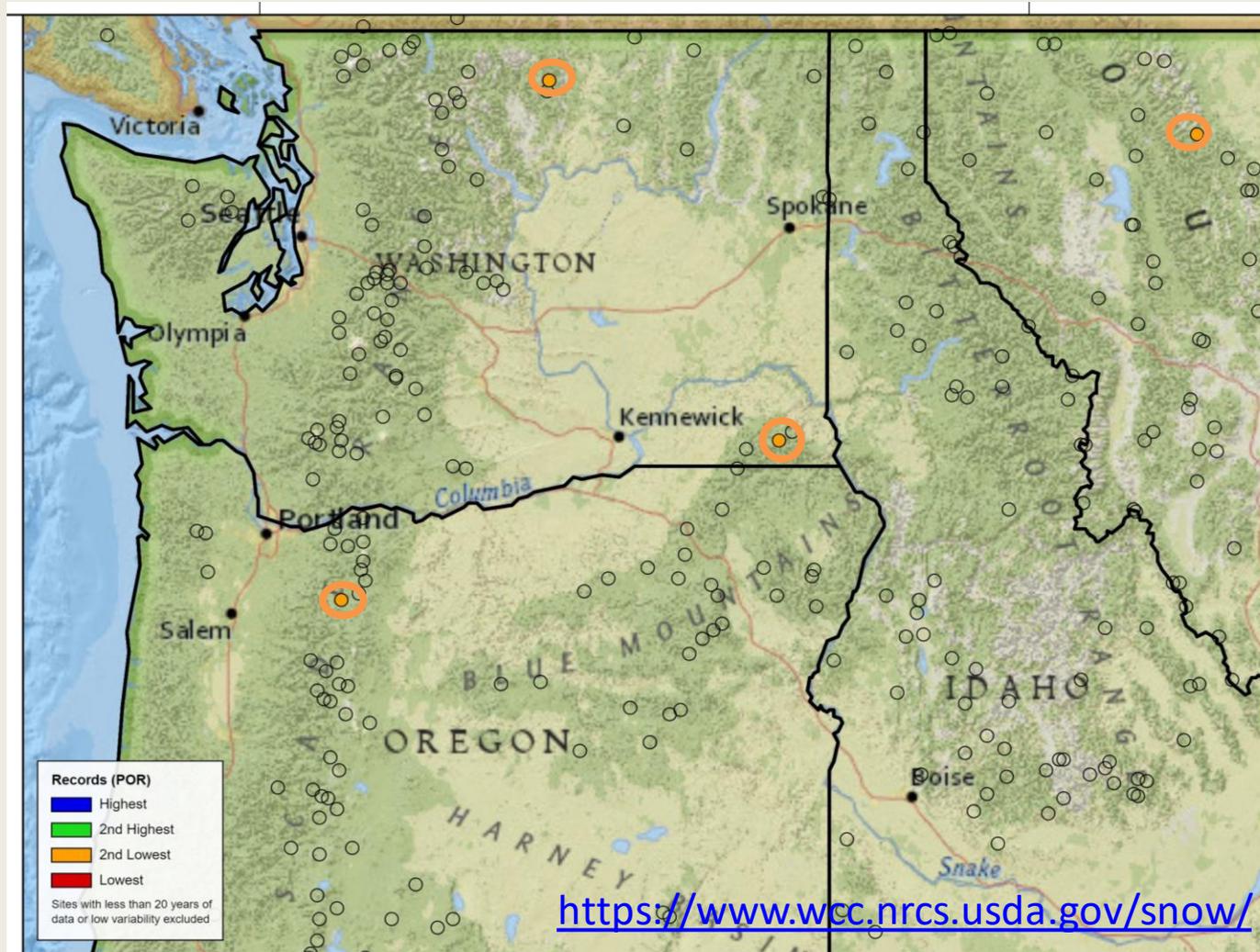


Pacific Northwest Snow Drought



End of Day January 6 Snow Water Equivalent Records

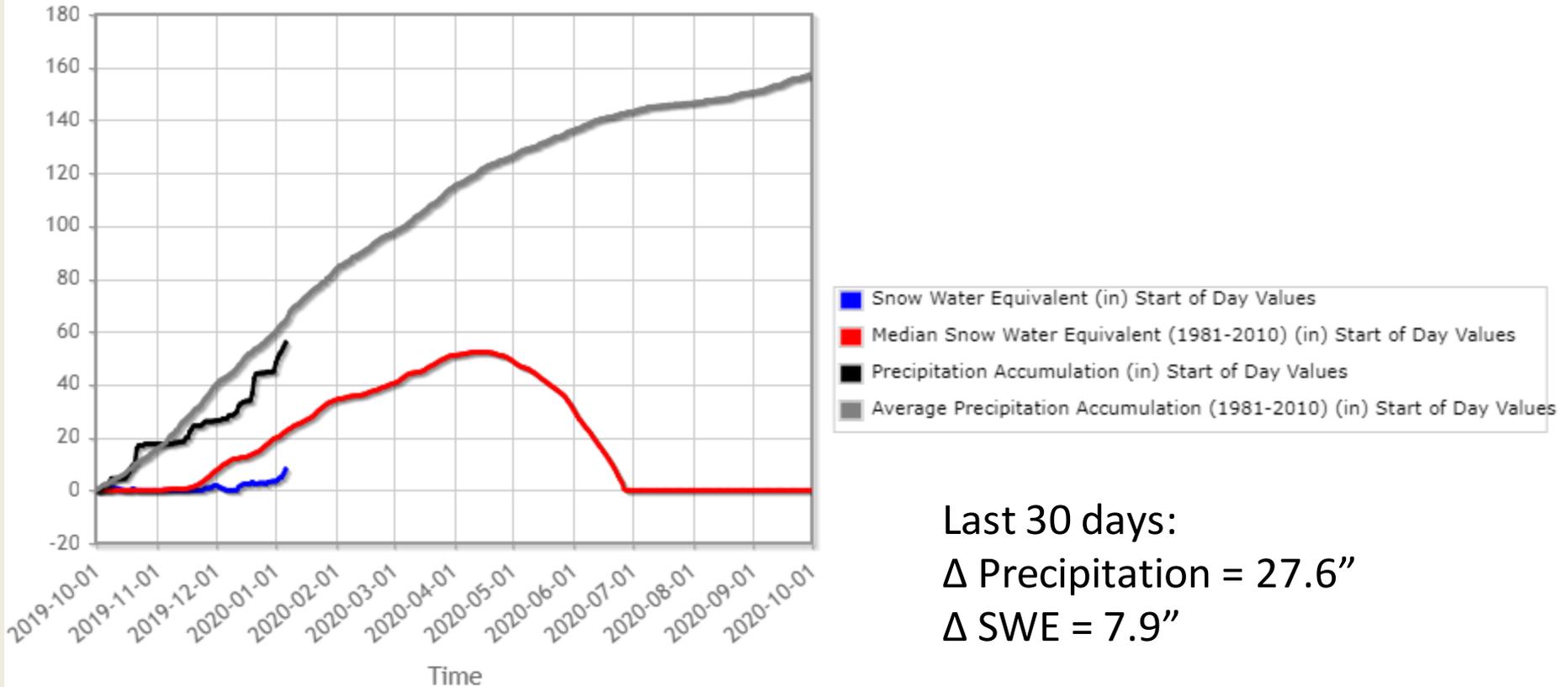
2nd Lowest



Pacific Northwest Snow Drought



Alpine Meadows (908) Washington SNOTEL Site - 3500 ft Reporting Frequency: Daily; Date Range: 2019-10-01 to 2020-10-01



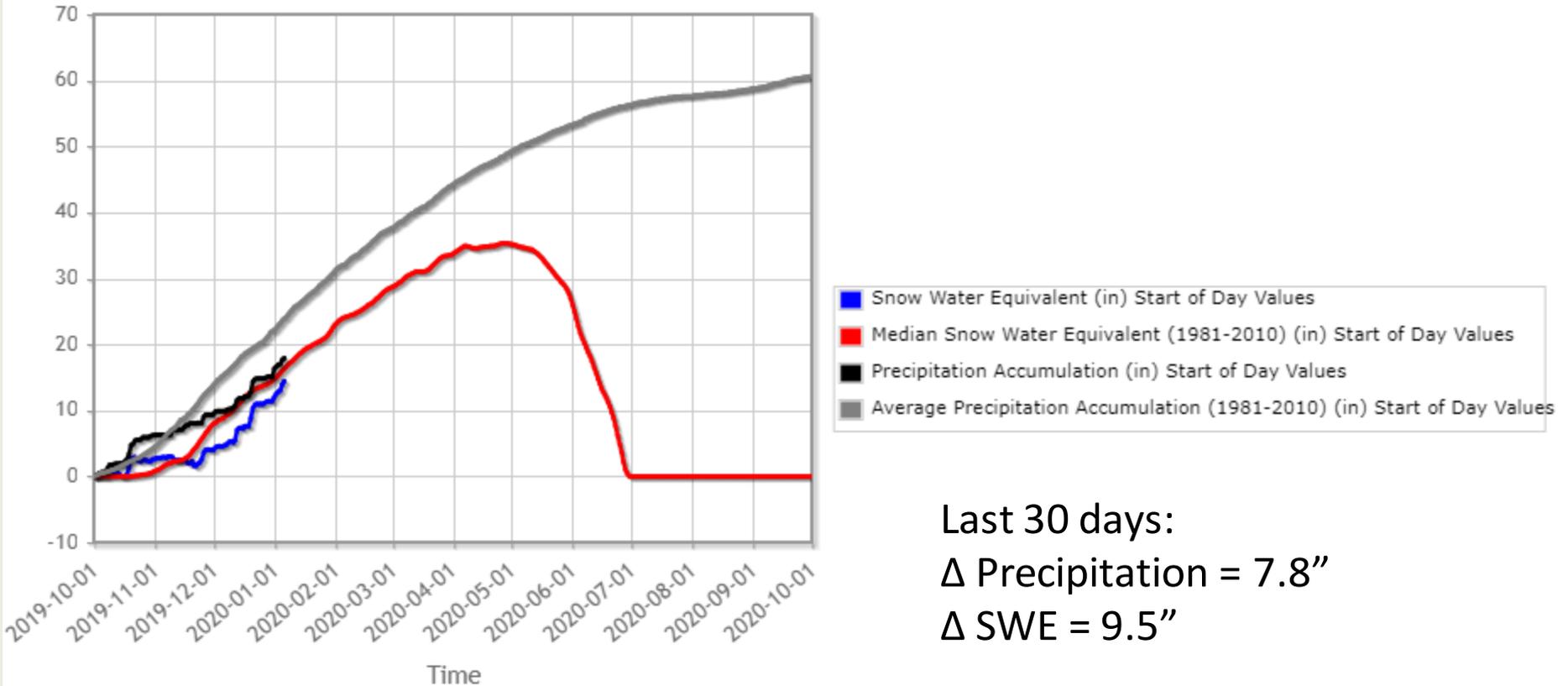
Last 30 days:
 Δ Precipitation = 27.6"
 Δ SWE = 7.9"

<https://www.wcc.nrcs.usda.gov/snow/>

Pacific Northwest Snow Drought



Corral Pass (418) Washington SNOTEL Site - 5800 ft Reporting Frequency: Daily; Date Range: 2019-10-01 to 2020-09-30



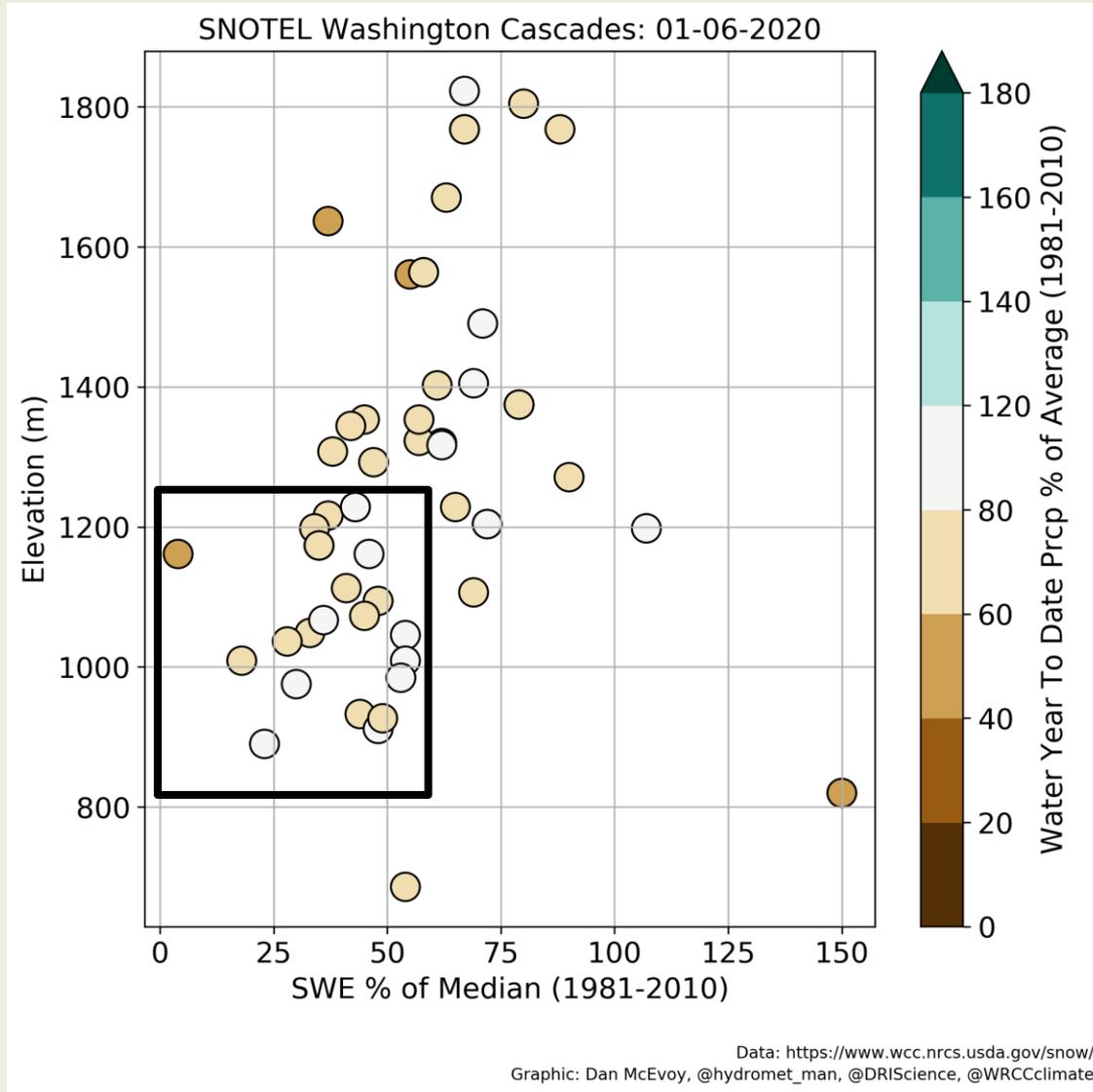
Last 30 days:

Δ Precipitation = 7.8"

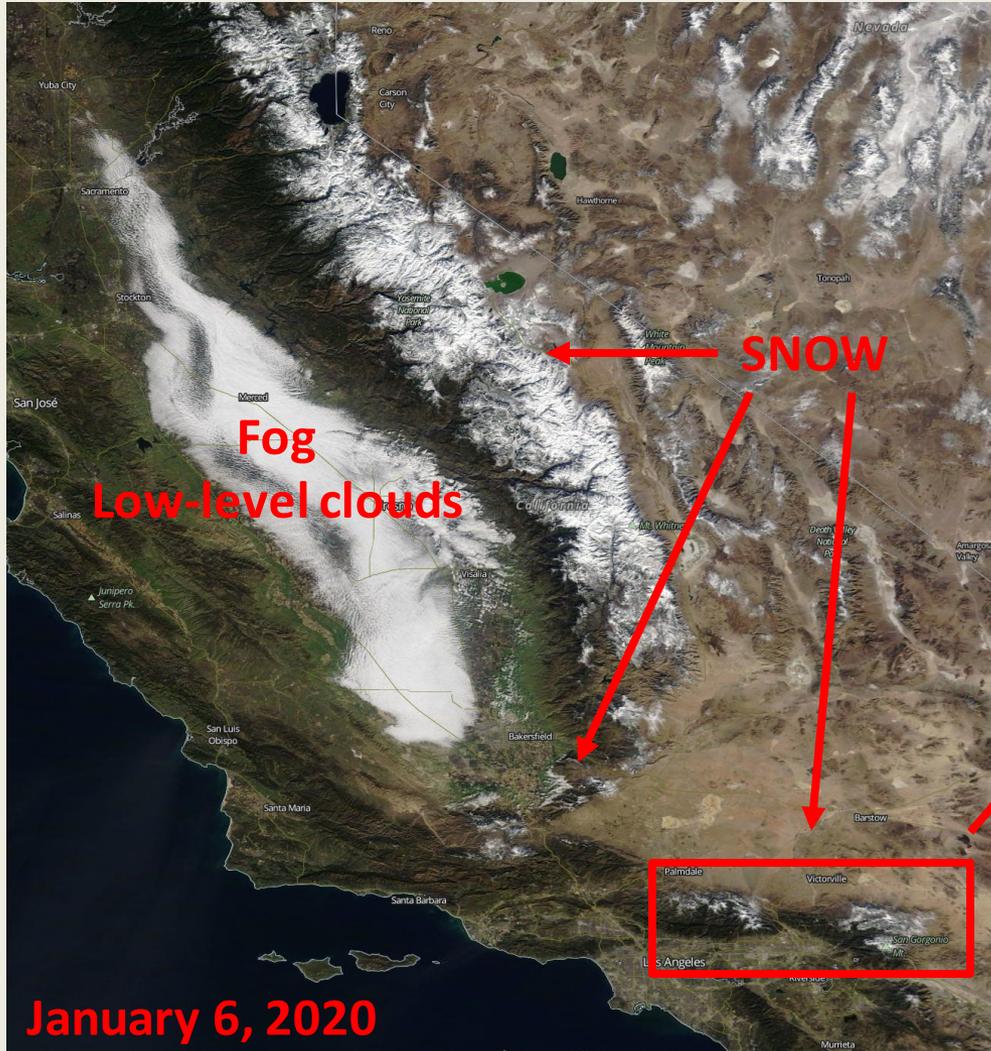
Δ SWE = 9.5"

<https://www.wcc.nrcs.usda.gov/snow/>

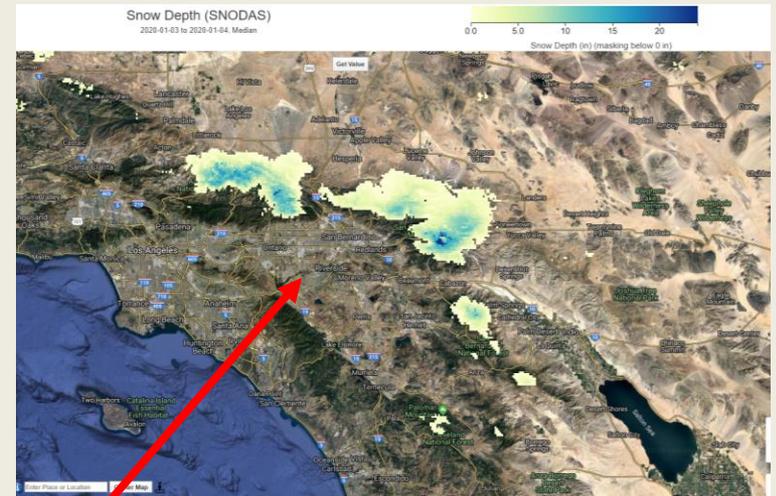
Pacific Northwest Snow Drought



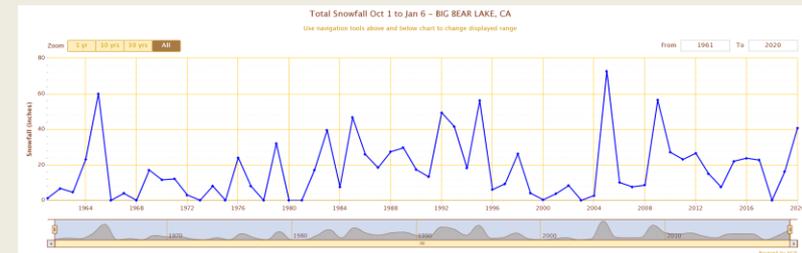
Southern California Snow



Modeled Snow Depth January 4, 2020



Big Bear Lake Snowfall Oct 1 – Jan 6



EOS Worldview: <https://worldview.earthdata.nasa.gov/>

1961 2020

Southern California Snow



Heavy rain and mountain snow caused major travel delays and road closures the week of Thanksgiving, one of the busiest travel weeks of the year



The 5 Freeway closed through the Grapevine north of Los Angeles due to snow. Nov. 28, 2019. Photo: CHP

Maximum 1-Day Total Snowfall for BIG BEAR LAKE, CA

Click column heading to sort ascending, click again to sort descending.

Rank	Value	Ending Date
1	30.5	2008-12-15
2	30.0	2019-11-29
3	29.0	2010-01-21
4	27.0	1991-03-27
5	26.0	1990-02-17
-	26.0	1979-01-31
7	24.0	1969-02-19
-	24.0	1969-02-06
9	23.0	1982-03-18
10	22.0	1964-11-18

Period of record: 1960-07-01 to 2019-12-24

<http://scacis.rcc-acis.org/>

ENSO Status September 9, 2019



- ENSO-neutral conditions are present.*
- Equatorial sea surface temperatures (SSTs) are near-to-above average across the Pacific Ocean.
- The pattern of anomalous convection is generally consistent with ENSO-neutral.
- ENSO-neutral is favored during the Northern Hemisphere winter 2019-20 (70% chance), continuing through spring 2020 (~65% chance).*

Credit: CPC

* Note: These statements are updated once a month (2nd Thursday) in association with the ENSO Diagnostics Discussion, which can be found here:

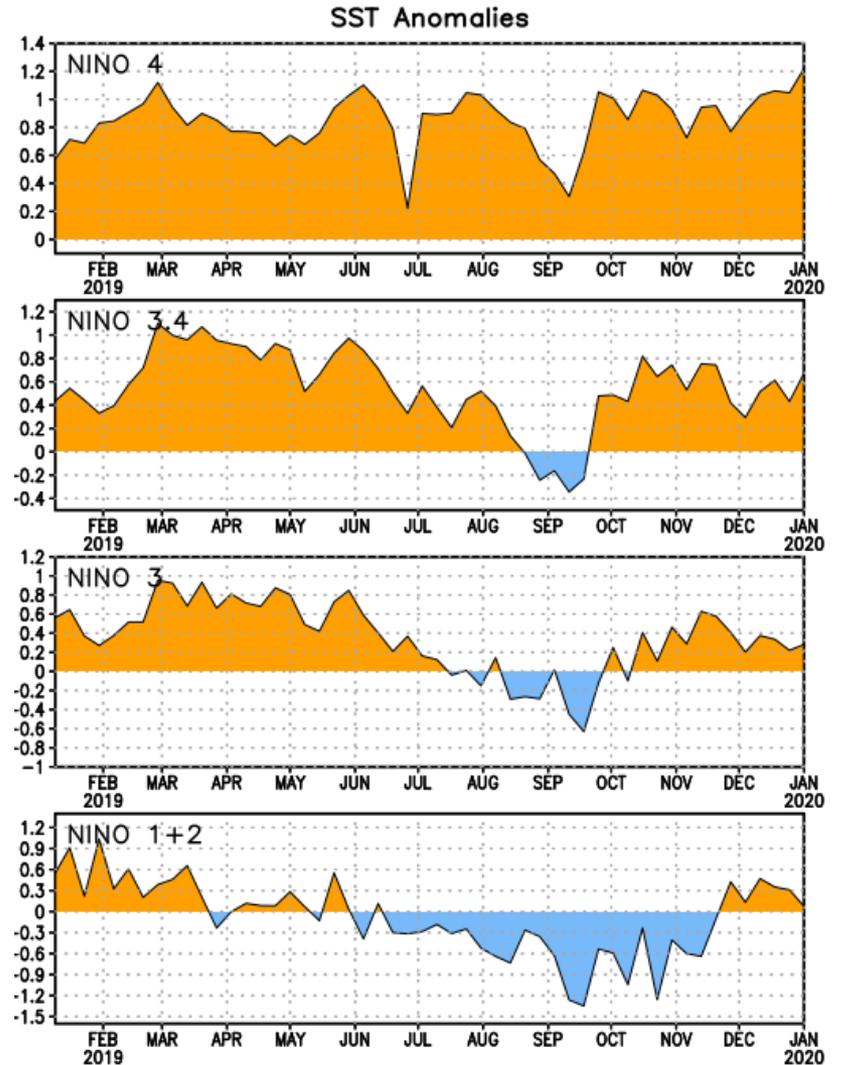
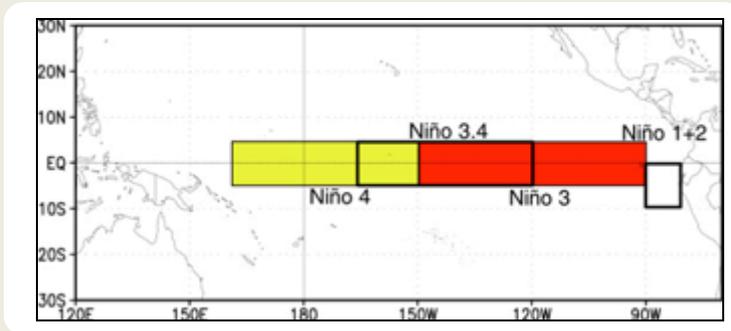
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/.

Niño Region SST Departures (°C) Recent Evolution

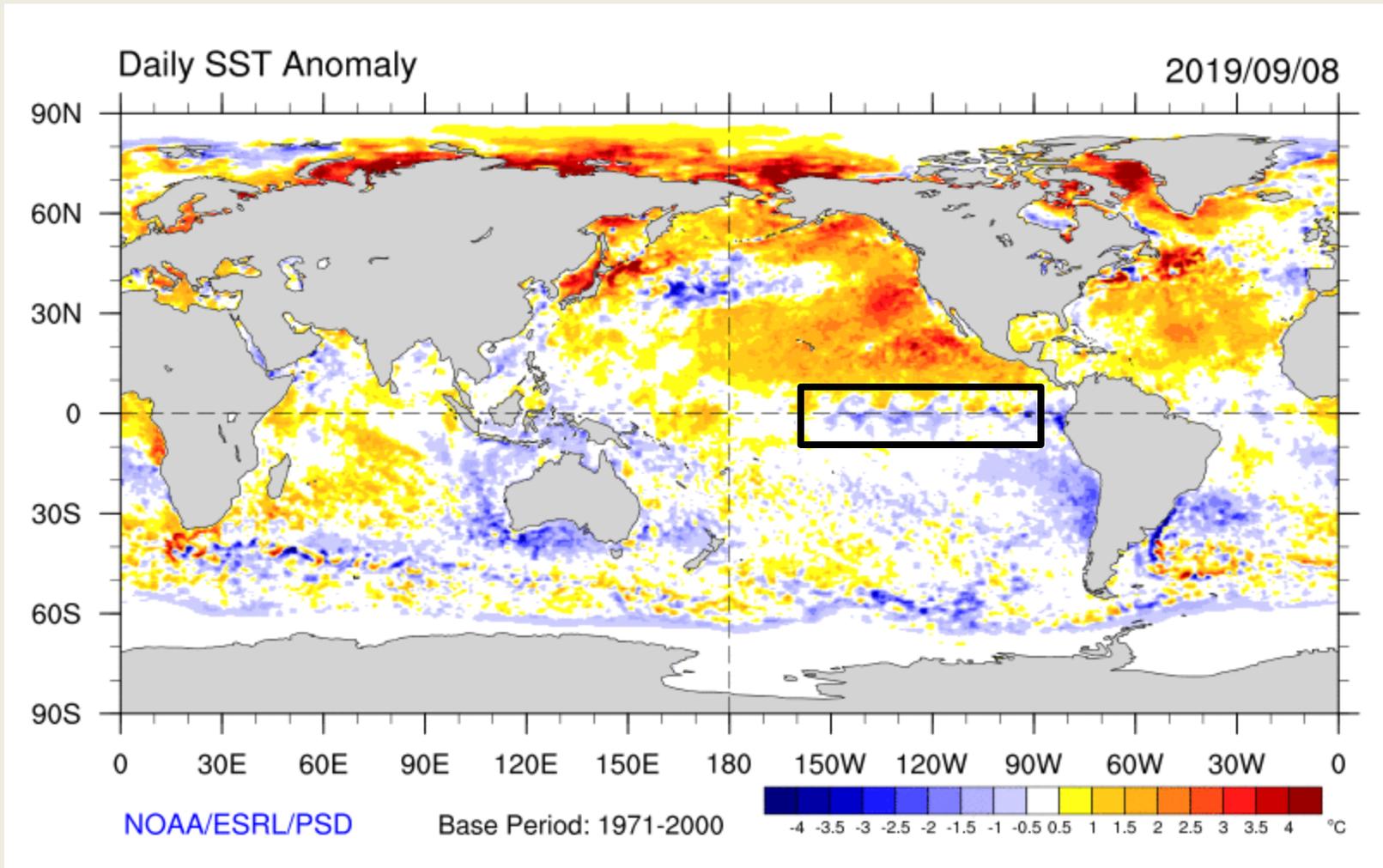


The latest weekly SST departures are:

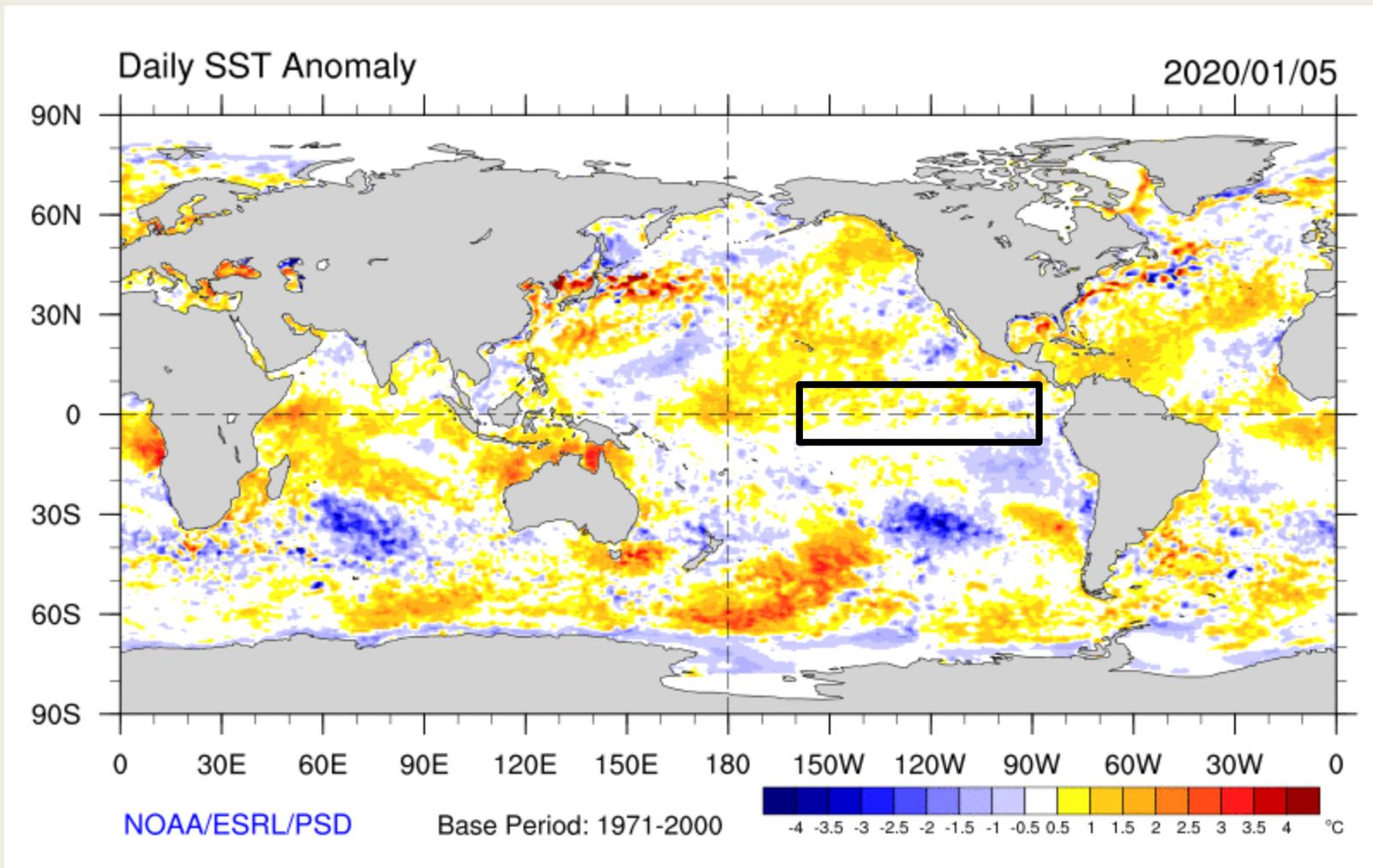
Niño 4	1.2°C
Niño 3.4	0.7°C
Niño 3	0.3°C
Niño 1+2	0.1°C



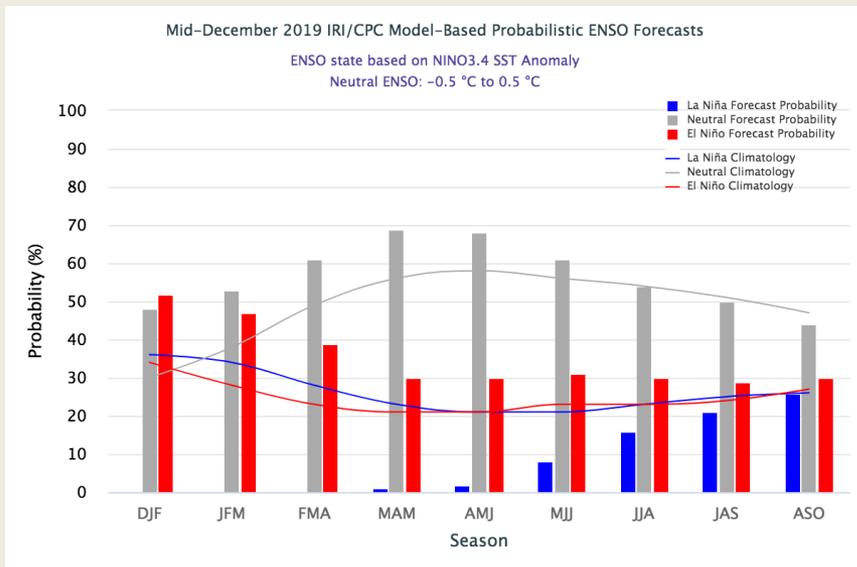
Sea Surface Temperatures – 2019/09/08



Current Sea Surface Temperatures

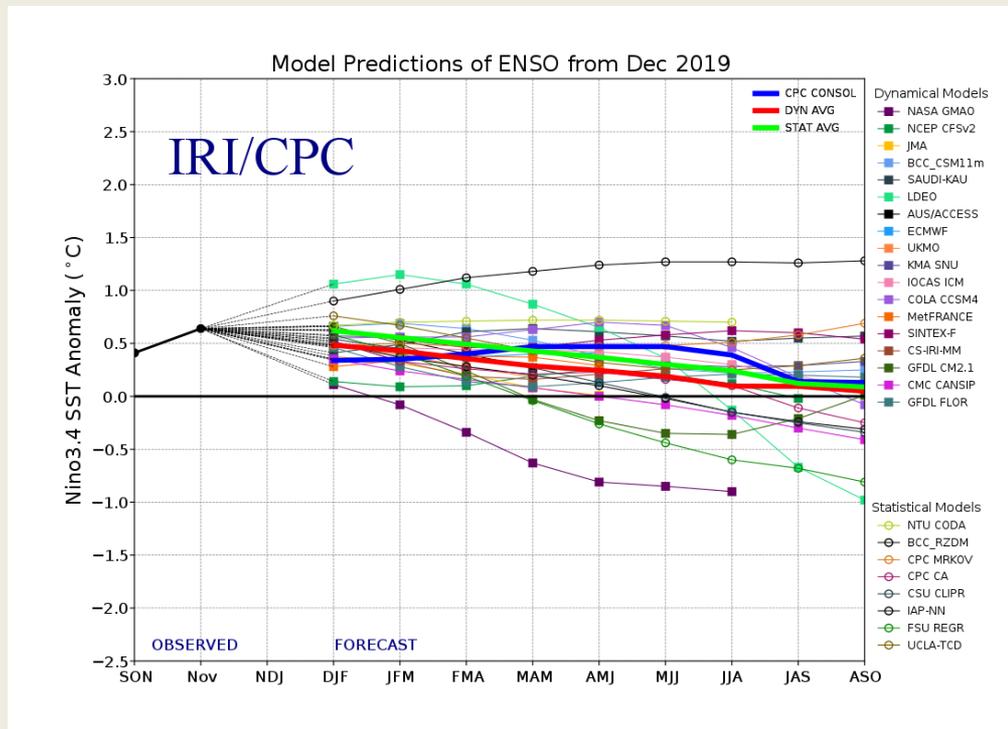


ENSO Forecasts



CPC/IRI El Niño forecast:

NMME models + other dynamical models + statistical models

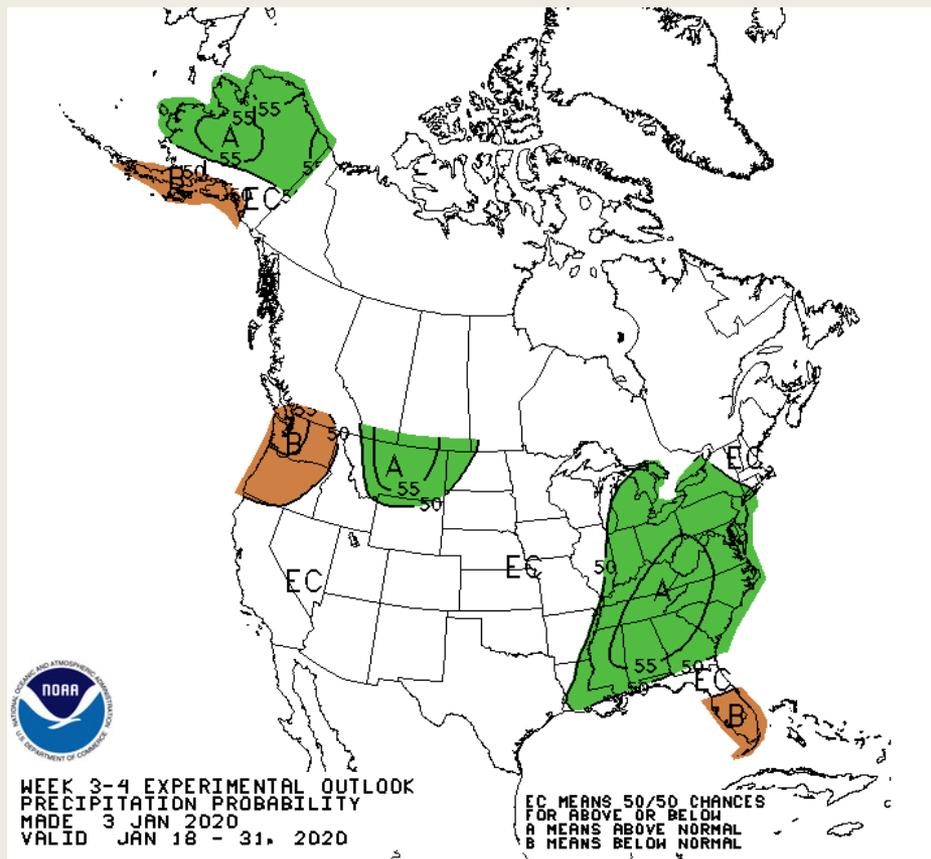
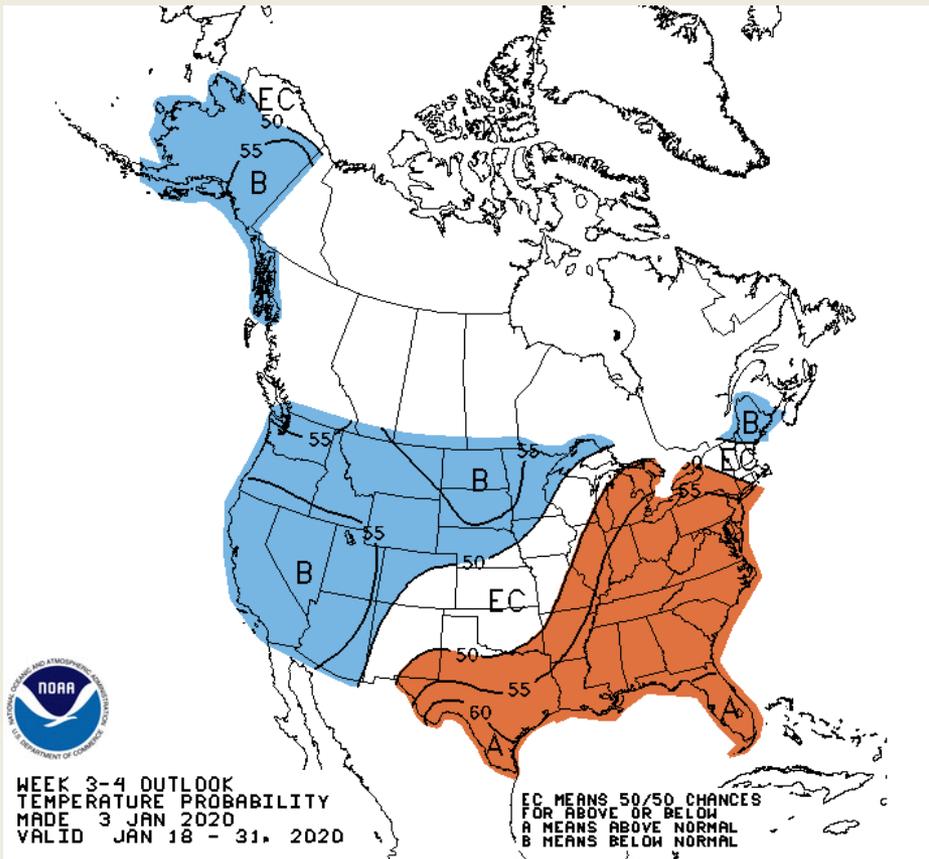


January 18-31 U.S. Forecasts



Temperature Probability

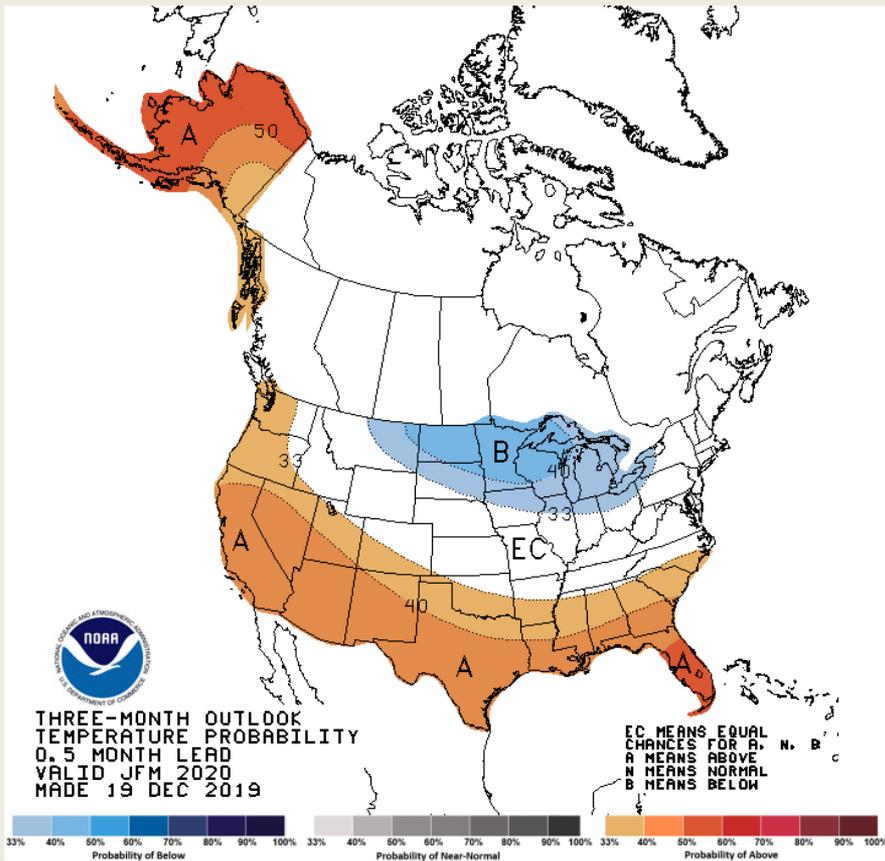
Precipitation Probability



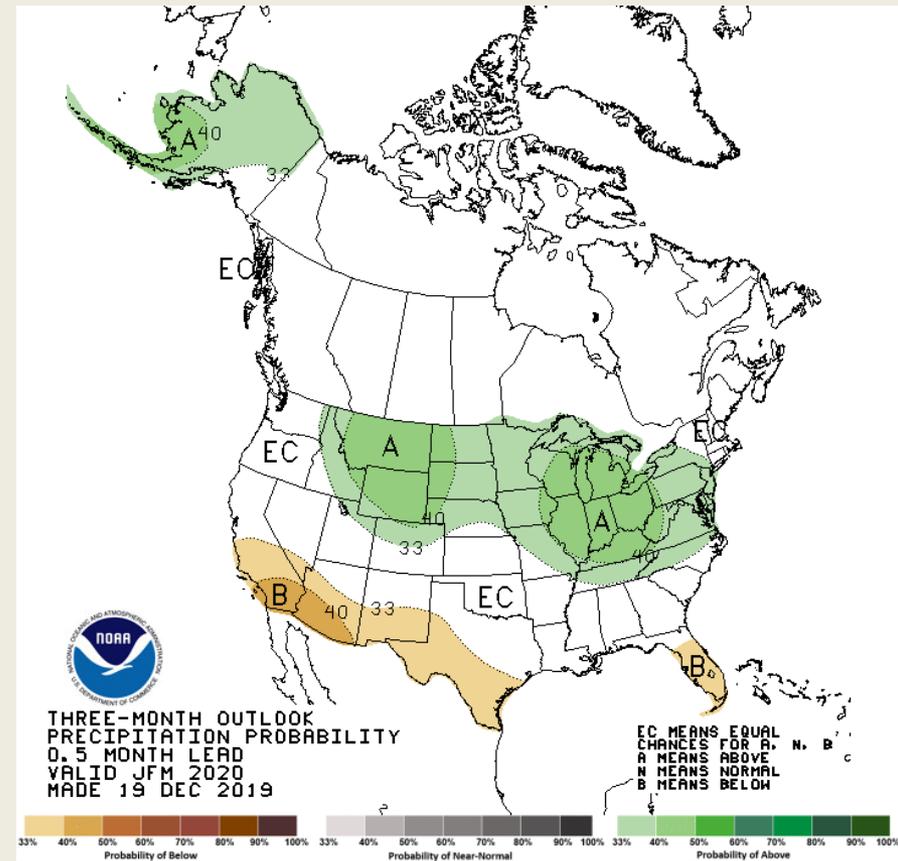
January-March Forecasts



Temperature Probability



Precipitation Probability

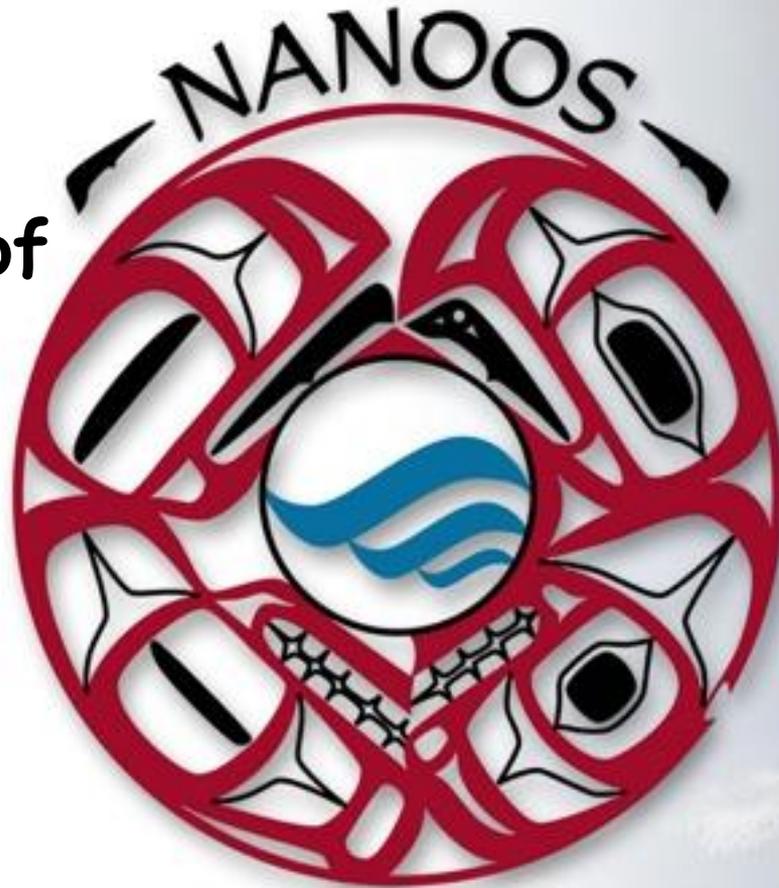


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**Northwest
Association of
Networked
Ocean
Observing
Systems**



**NOAA West Watch Update 7 January 2020:
Washington / Oregon Observations**

*Beth Curry, APL-UW Physical Oceanographer
on behalf of*

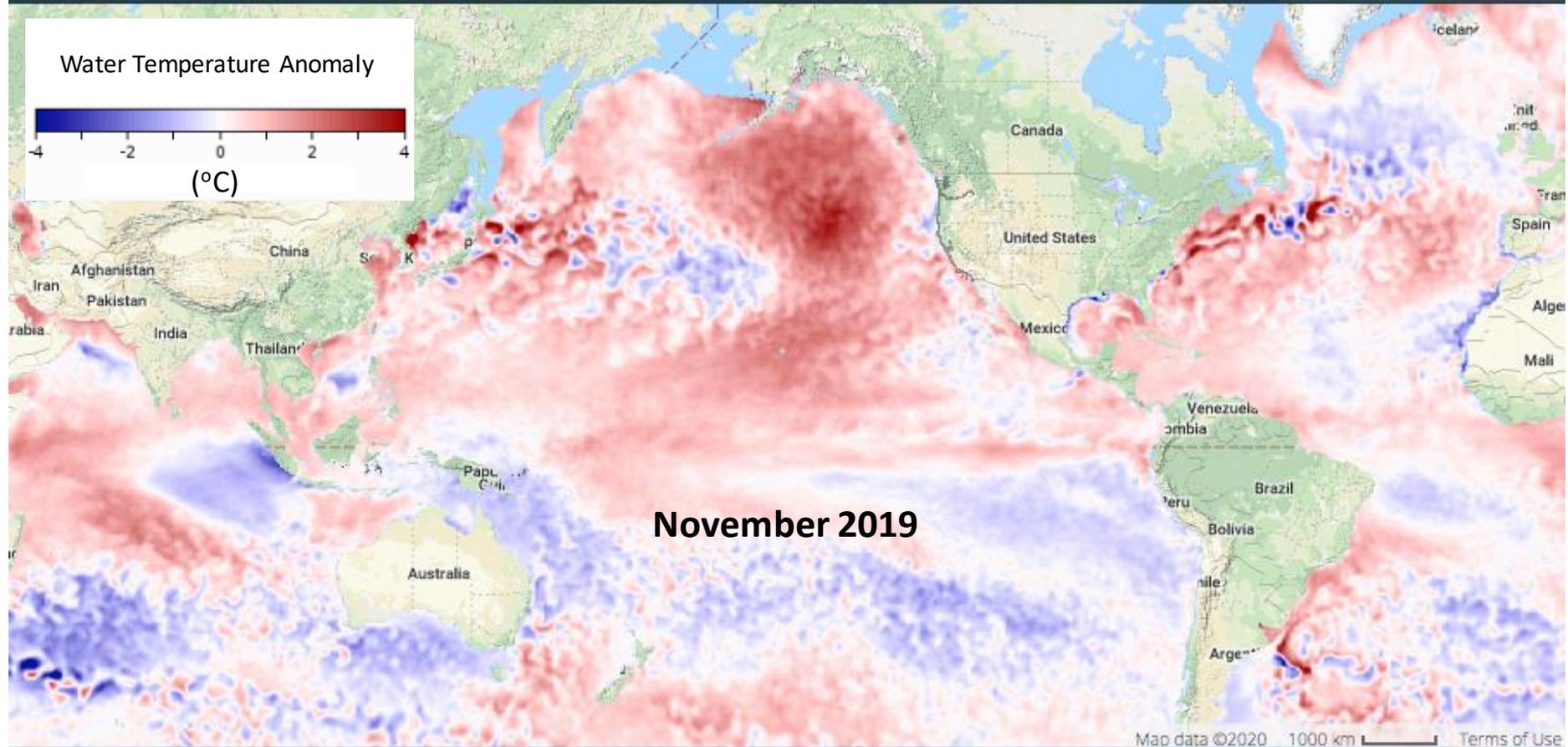
Jan Newton, NANOOS Executive Director

www.nanoos.org

NVS CLIMATOLOGY Log In More ▾ 

Map Overview

Terrain Map 

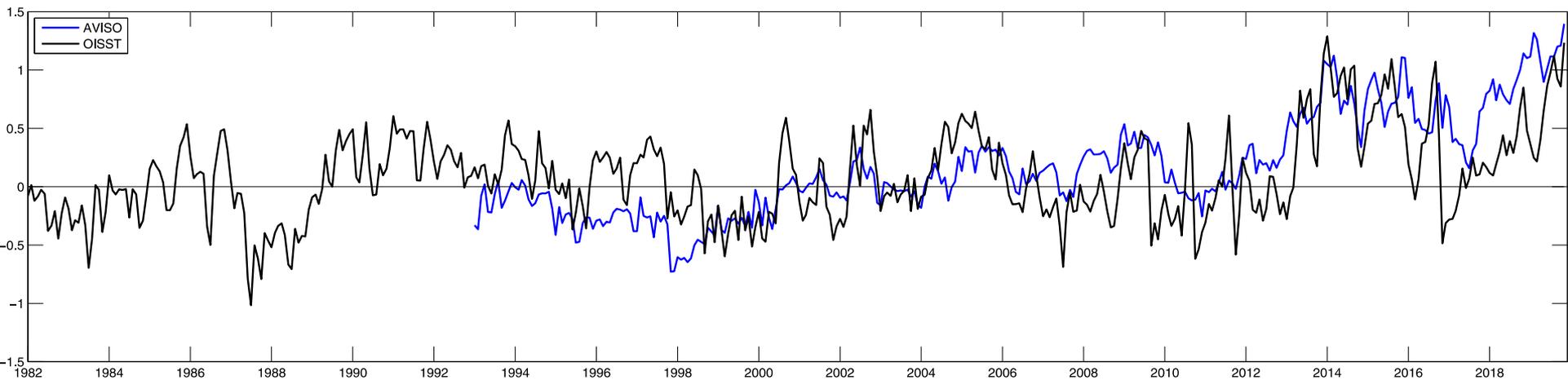


15 November 2019 3:59 pm PST 

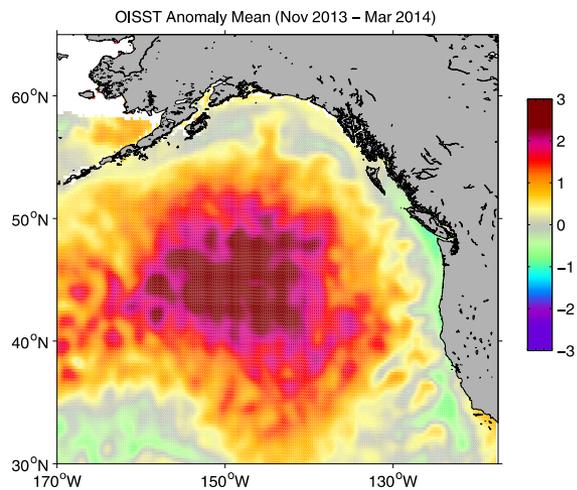
2016 2017 2018 2019 2020

D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M

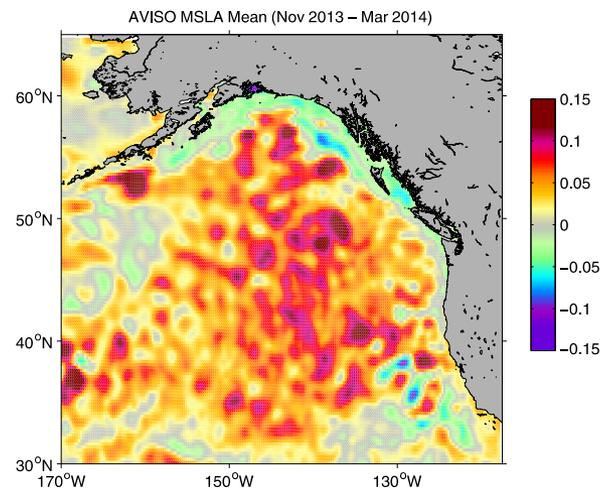
'Blob' Indices



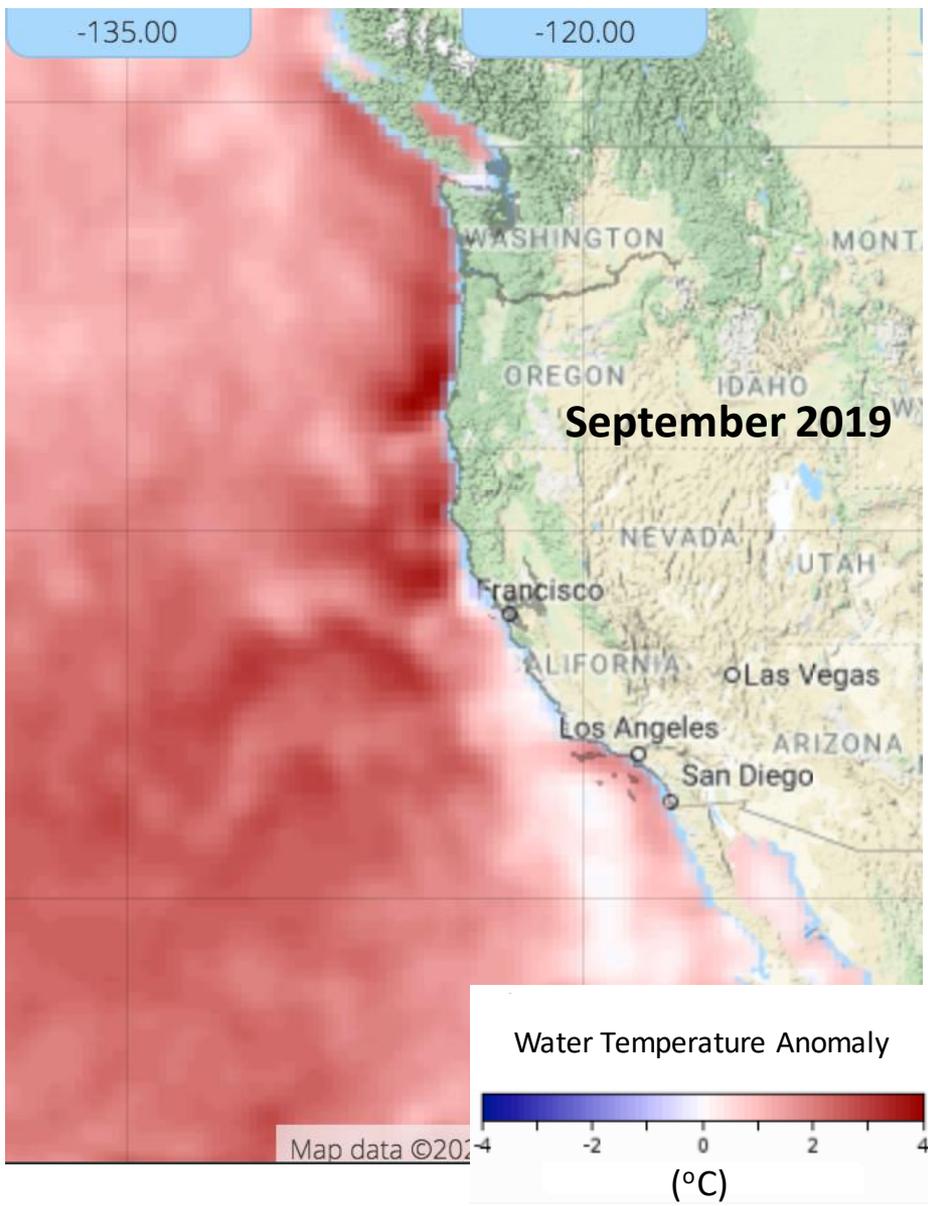
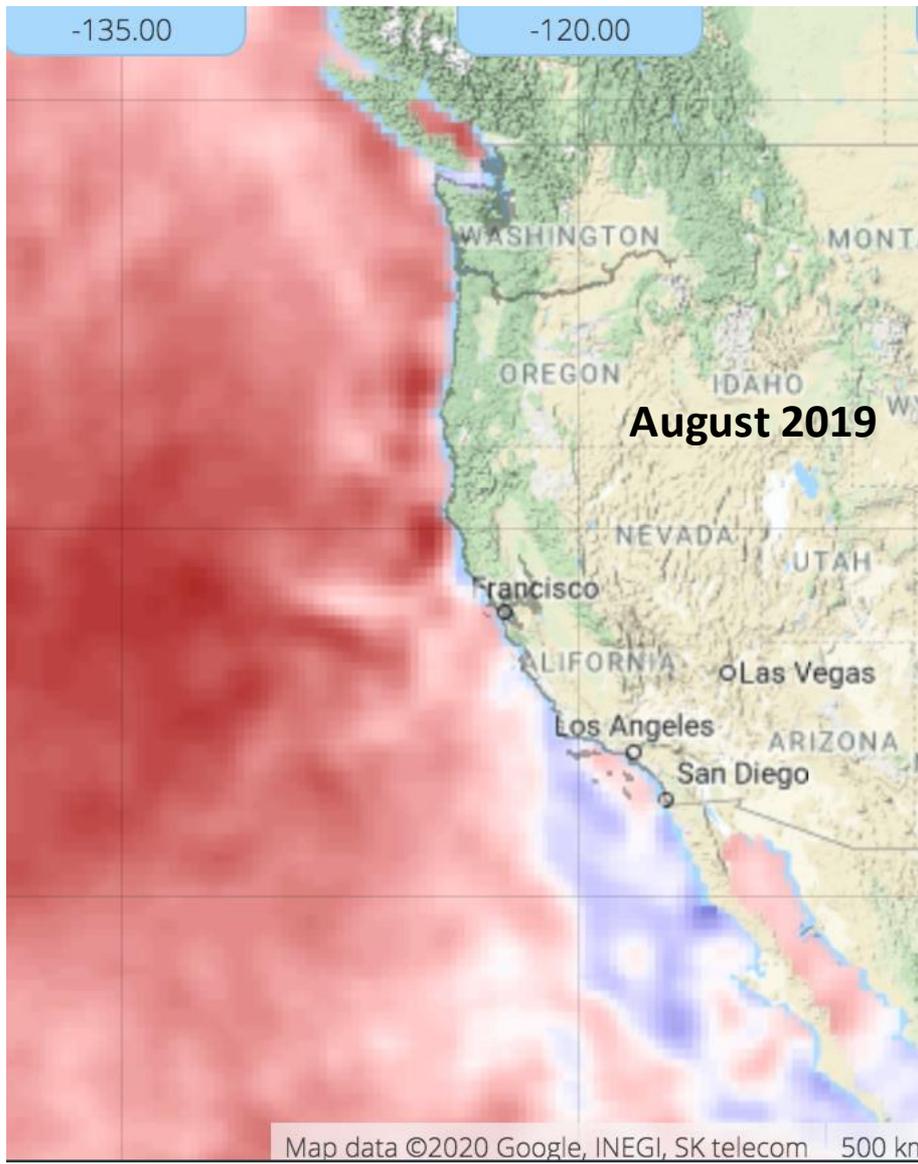
SST anomaly



MSL anomaly

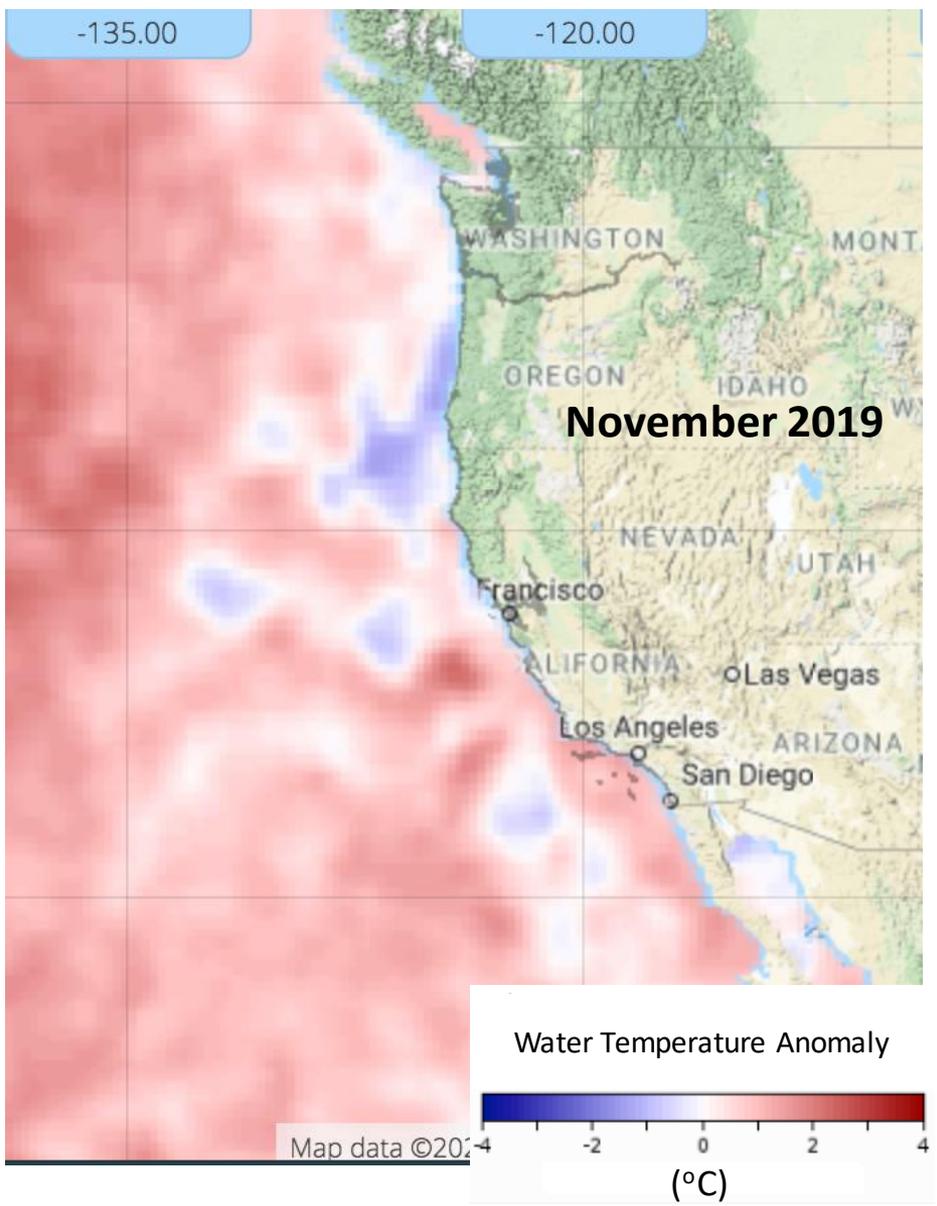
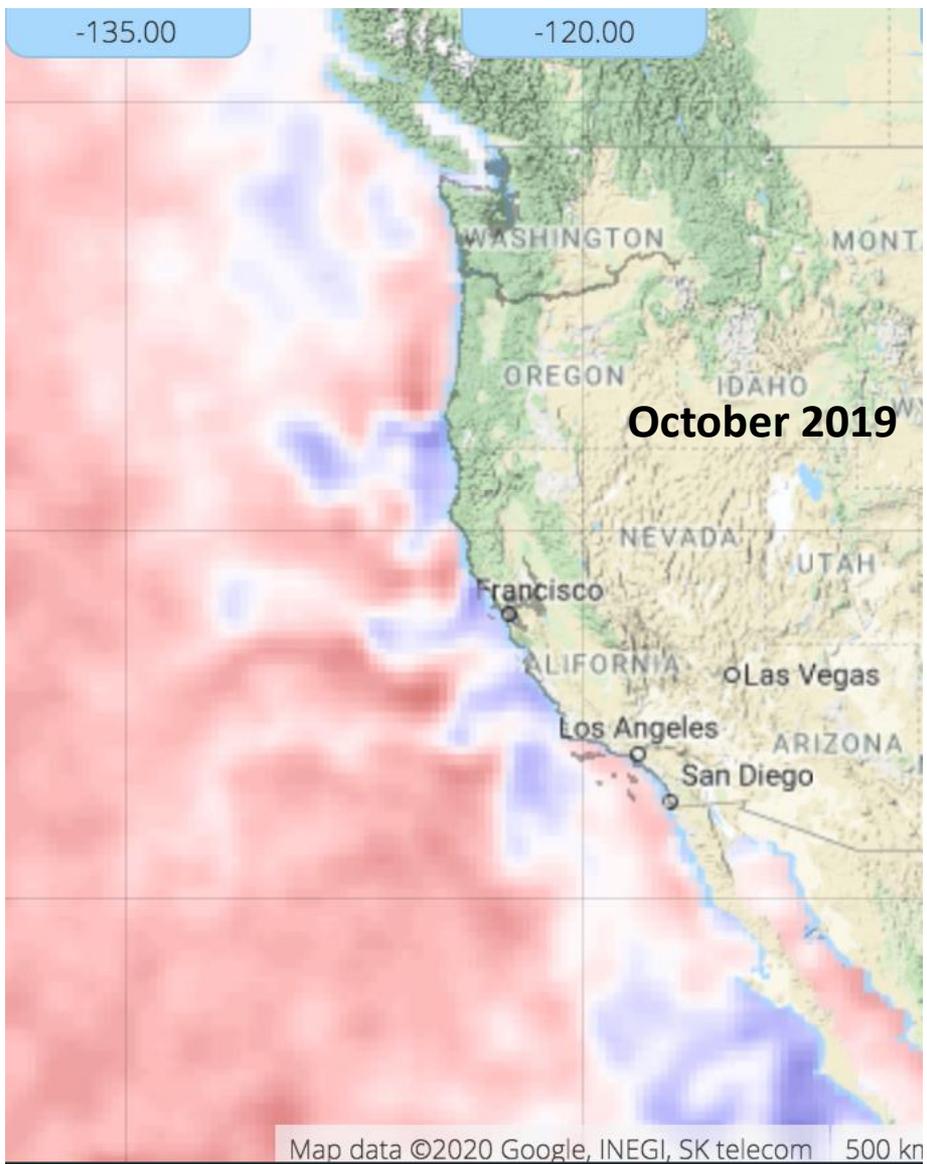


Sea Surface Temperature Anomaly NCEI Optimum Interpolation SST



NANOOS: www.nanoos.org Climatology app

Sea Surface Temperature Anomaly NCEI Optimum Interpolation SST



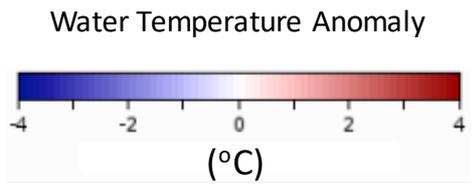
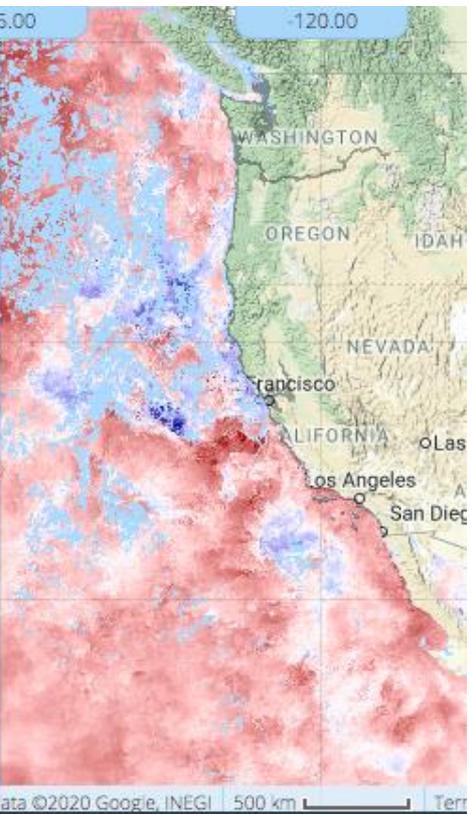
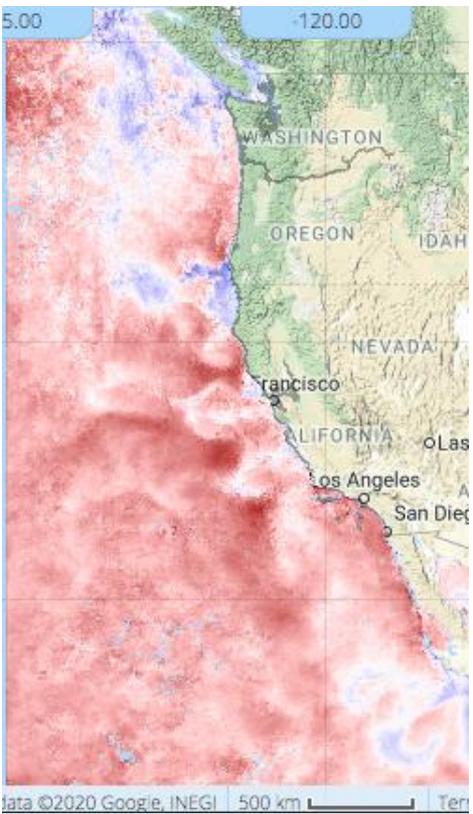
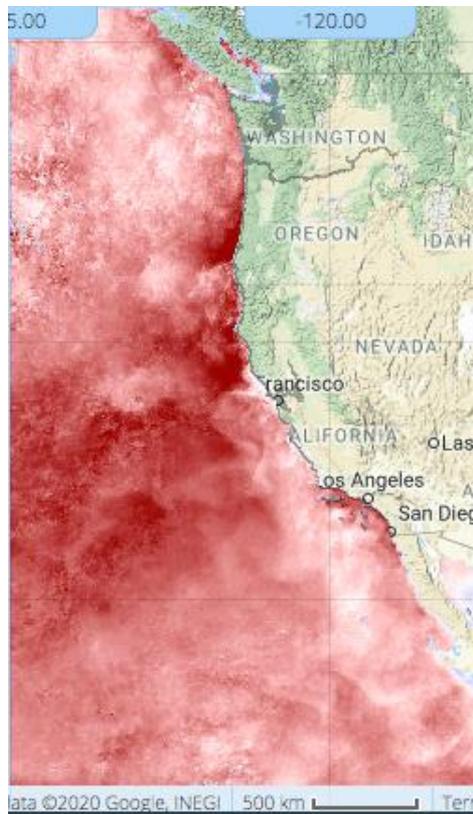
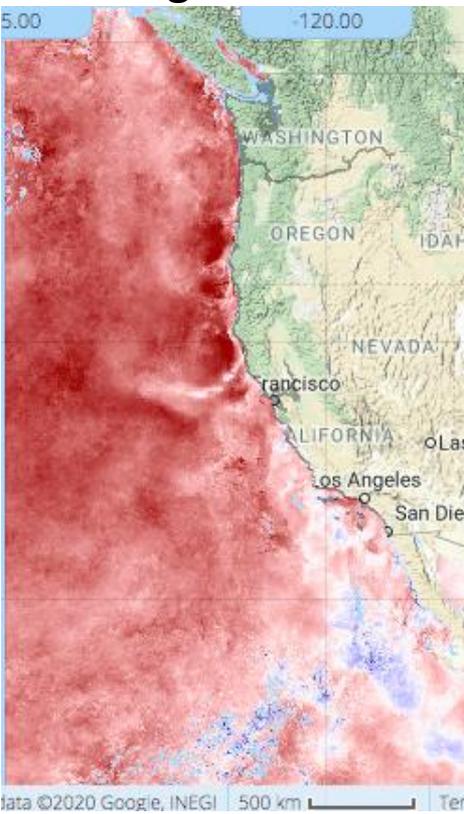
Sea Surface Temperature Anomaly OSU Modis

August 2019

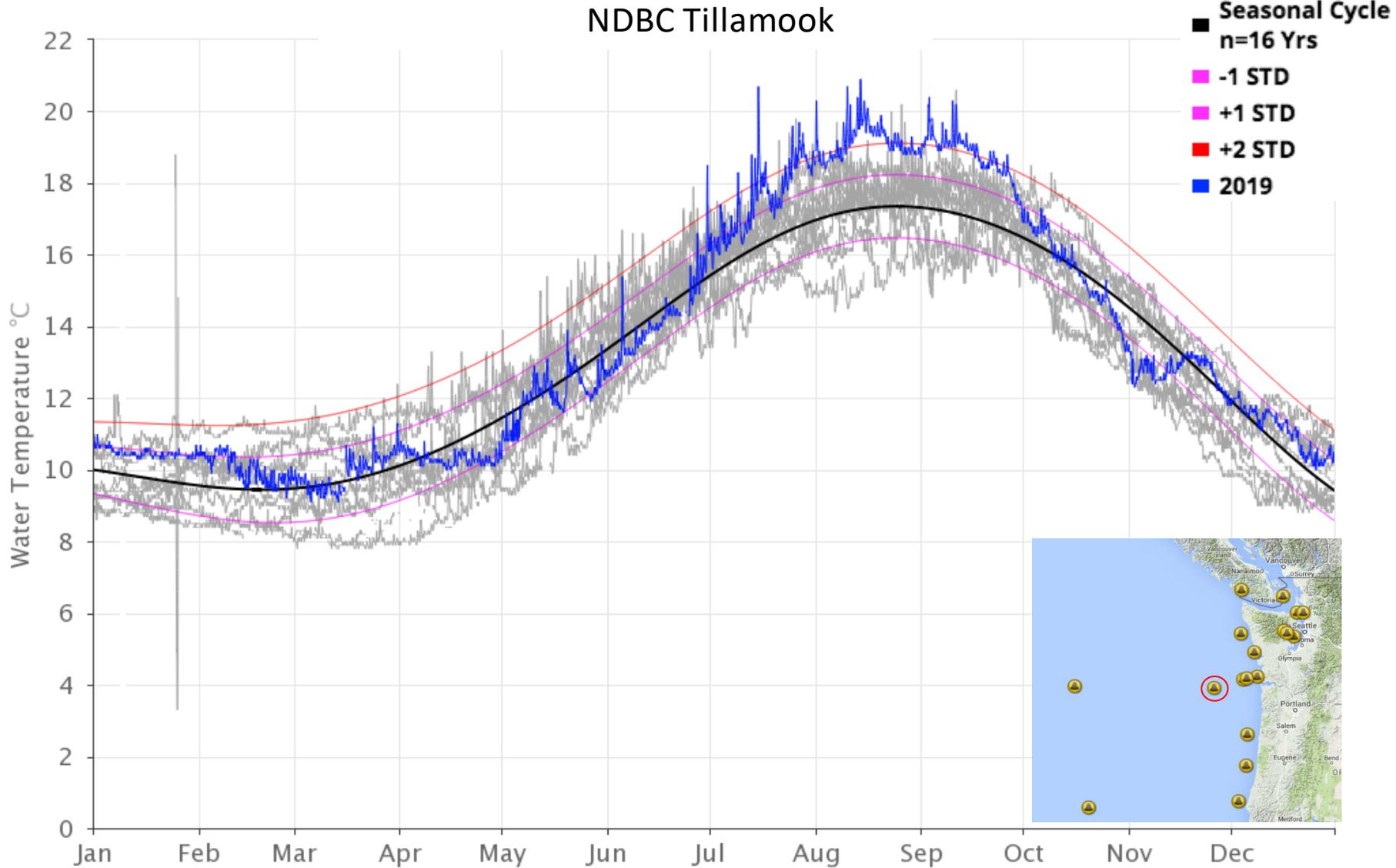
September 2019

October 2019

November 2019

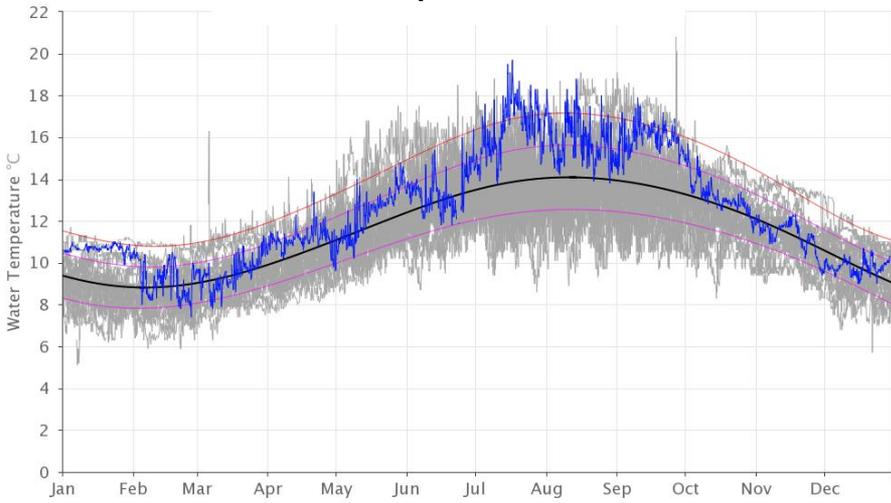


Sea Surface Temperature

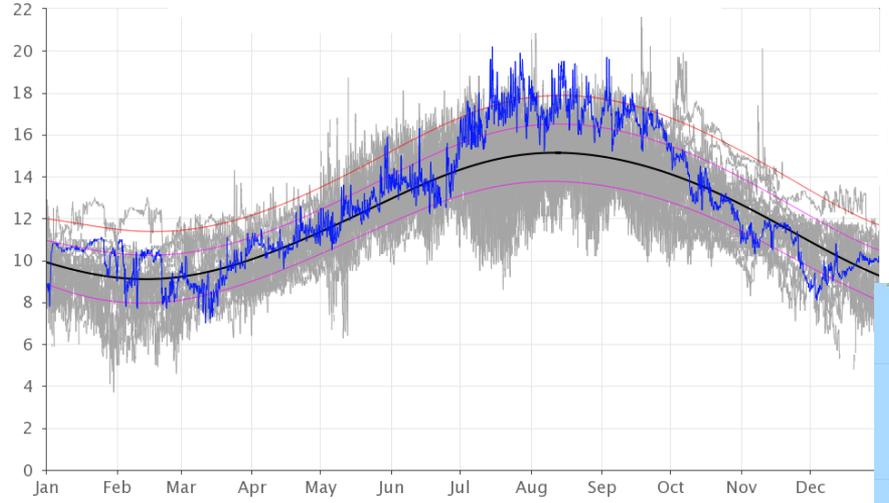


Sea Surface Temperature

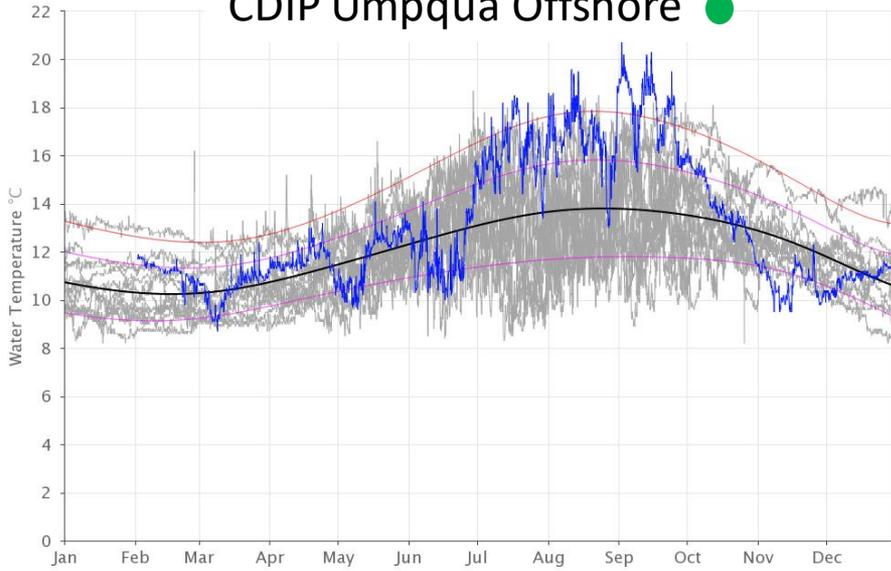
NDBC Cape Elizabeth ●



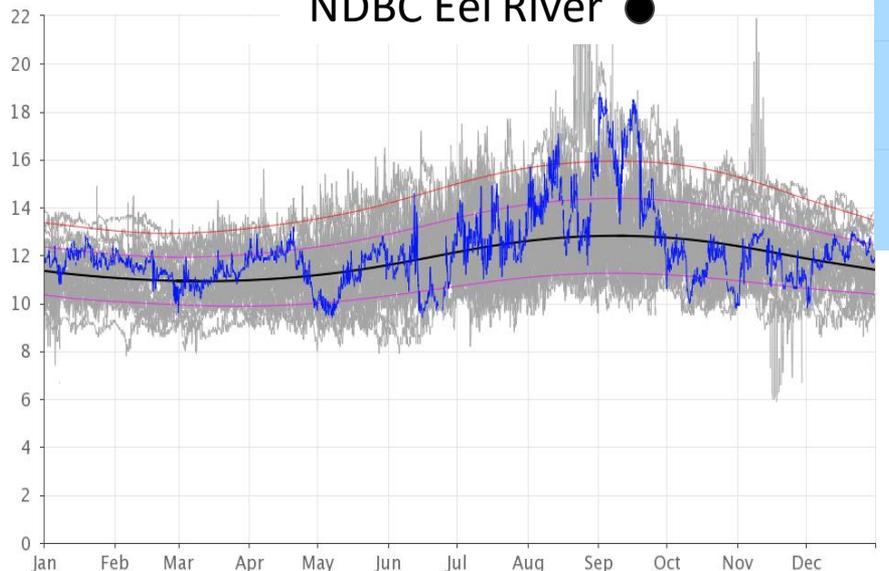
NDBC Columbia River Bar ●



CDIP Umpqua Offshore ●



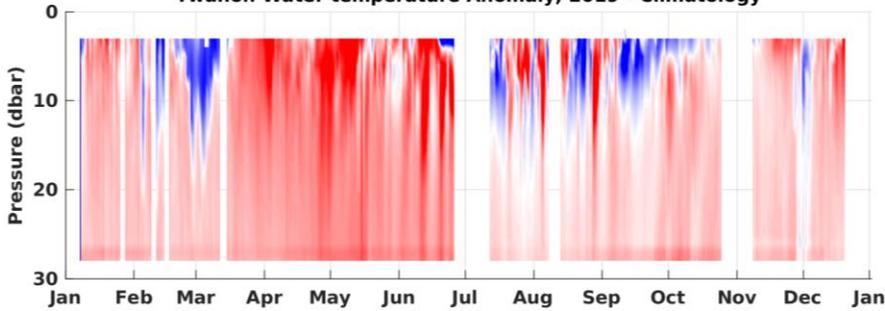
NDBC Eel River ●



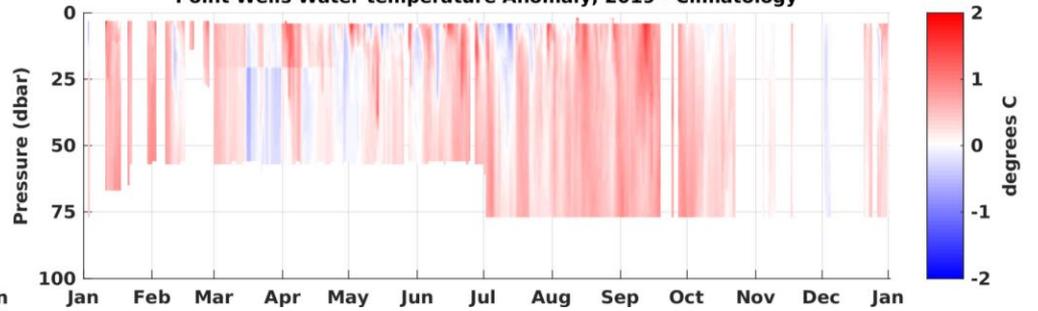
- -1 STD
- +1 STD
- +2 STD
- 2019



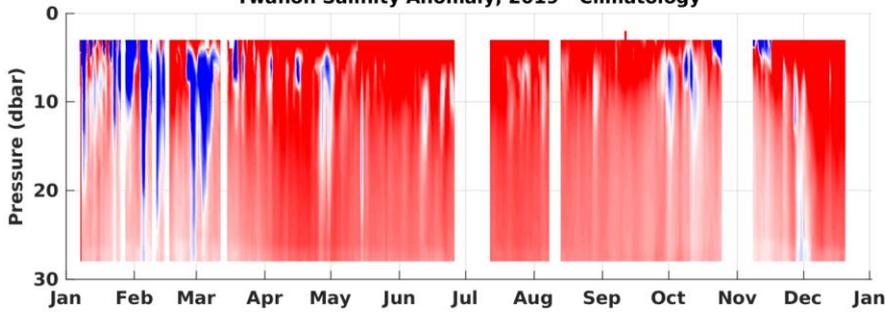
Twanoh Water temperature Anomaly, 2019 - Climatology



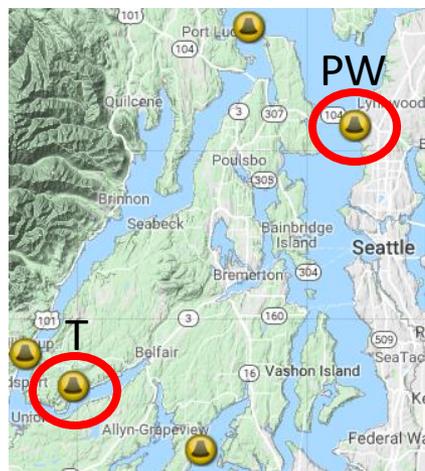
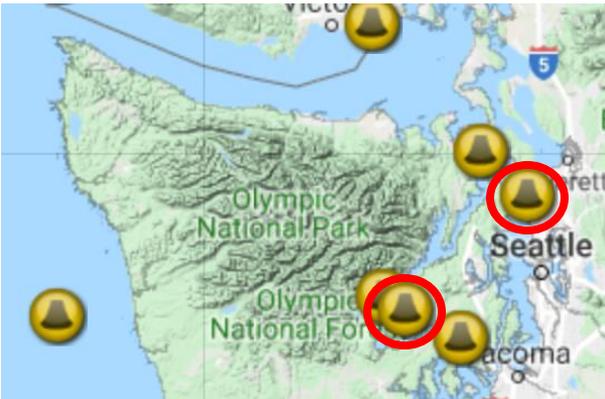
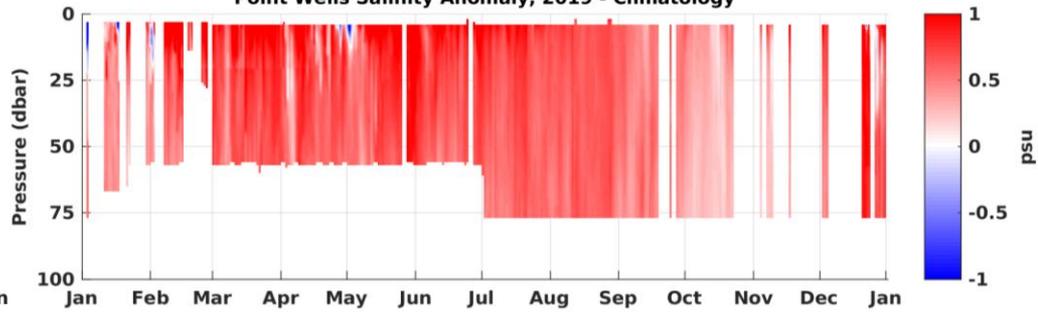
Point Wells Water temperature Anomaly, 2019 - Climatology



Twanoh Salinity Anomaly, 2019 - Climatology



Point Wells Salinity Anomaly, 2019 - Climatology



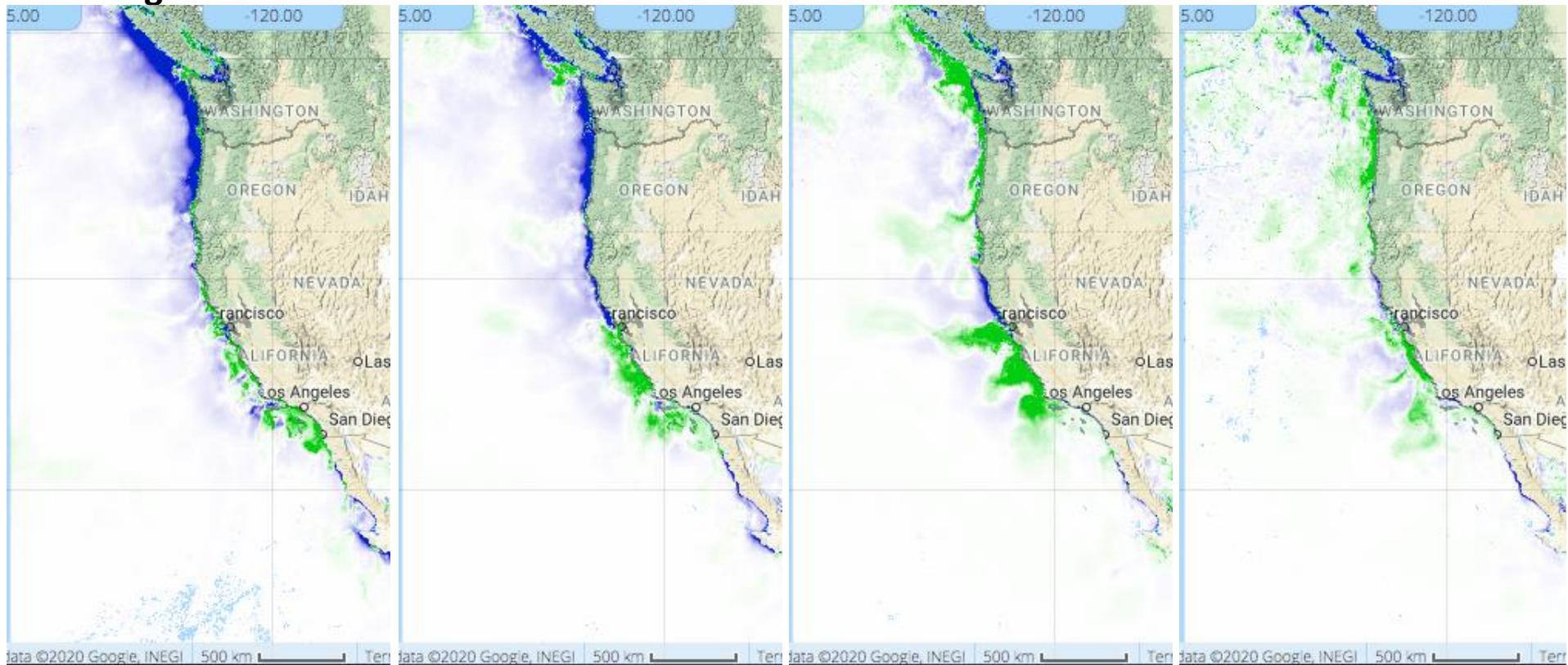
Chlorophyll Anomaly OSU Modis

August 2019

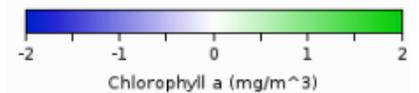
September 2019

October 2019

November 2019



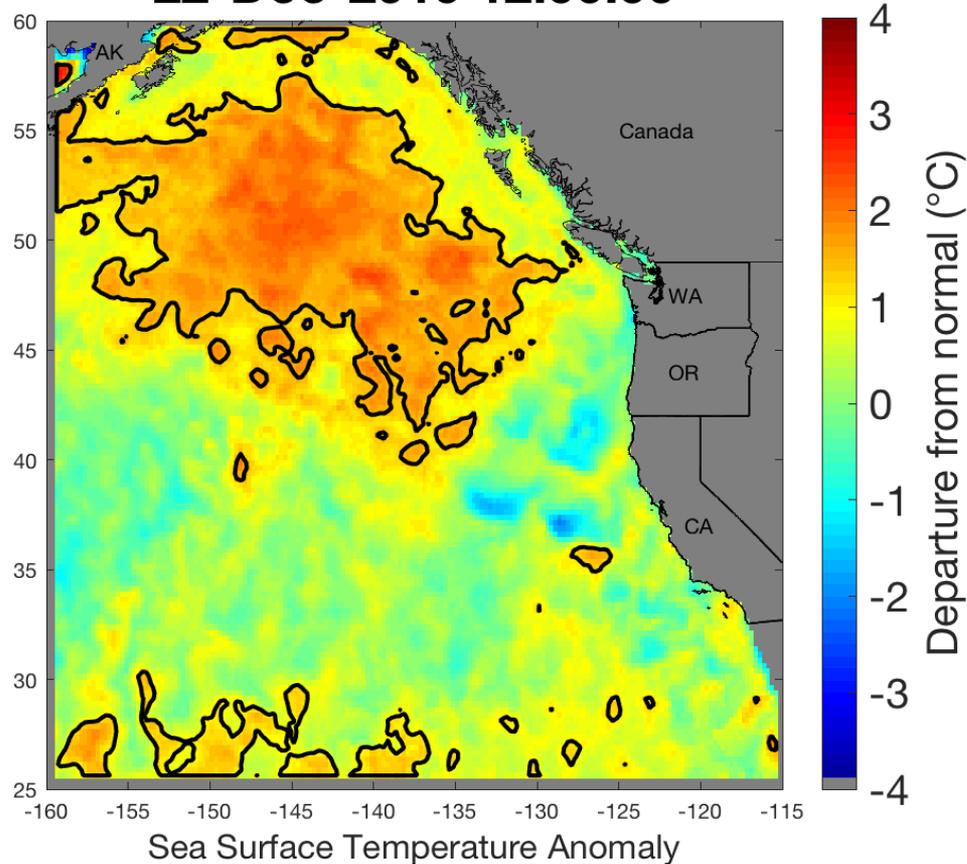
Chlorophyll



NOAA West Watch Update

January 2020

22-Dec-2019 12:00:00



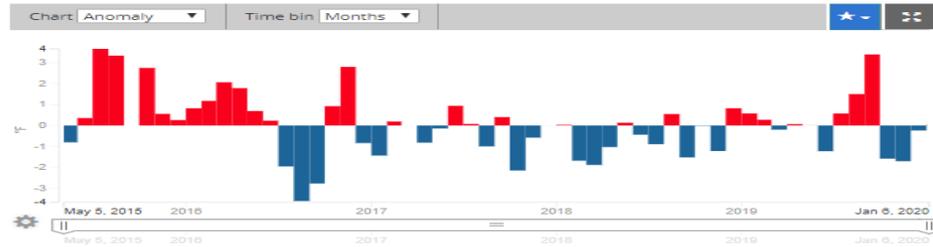
CENTRAL & NORTHERN
**CALIFORNIA OCEAN
OBSERVING SYSTEM**

CeNCOOS Climatology

NOAA National Data Buoy Center (NDBC)

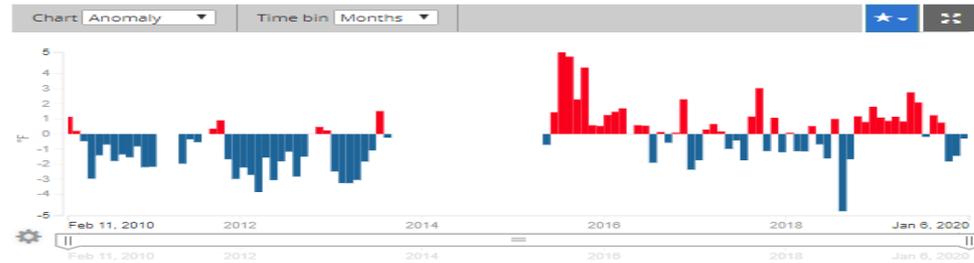
46022 - EEL RIVER - 17NM WSW of Eureka, CA

Water Temperature



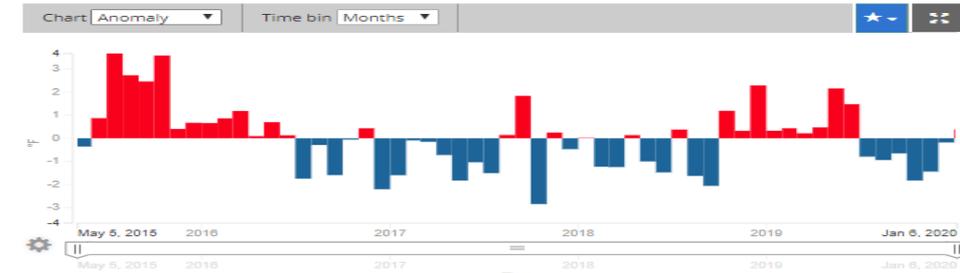
San Francisco - 18 NM West of San Francisco, CA (46026)

Water Temperature



Monterey Bay Aquarium Research Institute (MBARI)

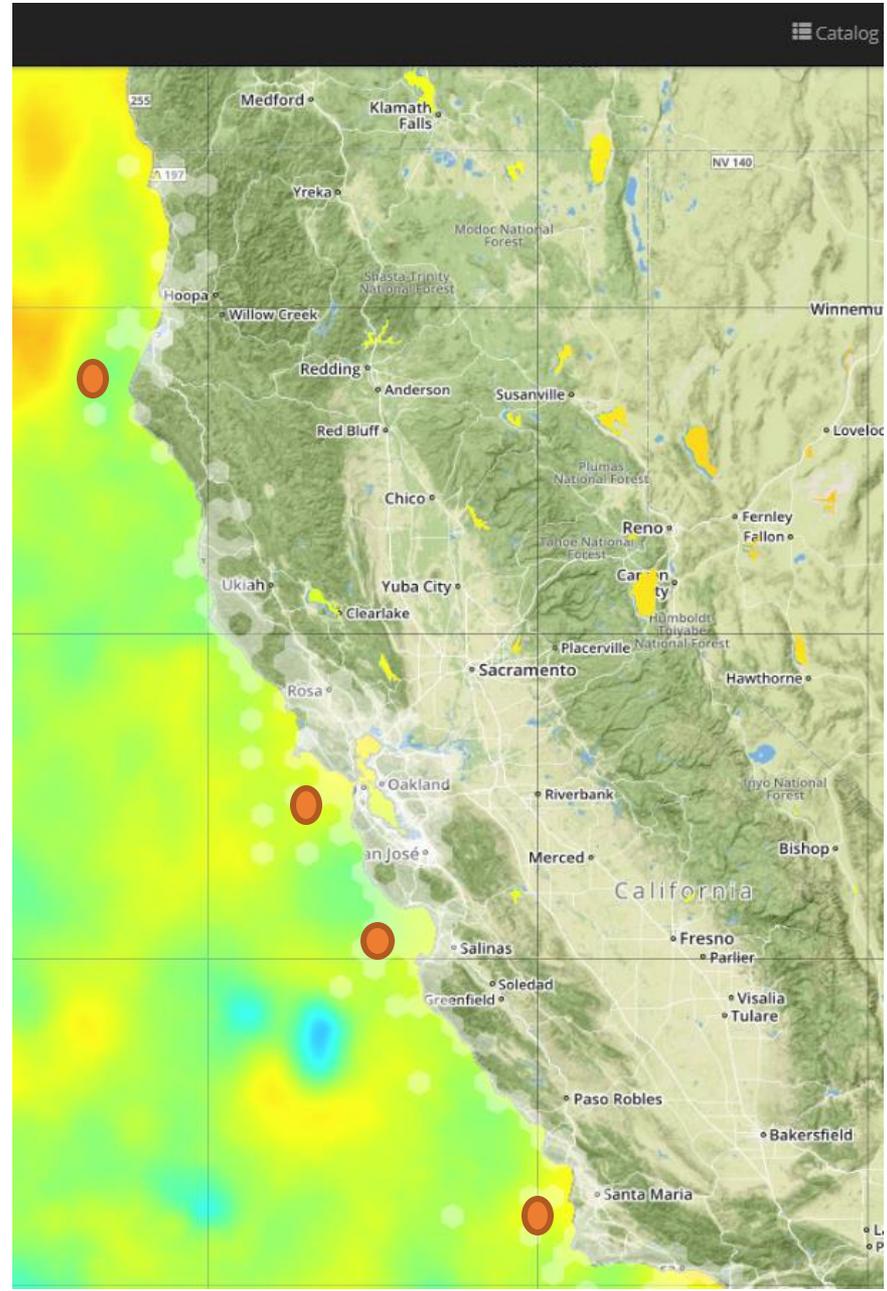
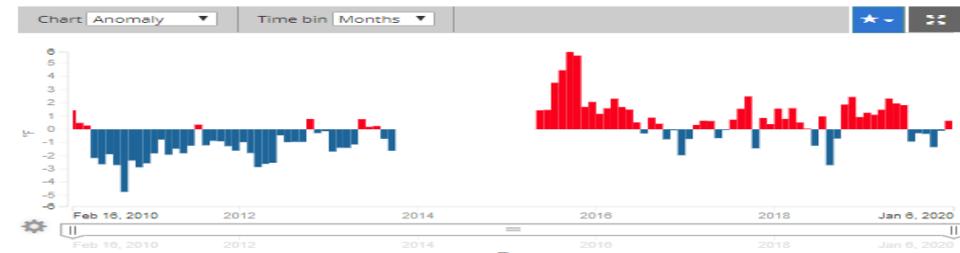
M1



NOAA National Data Buoy Center (NDBC)

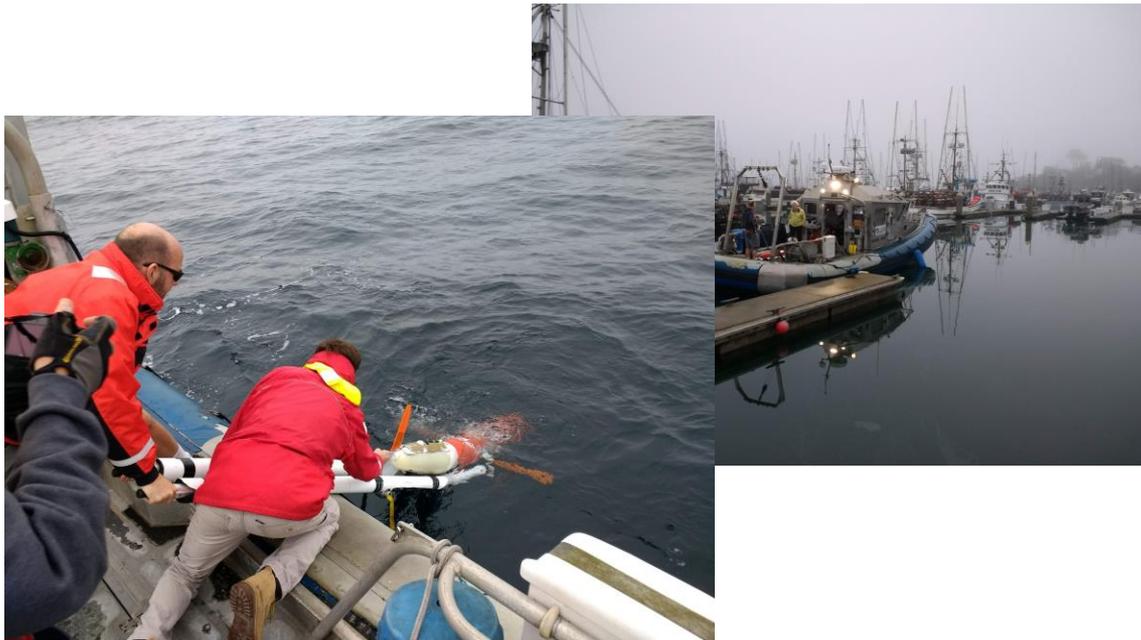
Santa Maria - 21 NM NW of Point Arguello, CA (46011)

Water Temperature

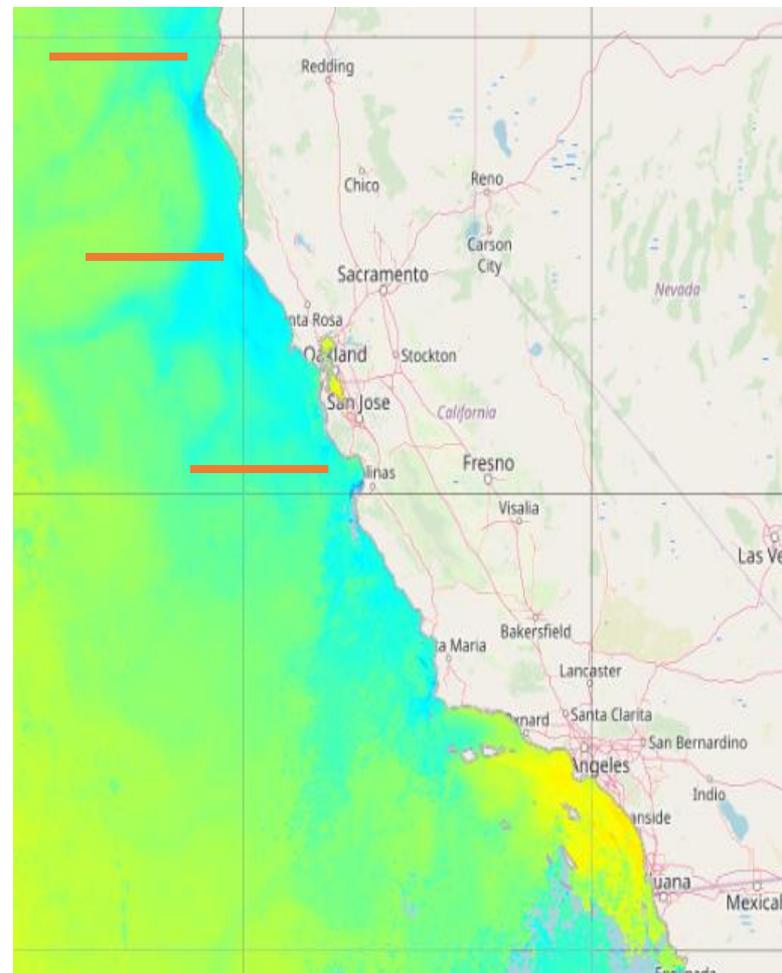
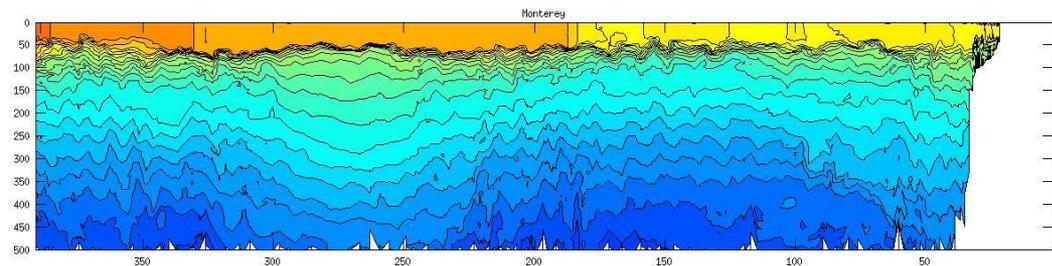
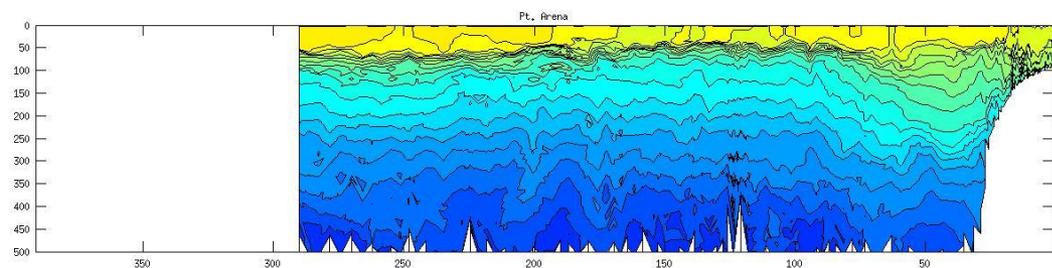
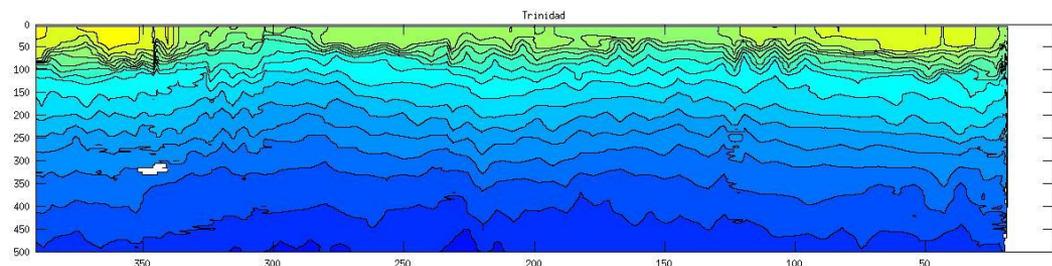


New Point Arena Glider: Filling the Gaps in Ocean Obs

The new continuous glider offshore of Mendocino provides a cost-effective means for measuring ocean heat, acidification, stratification and other ocean processes within this region of maximum upwelling and variability.



CeNCOOS Glider Array



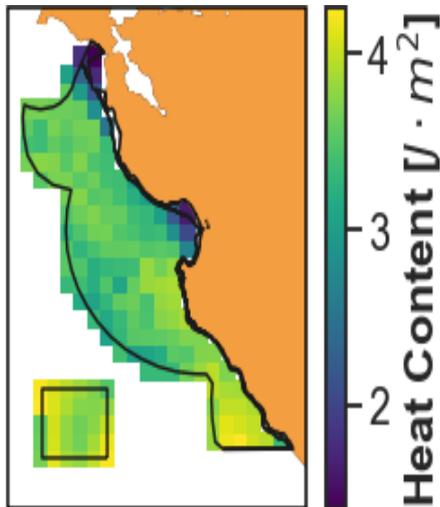
Regional Upper Ocean Heat Content Product in the Works

Keys: Integration of heat content of upper 100 meters of ocean.

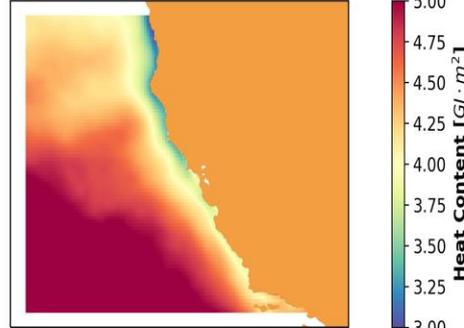
Simple Calculation:

$$H = \rho c_p \int_{100}^0 T(z) dz$$

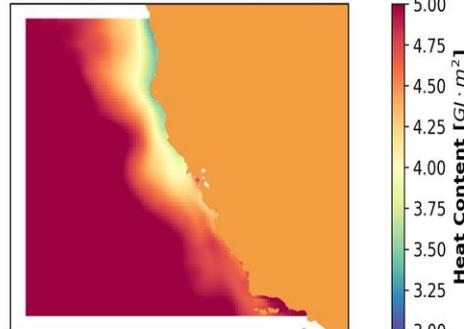
Mask Region of interest



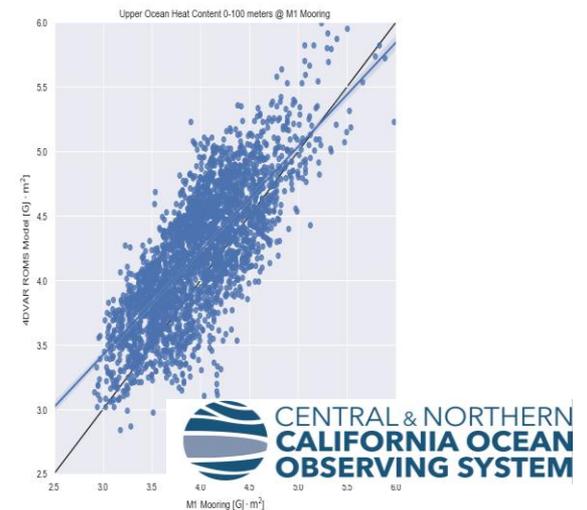
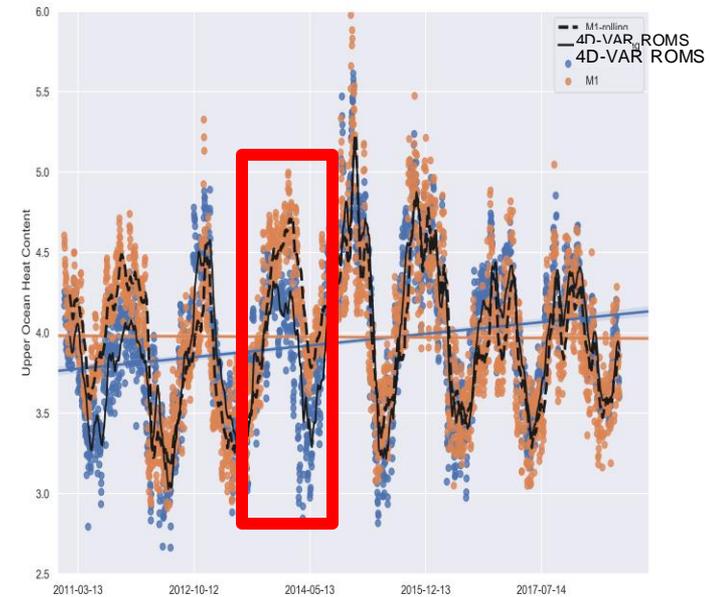
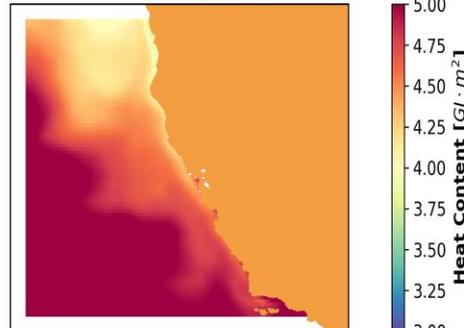
Upwelling Season [3-6]



Relaxation Season [7-10]



Winter Season [10-2]





CENTRAL & NORTHERN CALIFORNIA OCEAN OBSERVING SYSTEM

Thank you!

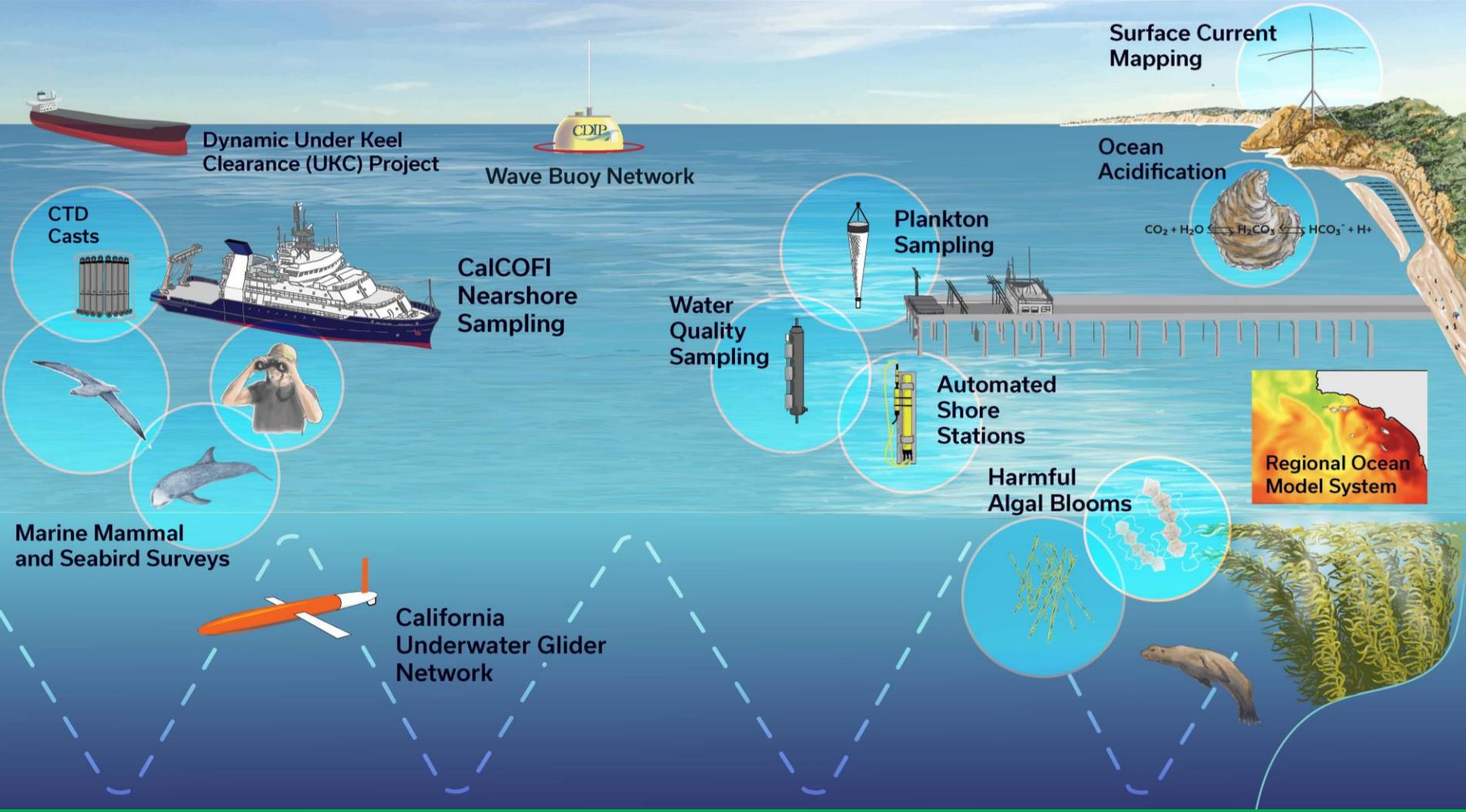
aharper@mbari.org

NOAA West Watch Update

January 2020



SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

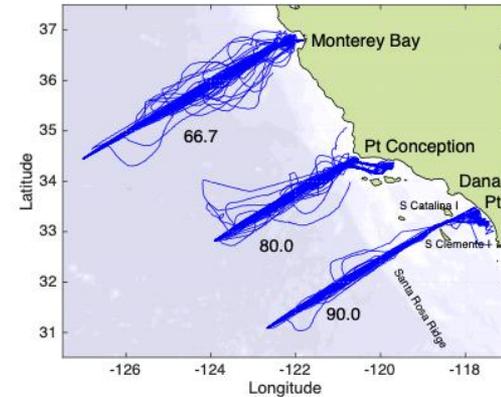
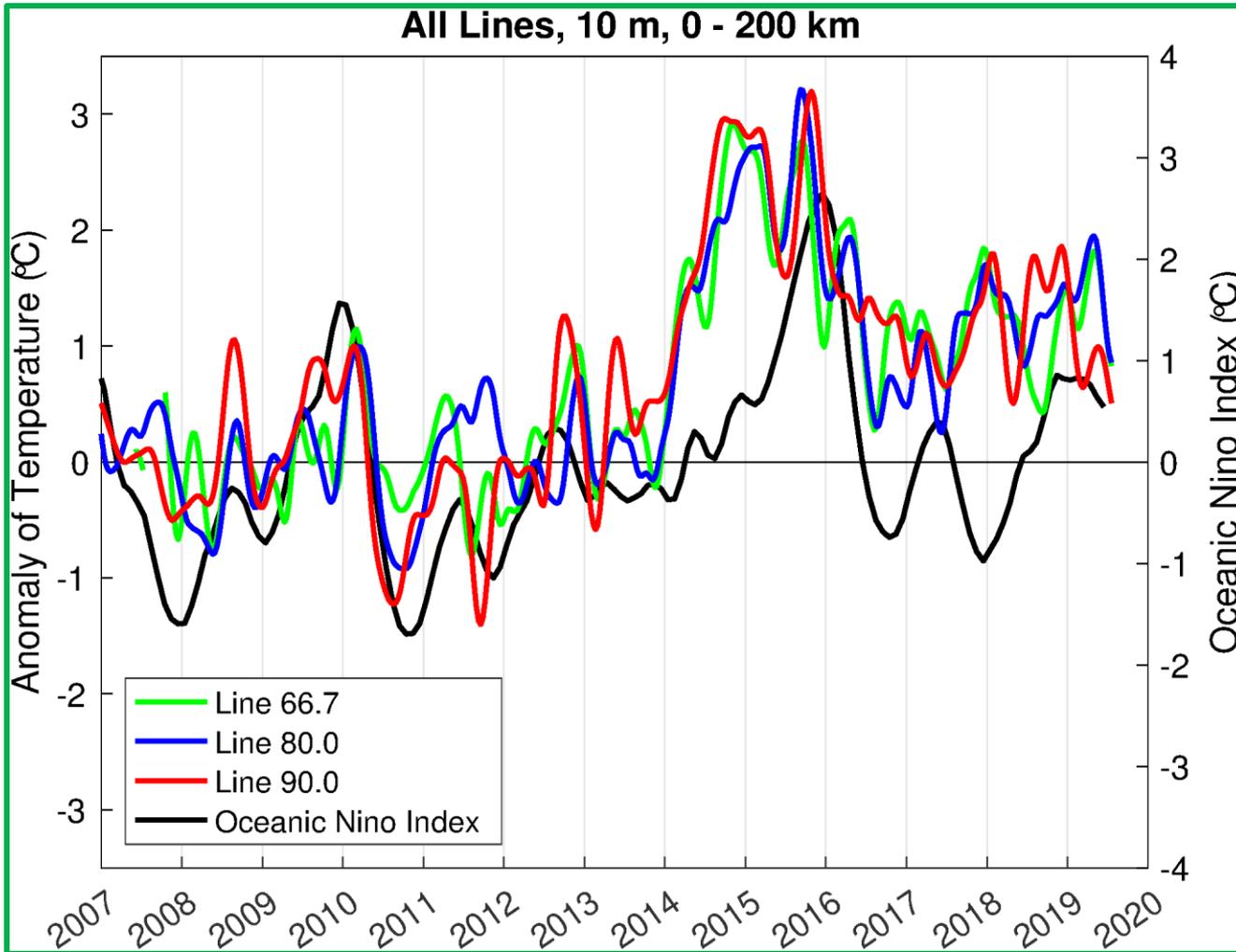


NOAA West Watch Update: Southern California

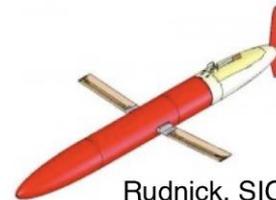
Megan Medina (Hepner)

7-January 2020

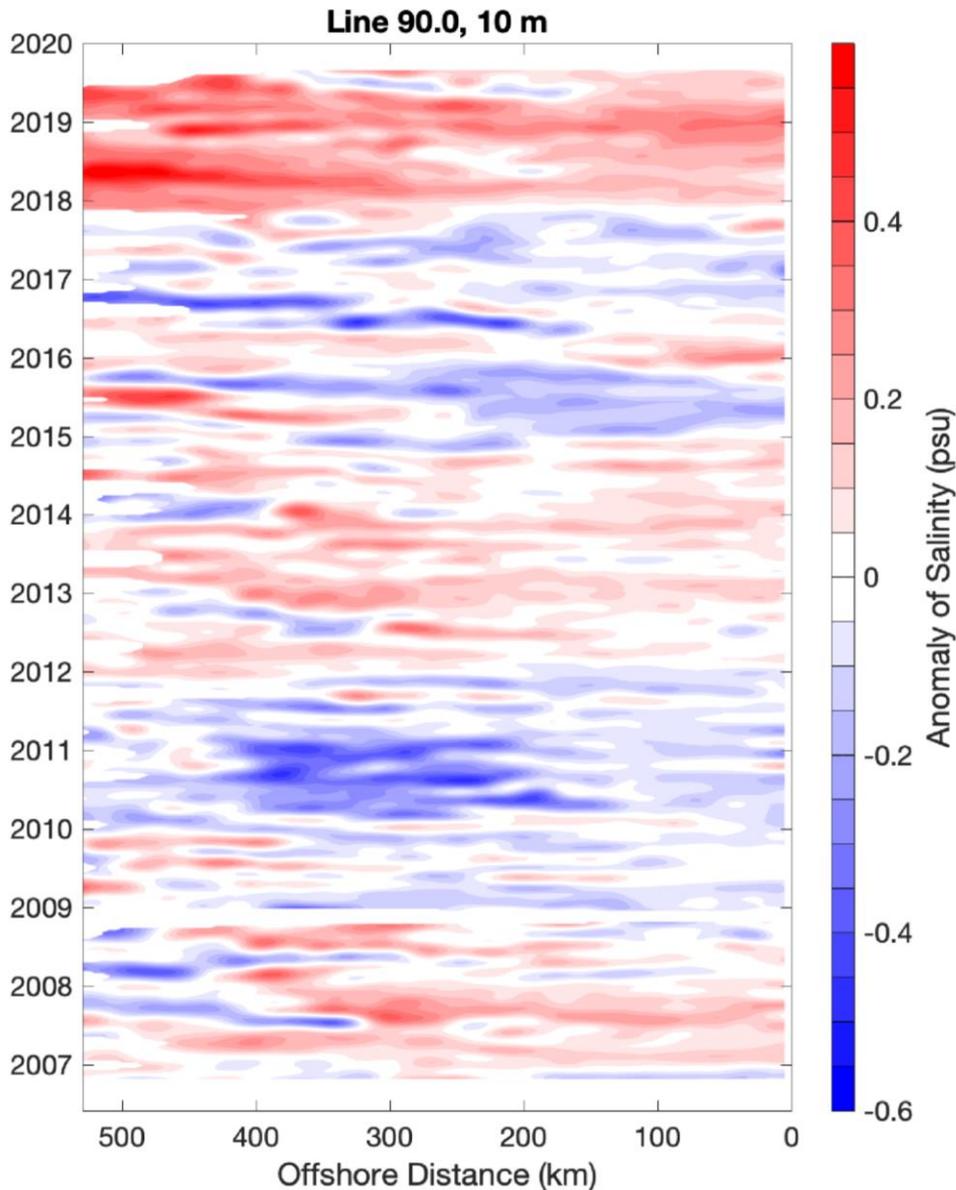
California Temperature Anomaly



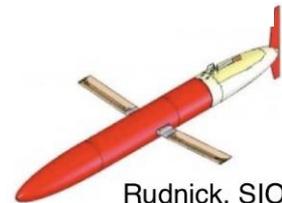
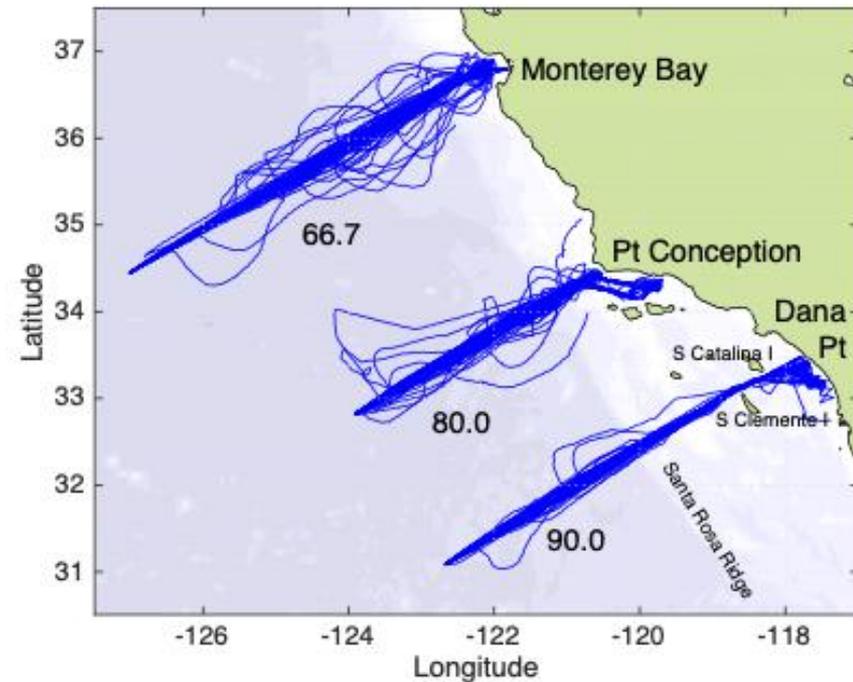
- California warmth continues although the equator is normal
- Persistent increase of about 1°C in California Current System



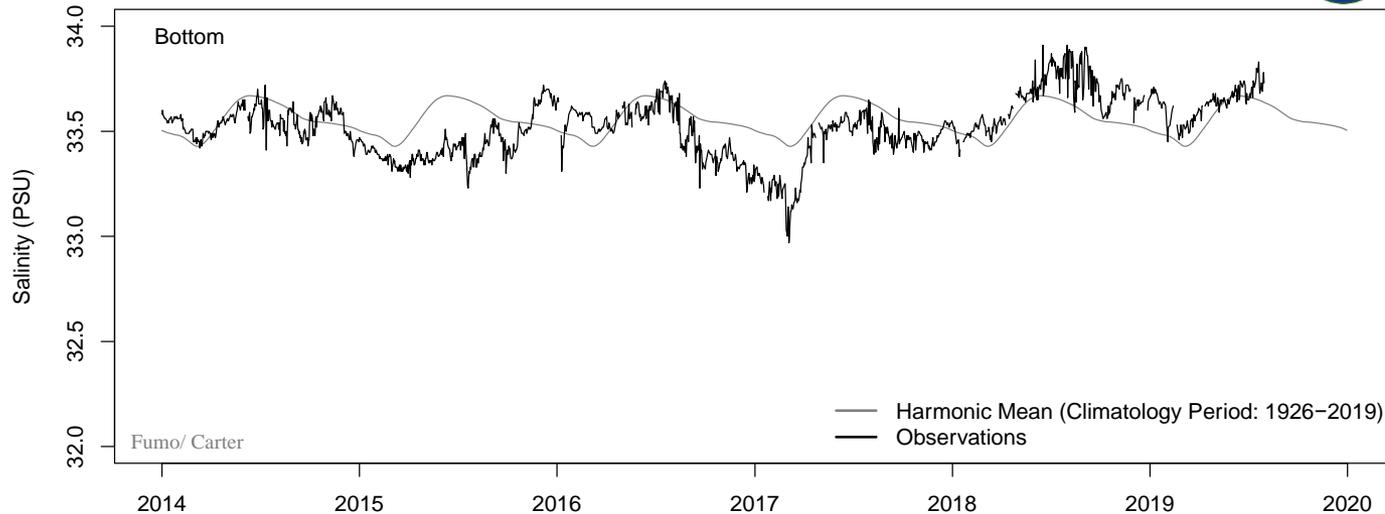
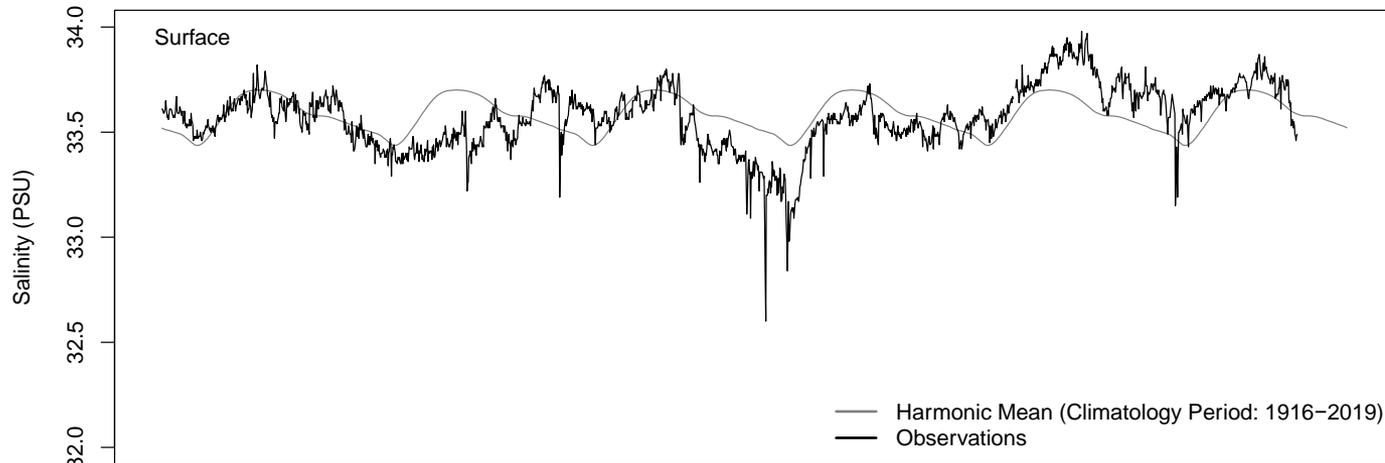
California Salinity Anomaly



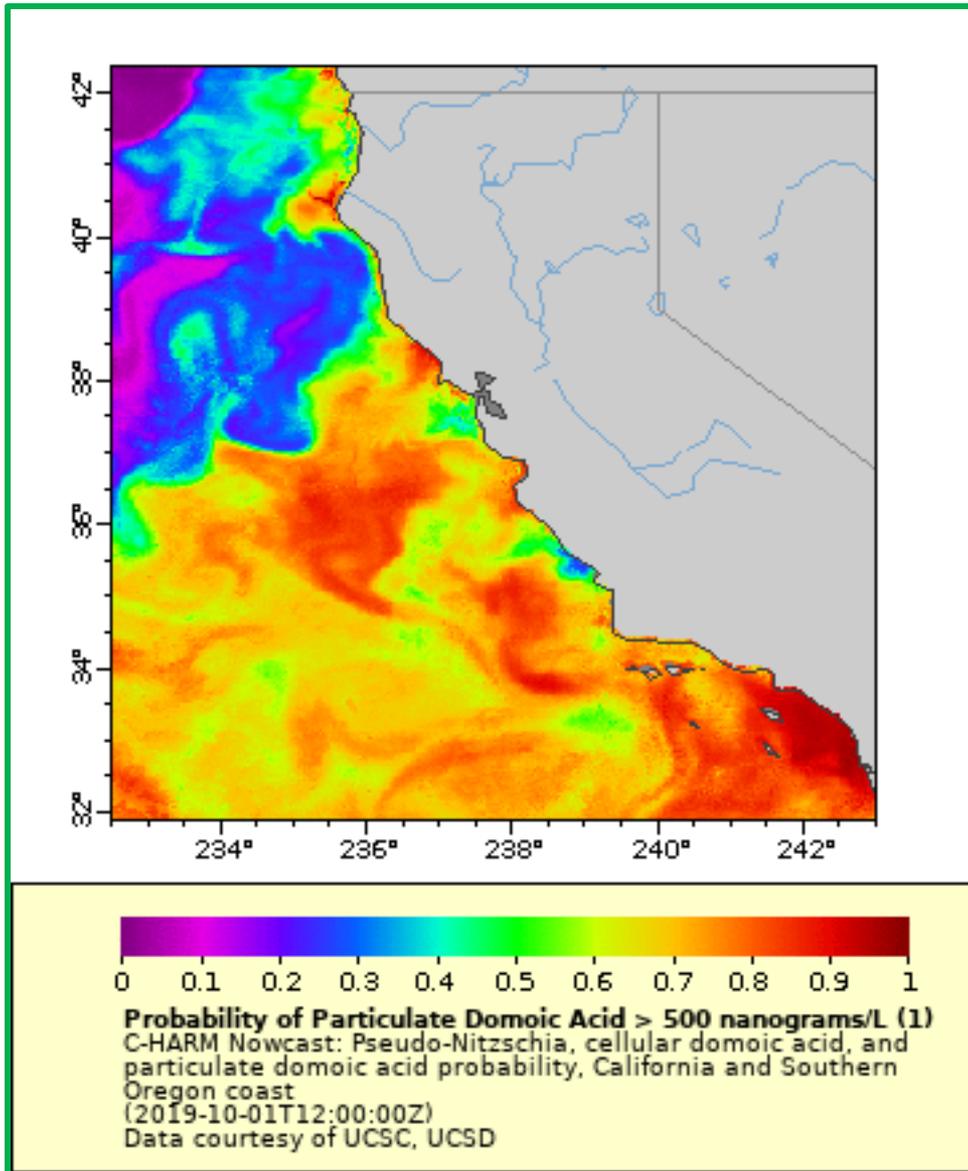
- Fresh during 2014-2027
- Salinity Anomaly 2018-2019
 - strongest at halocline



Southern California Salinity Anomaly



C-HARM pDA and CDPH Closures



September – October 2019 Overview

C-HARM predicted high pDA in:

- Humboldt/North County coastline
- Sonoma coastline
- Half Moon Bay
- southern portion of Monterey Bay
- Southern California Bight

CDPH Shellfish Notifications:

- September 4th in Sonoma due to Paralytic Shellfish Poisoning (PSP)
- October 15 – December 20 in Humboldt and Mendocino Counties due to Amnesic Shellfish Poisoning (ASP)

Marine Mammal DA Strandings

- 36 in Northern California
- 7 in Southern California Bight

C-HARM pDA and CDPH Closures



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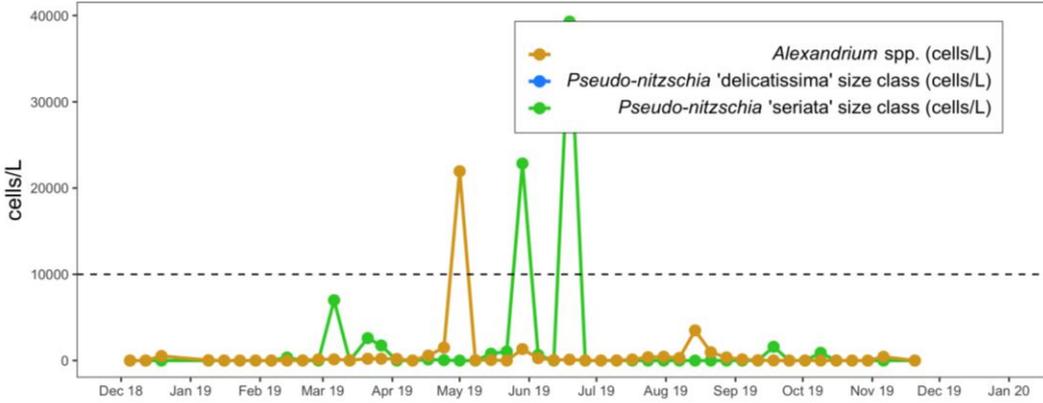
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Marine Mammal DA Strandings

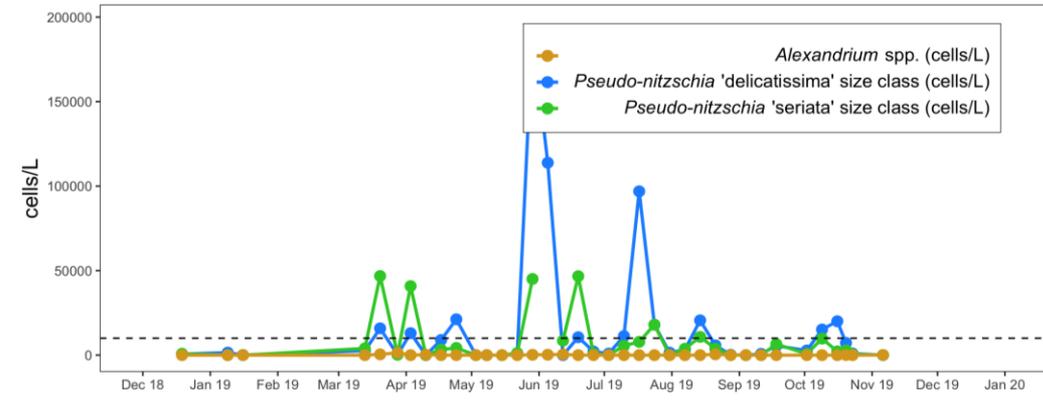
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- 7 in Southern California Bight

Harmful Algal Bloom Monitoring Alert Program (HABMAP)

Santa Cruz Municipal Wharf HAB and DA Data

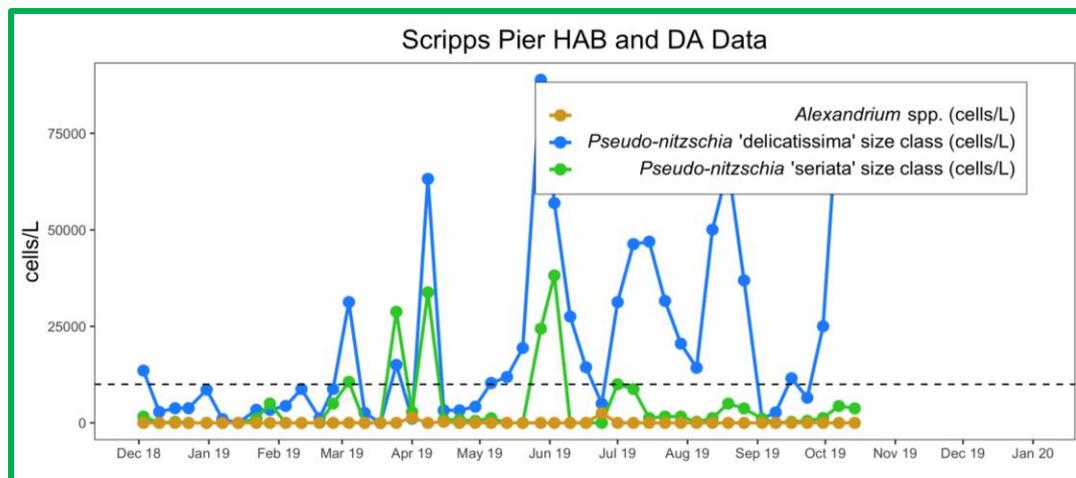
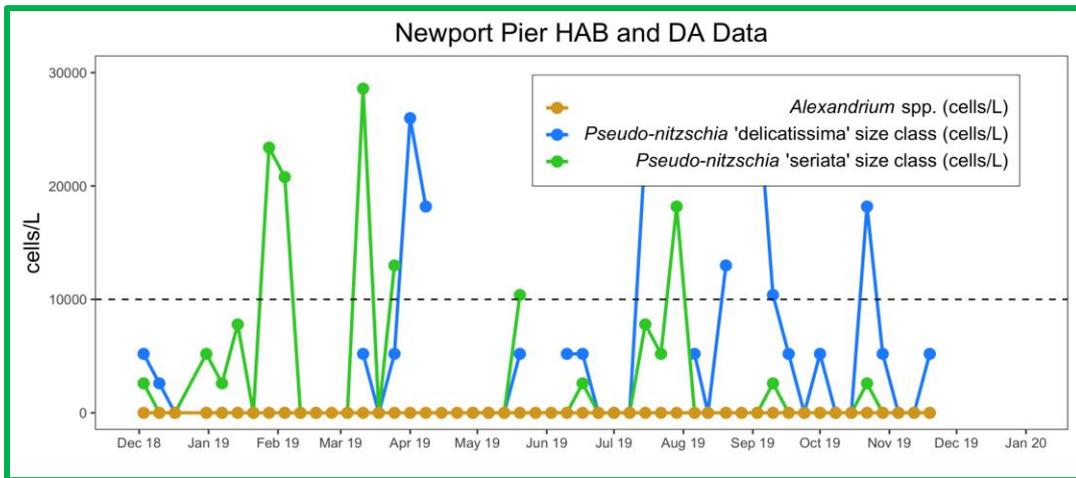


Monterey Pier HAB and DA Data



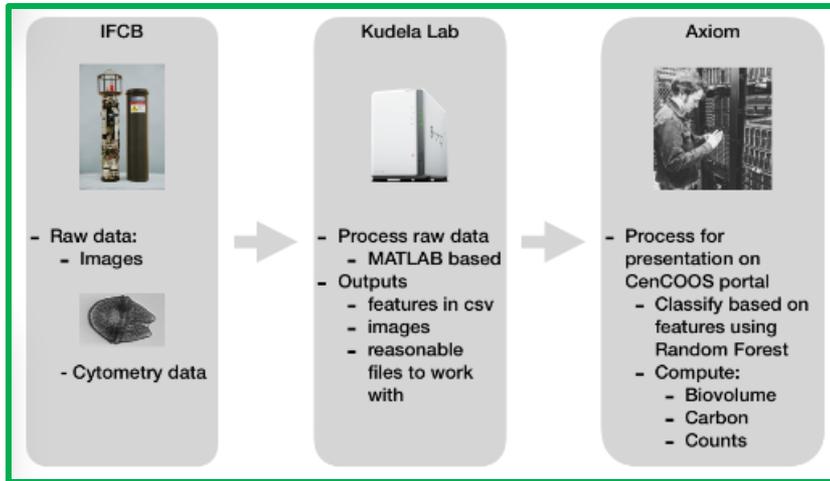
Pseudo-nitzschia "seriata" does not refer to an actual species but rather the larger size class of *Pseudo-nitzschia*, which is generally a more toxigenic group of species. *Pseudo-nitzschia* "delicatissima" refers to the smaller size class that is generally non-toxic. The dashed line on the plots demarcates the 10,000 cells/L "bloom" threshold designated here for *Pseudo-nitzschia* populations only.

Harmful Algal Bloom Monitoring Alert Program (HABMAP)



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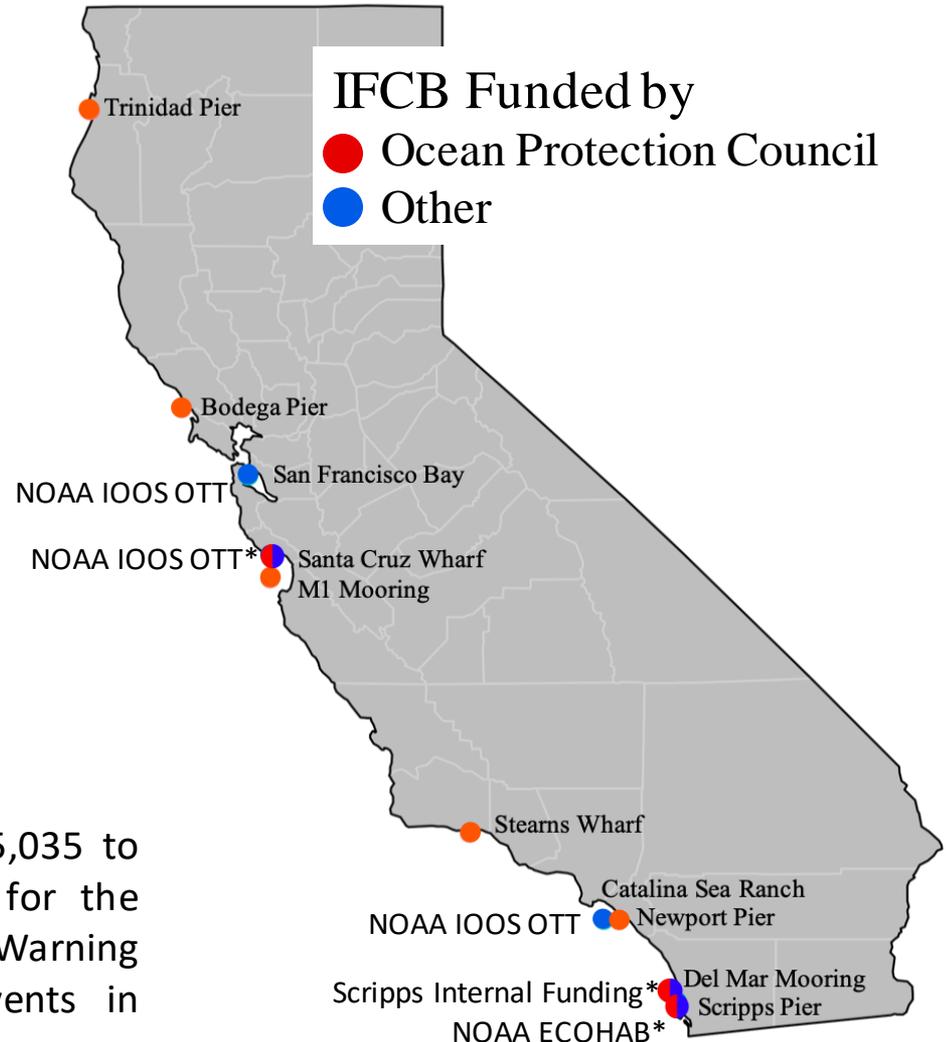
An Early Warning System for HAB Events in California



Imaging Flow CytoBot (IFCB) data pipeline



On November 13, 2019 OPC Awarded \$1,285,035 to the Regents of the University of California for the “Implementation of an Automated Early Warning System for Harmful Algal Bloom (HAB) Events in California” lead by Clarissa Anderson



SCCOOS & CeNCOOS HABMAP

SCCOOS

Southern California Coastal Ocean Observing System



SCCOOS & CeNCOOS Harmful Algal Bloom Monitoring Alert Program

Locations

Observations

Applications

Data Access

Publications



The California Harmful Algal Bloom Monitoring and Alert Program (HABMAP) was formed in 2008 as an ad-hoc consortium of concerned scientists, federal and state managers, and stakeholders. Since 2011, the U.S. Integrated Ocean Observing System (IOOS) regional associations of California – Southern California Coastal Ocean Observing System (SCCOOS) and Central and Northern California Ocean Observing System (CeNCOOS) – have been sustaining the monitoring effort. Principal investigators (PIs) sample weekly at nine university-run or municipal pier stations from San Diego to Humboldt for a suite of HAB species and for the neurotoxin domoic acid (DA) caused by the Harmful Algal Bloom (HAB) producing diatom *Pseudo-nitzschia*. The data were used to validate the California Harmful Algae Risk Mapping (C-HARM) System, a model developed with support from NASA Applied Sciences Program and NOAA National Centers for Coastal Ocean Science (NCCOS) to predict when and where toxic blooms occur to better inform management decisions.

<http://sccoos.org/harmful-algal-bloom/>

SCCOOS & CeNCOOS HABMAP

California HABMAP Monitoring

Sampling Location

Newport Pier

Observations

Pseudo-nitzschia delicatissima group (cells/L)

Date Range

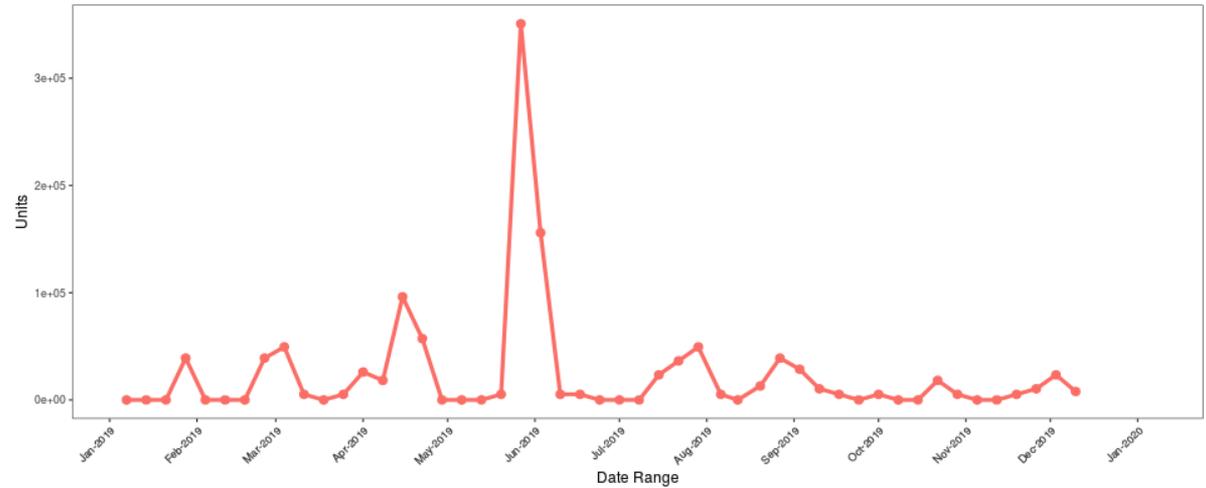
2019-01-06



to

2020-01-06

Plot Table



https://sccoos.shinyapps.io/California_HAB/

California HABMAP - SCCWRP

California HABMAP

A Statewide HAB Network and Forecasting System

[About HABMAP](#) ▾ [HAB Species](#) ▾ [HAB Forecast](#) [Bulletin and News](#) [Data](#) ▾ [Resources](#) ▾ [Ocean Observations](#) ▾



HABMAP

The Harmful Algal Bloom Monitoring and Alert Program collects weekly phytoplankton and water quality [data](#) at seven piers along the Central and Southern California coast. [HABMAP](#) provides timely updates on marine HAB events, and aids in understanding the timing, extent, and impact of these events on humans and the marine ecosystem.

For information on freshwater HABs in California, visit the [CA HAB Portal](#).

News 

The sampling locations are:



- [Trinidad Pier](#)
- [Bodega Bay](#)
- [Santa Cruz Wharf](#)
- [Monterey Wharf](#)
- [Cal Poly Pier](#)
- [Stearns Wharf](#)
- [Santa Monica Pier](#)
- [Newport Pier](#)
- [Scripps Pier](#)

Search ... 

RECENT POSTS

- [California HAB News: Oct 2019](#)
- [California HAB News: Sep 2019](#)
- [California HAB News: Aug 2019](#)
- [California HAB News: July 2019](#)

<http://habs.sccoos.org/>

Ocean Acidification

SCCOOS

Southern California Coastal Ocean Observing System



Ocean Acidification

[Locations](#) [Technologies](#) [Observations](#) [Applications](#) [Data Access](#) [Publications](#)



To better understand ocean acidification and the effects on shellfish SCCOOS, along with AOOOS, NaNOOS and CeNCOOS, partnered with the shellfish industry to test state-of-the-art carbon system instruments, such as the [Burkolator](#), at hatcheries and shellfish growing sites, as well as transition more affordable sensors (e.g., ACDC and SeapHOx) to operations. The full asset list is available on the [IOOS Partners Across Coasts Ocean Acidification \(IPACOA\)](#) data portal.

Locations

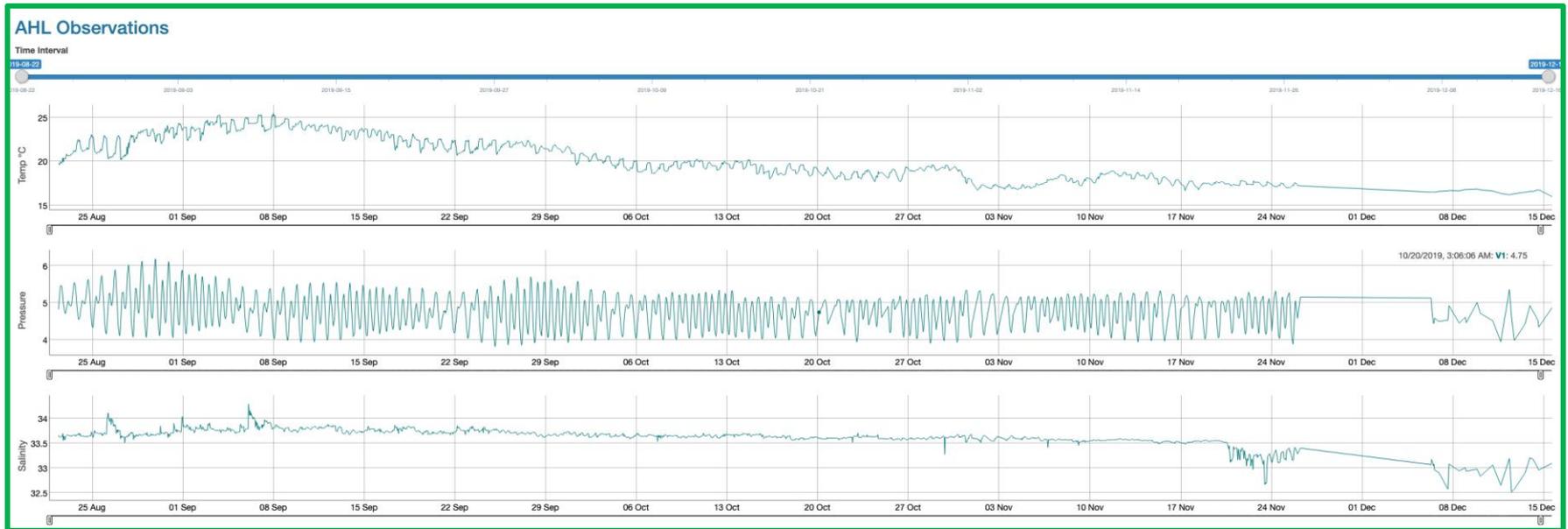
The ACDC was operated alongside two SeapHOx units measuring pH, temperature and salinity and the Burkolator. The calibrated SeapHOx pH data were then combined with the salinity-derived alkalinity to generate a continuous pCO_2 value for comparison with the ACDC system. The SeapHOx units, functioning in real time, provided more accurate pH data in comparison to the ACDC.

The Burkolator was measuring eight OA variables at the Carlsbad Aquafarm in the Agua Hedionda Lagoon from January 2017 to June 2019. The generation 1 ACDC was transitioned to Catalina Sea Ranch NOMAD buoy in March 2019 and the Burkolator is now being transitioned to University of California Davis. The SeapHOx unit continues to monitor pH data in real time at Carlsbad Aquafarm.

sccoos.org/ocean-acidification/

Ocean Acidification – Carlsbad Aquafarm

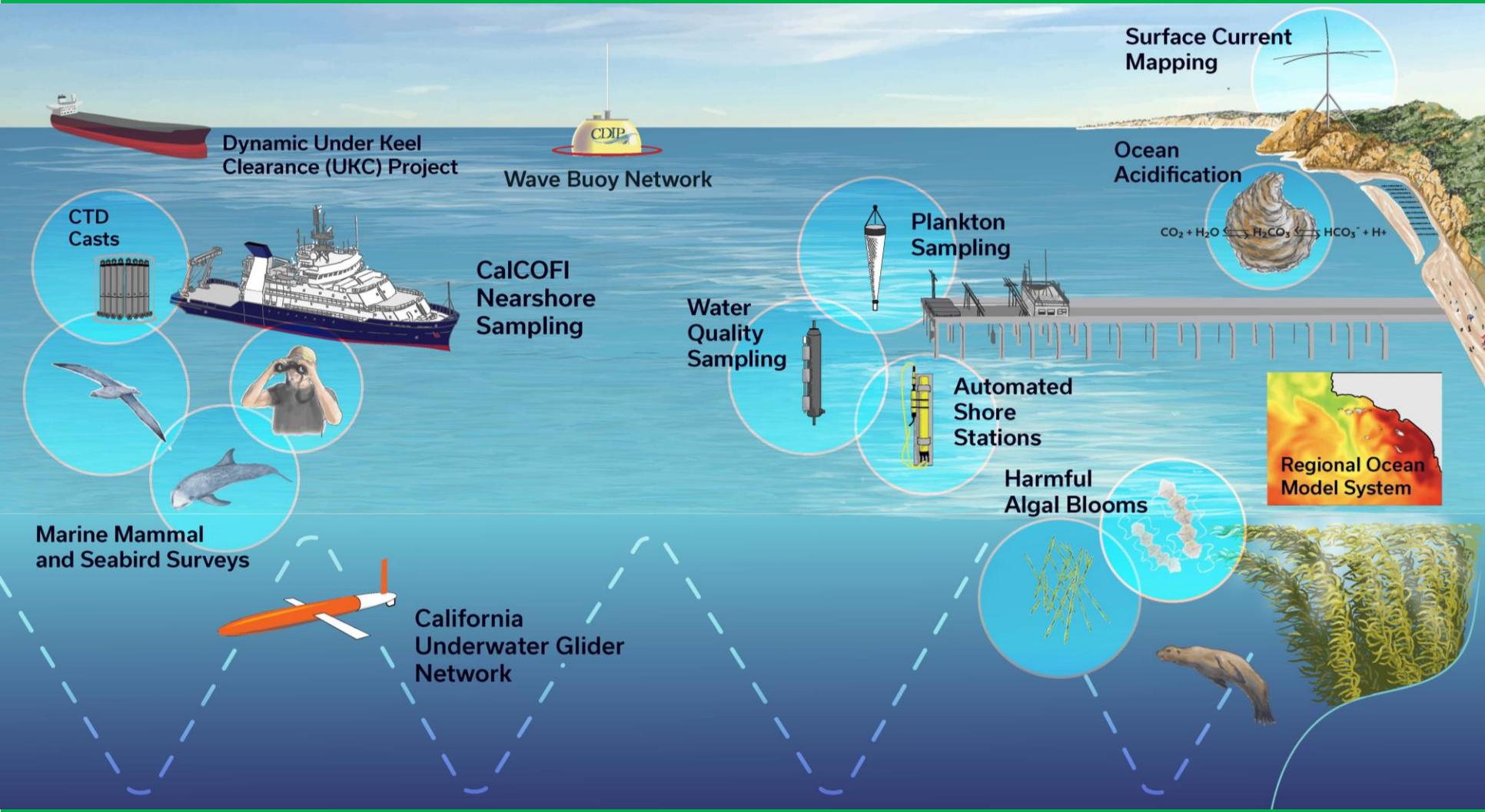
SeapHOx measures: temperature, oxygen, pH, pressure, salinity and derived Alkalinity and derived pCO₂



sccoos.shinyapps.io/AHL_Observations/



SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM



Thank you!

Megan Medina (Hepner) – mhepner@ucsd.edu

7-January 2020

Call Agenda



- Project Recap & Updates (Dan McEvoy)
- Regional Climate and ENSO brief (Dan McEvoy)
- IOOS Nearshore Conditions brief (Beth Curry, Alex Harper, Megan Hepner-Medina)
- **Discussion - Environmental conditions and impacts reporting (All)**
 - **Additional impacts to share?**



-
- **Next webinar: Tuesday, April 21st 2020**

THANK YOU!