Seasonal Climate Forecast
Dec. 2024 – Feb. 2025

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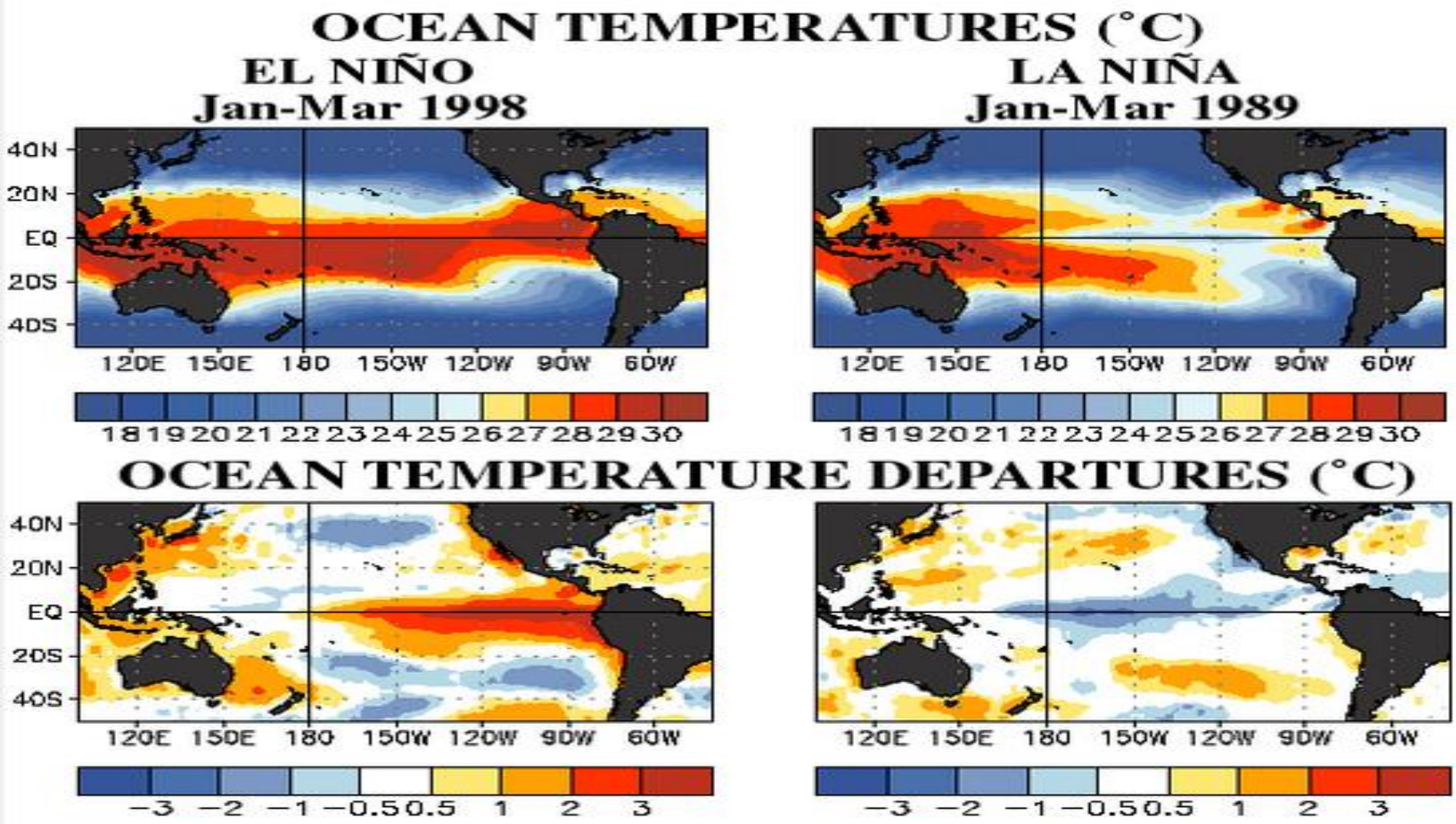
S. Prichard

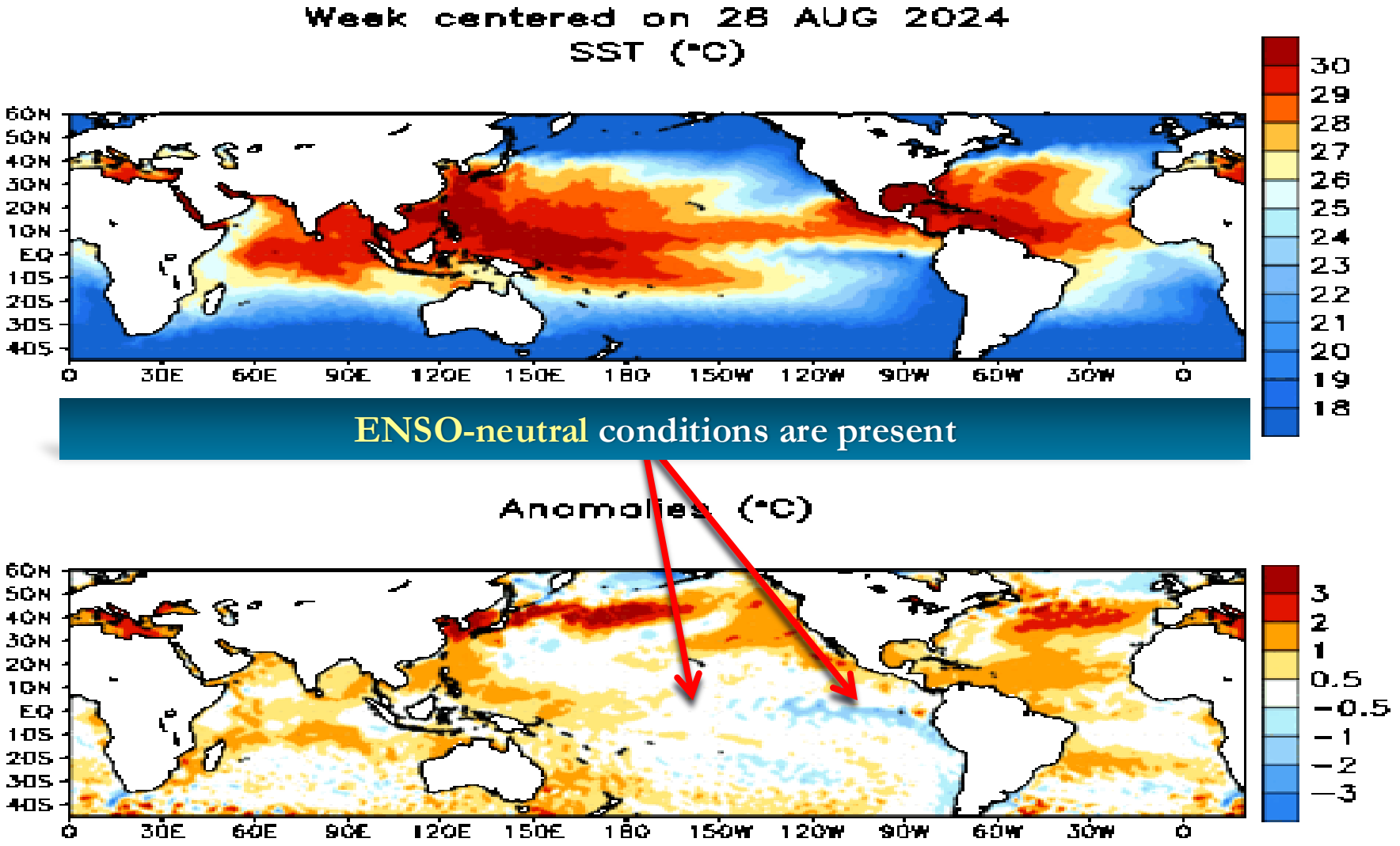
El Niño vs La Niña
(SST Patterns in the Tropical Pacific Ocean)



Courtesy: https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensocycle/ensocycle.shtml

Sea Surface Temperatures (SSTs)

Animated (PowerPoint only) SSTs (top) / Anomalies (bottom)



Courtesy: https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_update/gsstanim.shtml

El Niño Southern Oscillation (ENSO) Current Status and Forecast

- The October Southern Oscillation Index (SOI) of 0.5 reflected an increase in easterly trade wind strength in the equatorial Pacific Ocean.

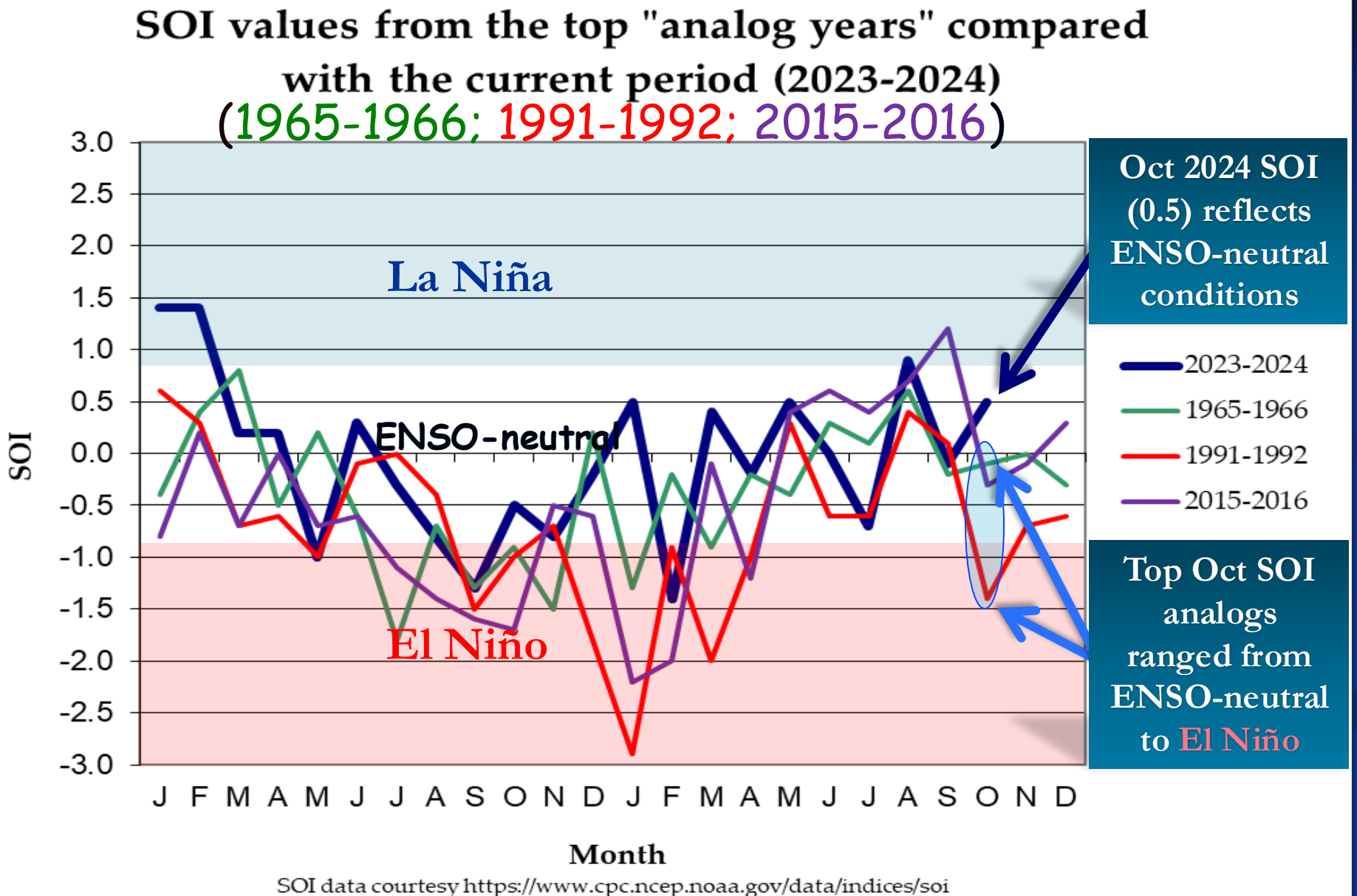
- The August – October Oceanic Niño Index (ONI) remained -0.2°C, reflecting near-to-below average sea surface temperatures ("SSTs") in the central equatorial Pacific Ocean (within the cold ENSO-neutral range).

- NOAA's Climate Prediction Center (CPC) expects a transition from cold ENSO-neutral to weak La Niña during the October – December period, with weak La Niña persisting through January-March 2025.

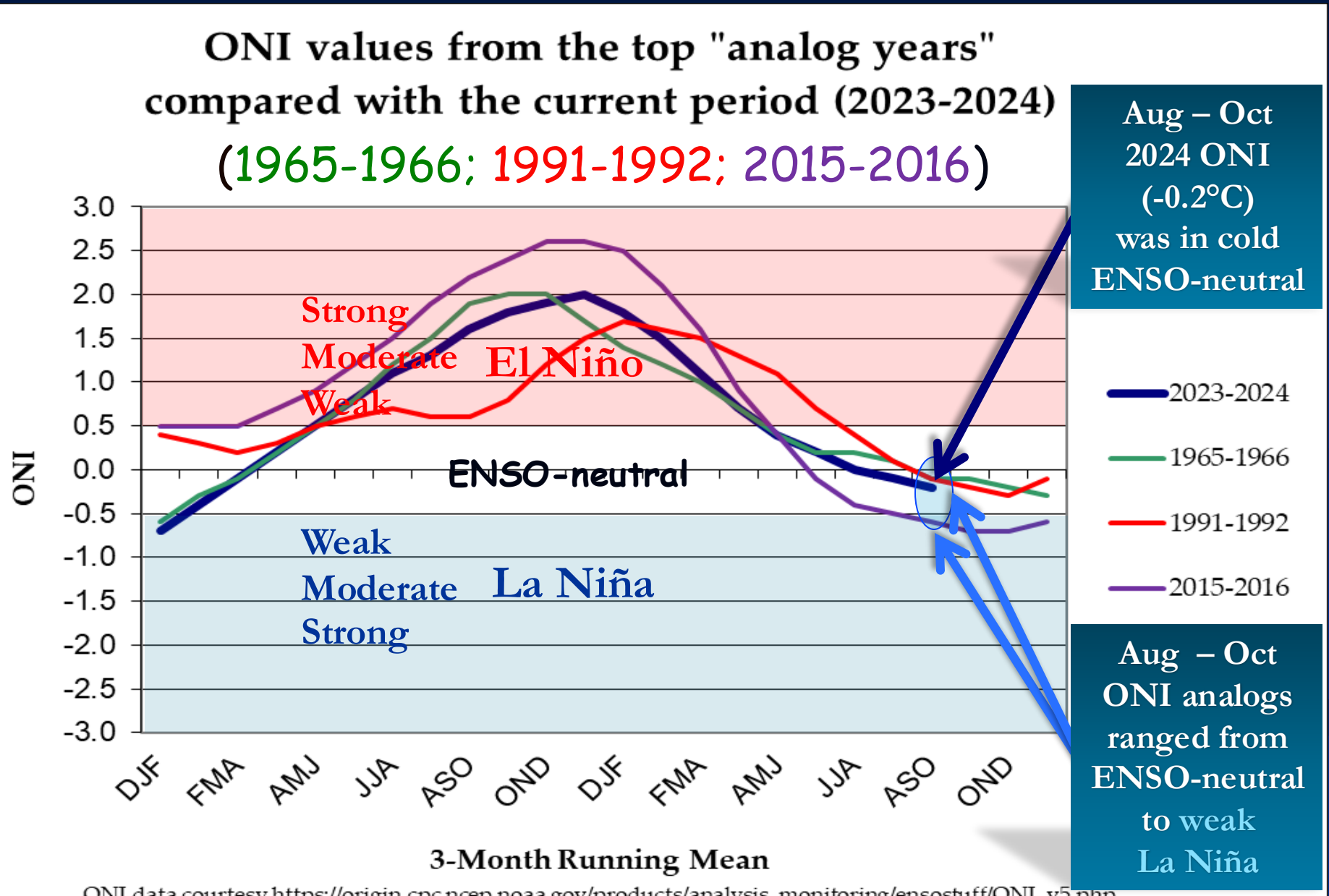
Note: This "analog" forecast does not consider NOAA's ENSO forecast. It uses only historical and current ENSO conditions to find "analog years" that most-closely match the recent evolution of the ENSO state.

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf

Southern Oscillation Index (SOI)



Oceanic Niño Index (ONI)



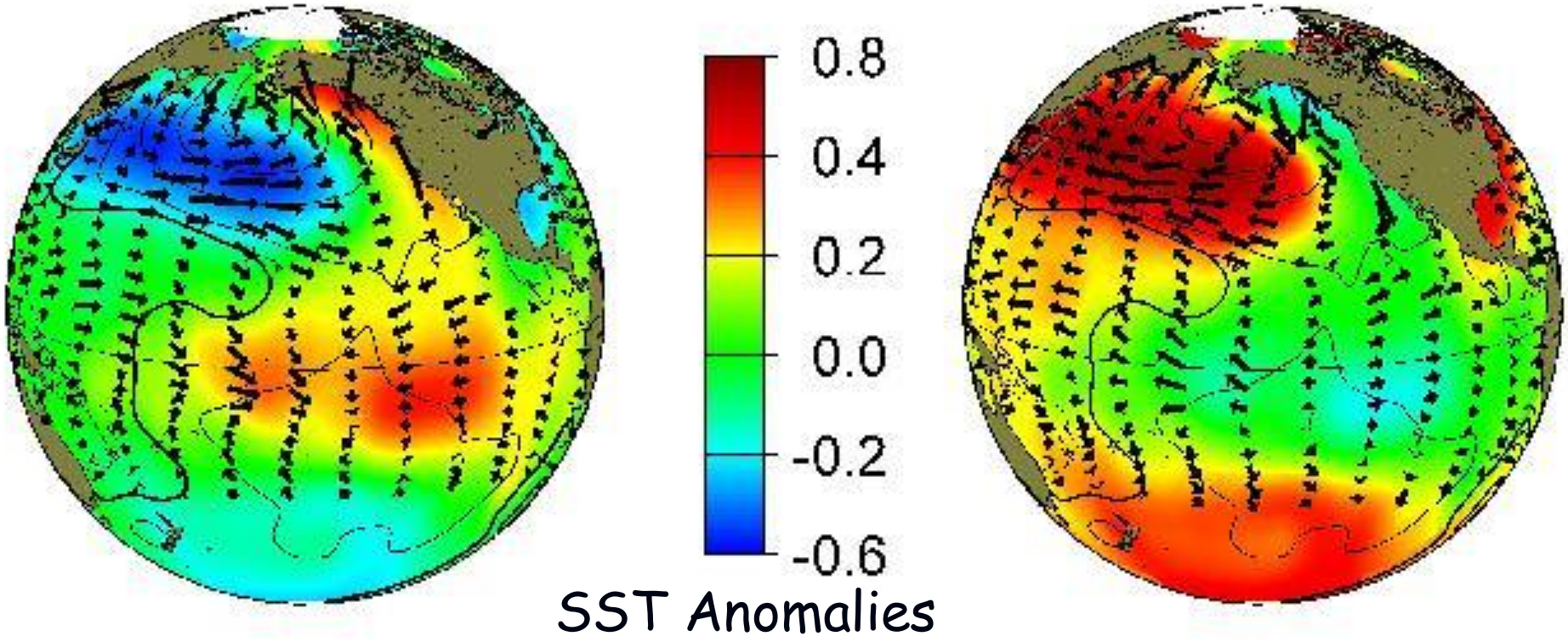
ONI data courtesy https://origin.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ONI_v5.php

The Pacific Decadal Oscillation (PDO)

(Reflects SST "Phase" in the North Pacific Ocean)

Positive (Warm) "Phase"

Negative (Cool) "Phase"



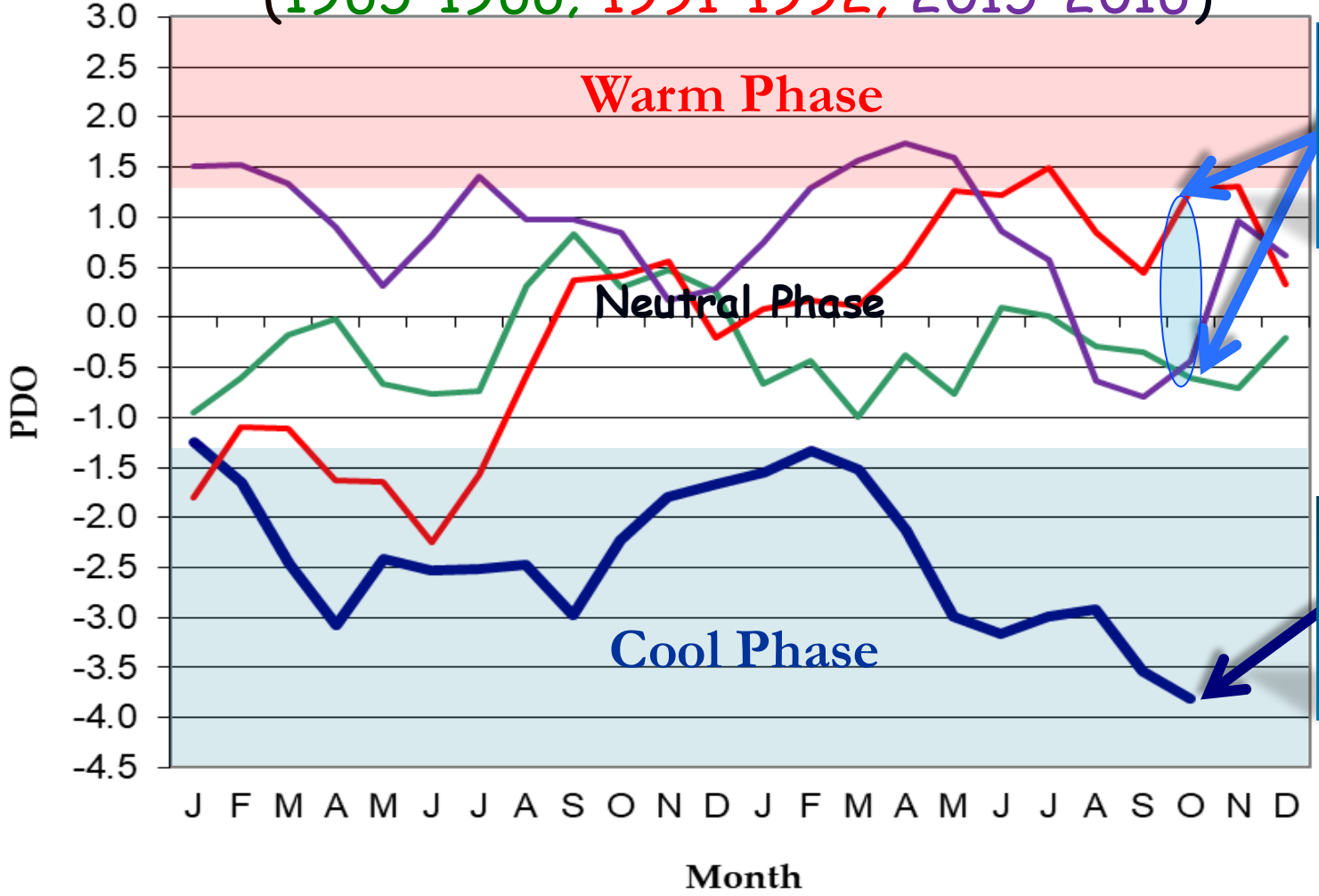
Courtesy: http://research.jisao.washington.edu/pdo/img/pdo_warm_cool.jpg

North Pacific Ocean

(Poleward of 20°N Latitude)

PDO values from the top "analog years" compared with the current period (2023-2024)

(1965-1966; 1991-1992; 2015-2016)



Top Oct PDO analogs were in "Neutral" Phase

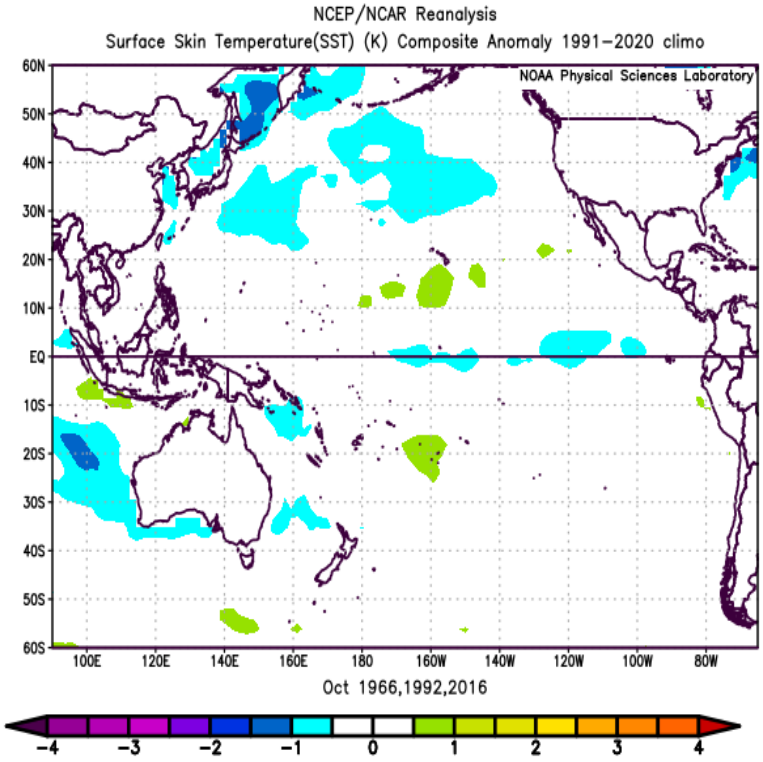
2023-2024
1965-1966
1991-1992
2015-2016

Oct 2024 PDO (-3.81) was deeply in the "Cool" Phase

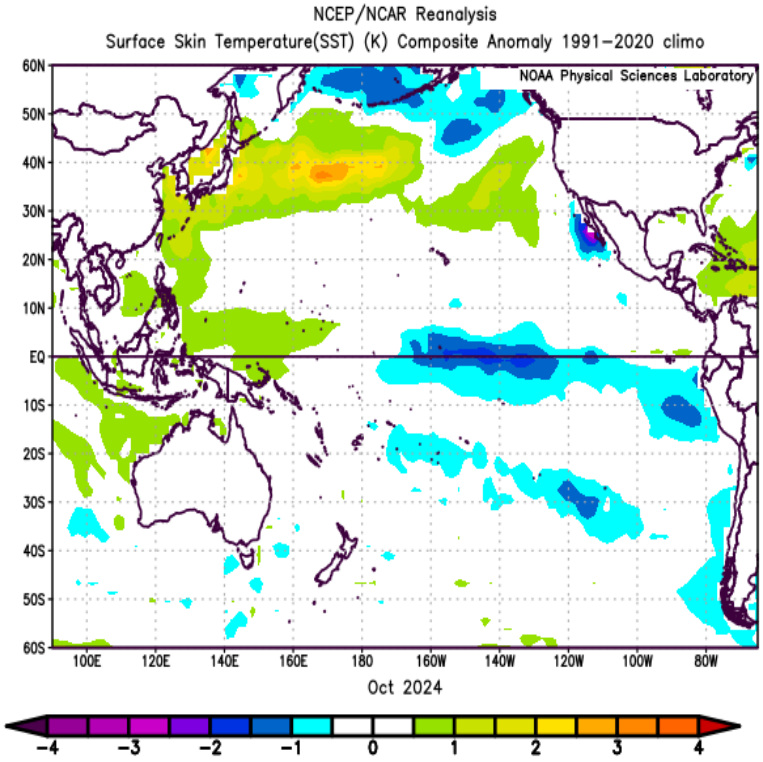
PDO data courtesy https://www.ncei.noaa.gov/pub/data/cmb/ersst/v5/index/ersst.v5.pdo.dat

SST Anomalies Comparison

October Analogs

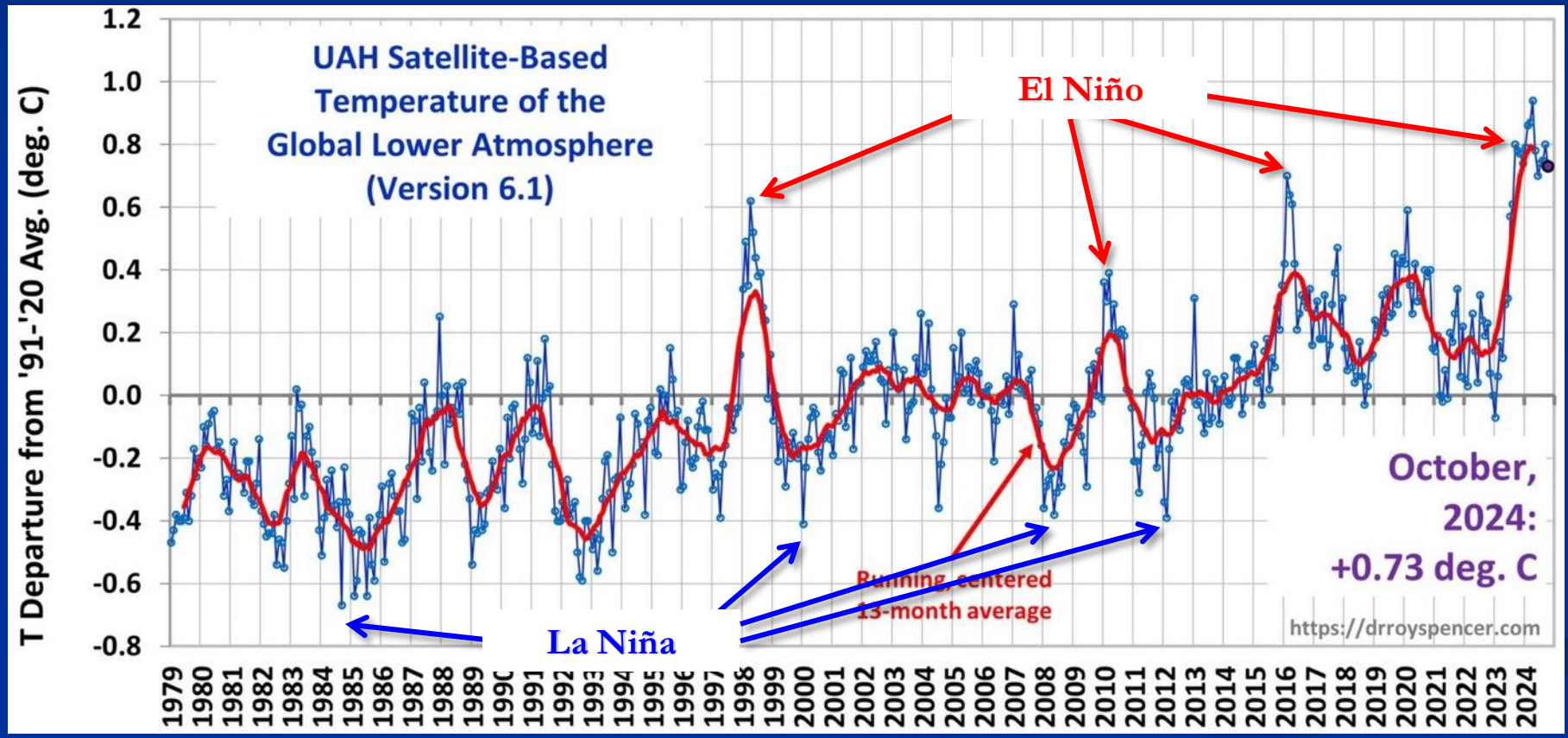


October 2024



- The SST anomalies of both the October analog composite (left) and October 2024 (right) reflected ENSO-neutral conditions, with the latter having stronger negative temperature anomalies in the central & eastern equatorial Pacific Ocean. 2016 is the best match of the analogs…

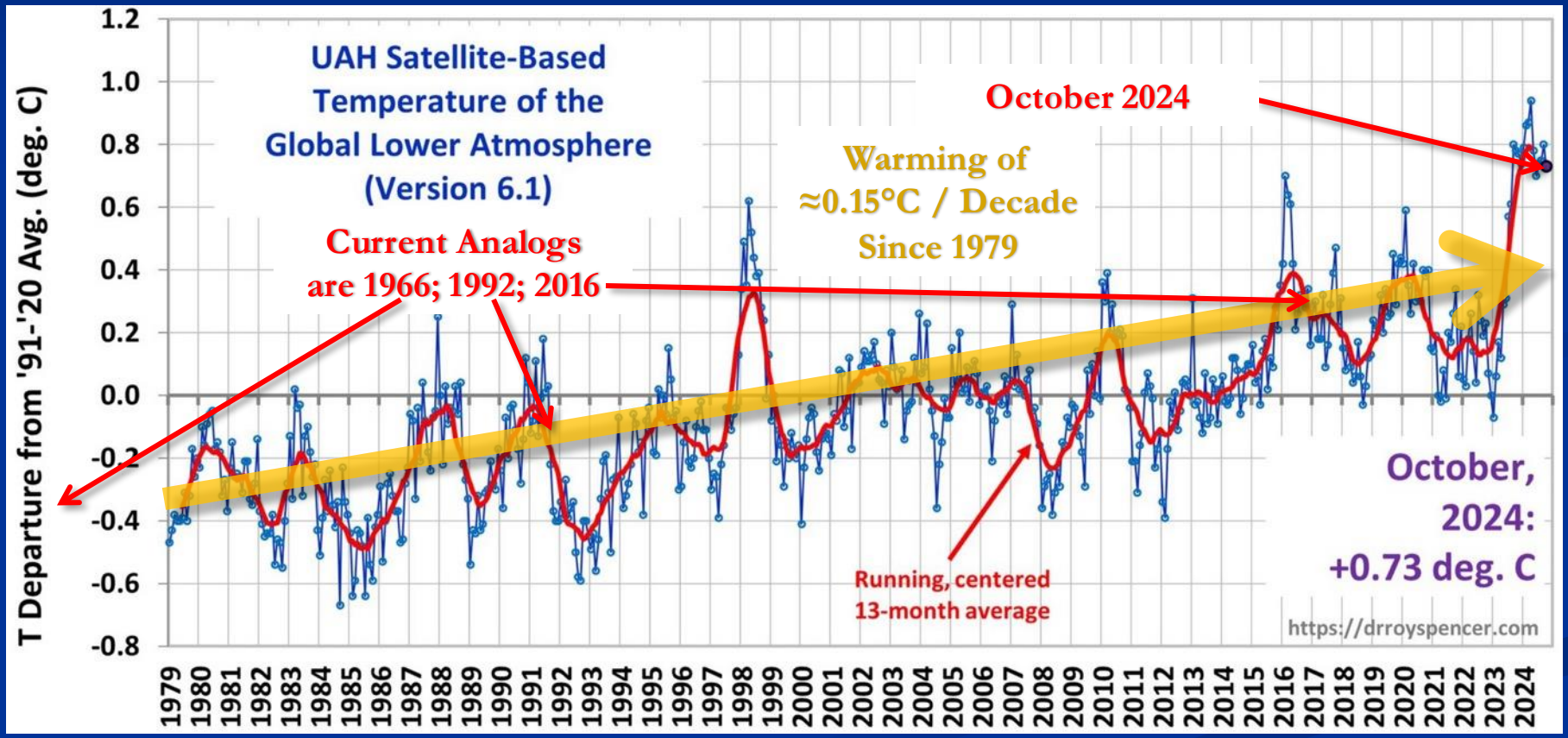
El Niño & La Niña Impact Global Temperatures…



Courtesy: http://www.drroyspencer.com/latest-global-temperatures/

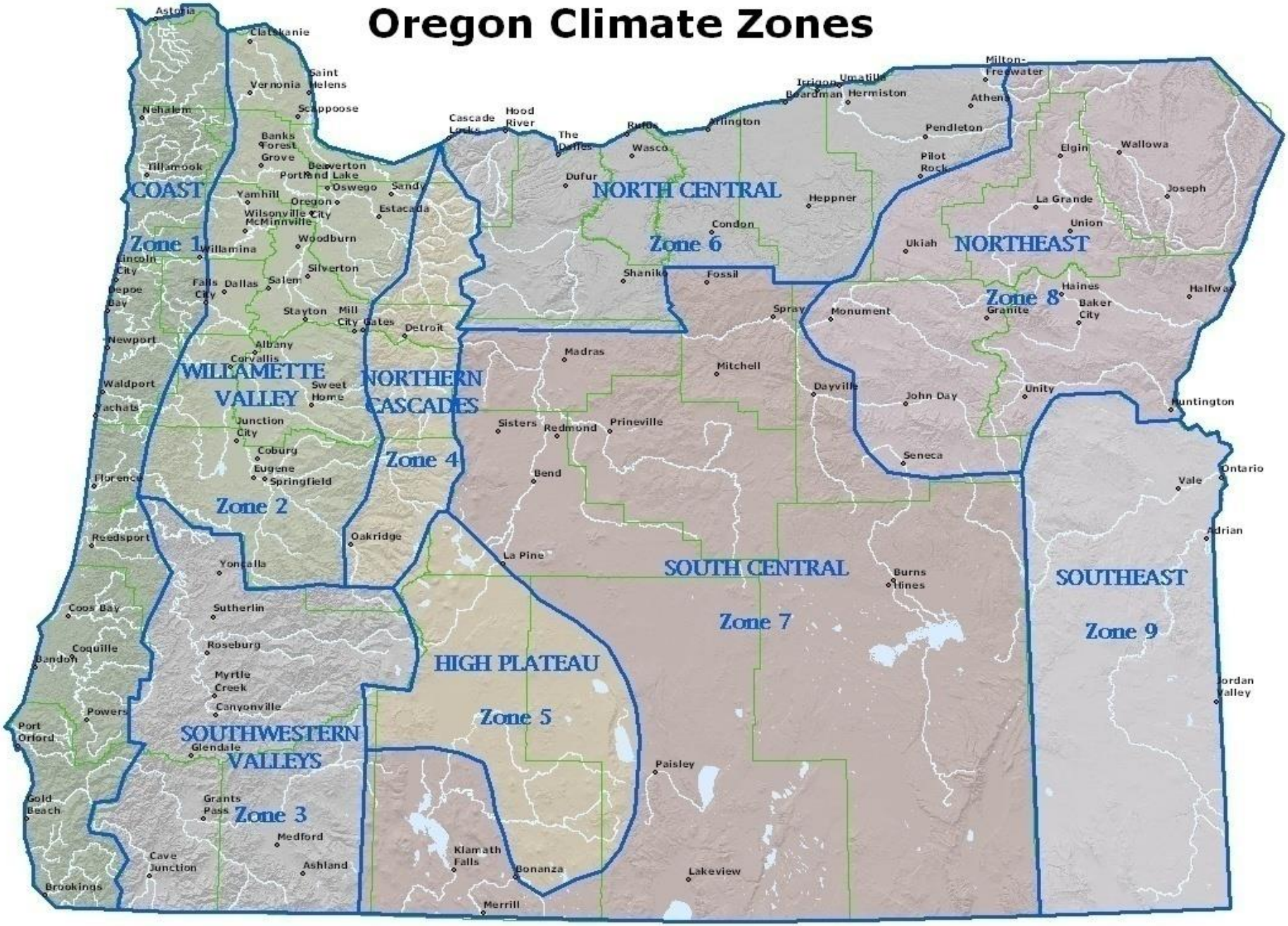
Global Temperature Trends

Increase Error in Analog Forecasts!



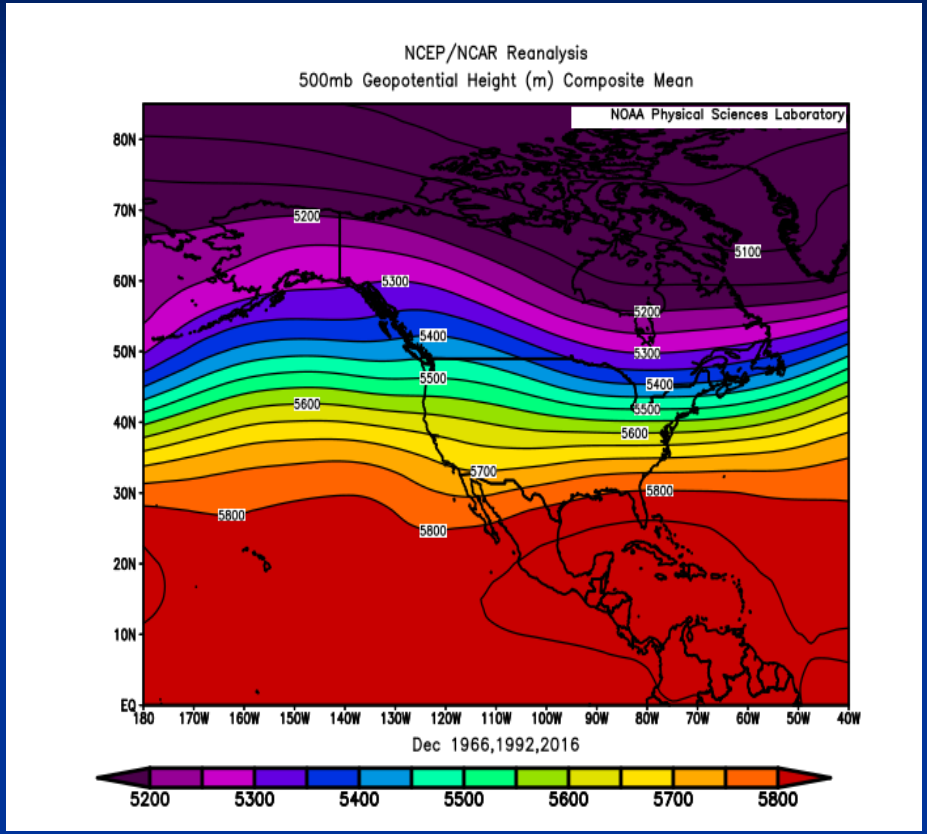
Courtesy: http://www.drroyspencer.com/latest-global-temperatures/

Oregon Climate Zones

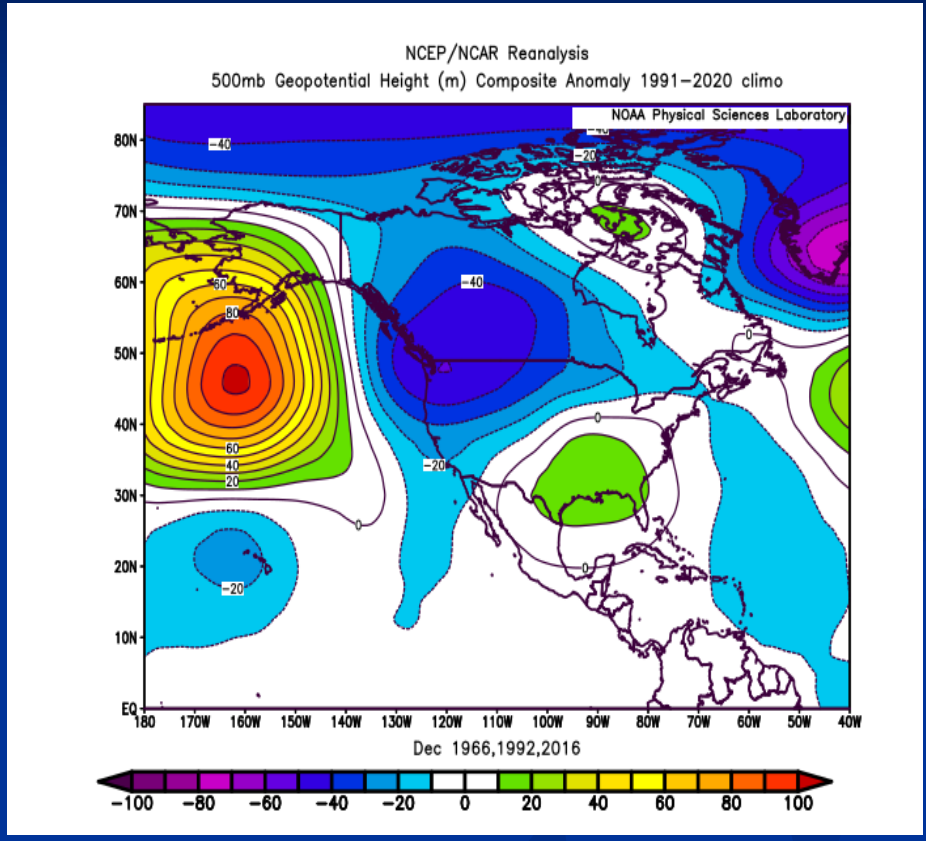


December 2024 Forecast

Mean Upper-Air Pattern



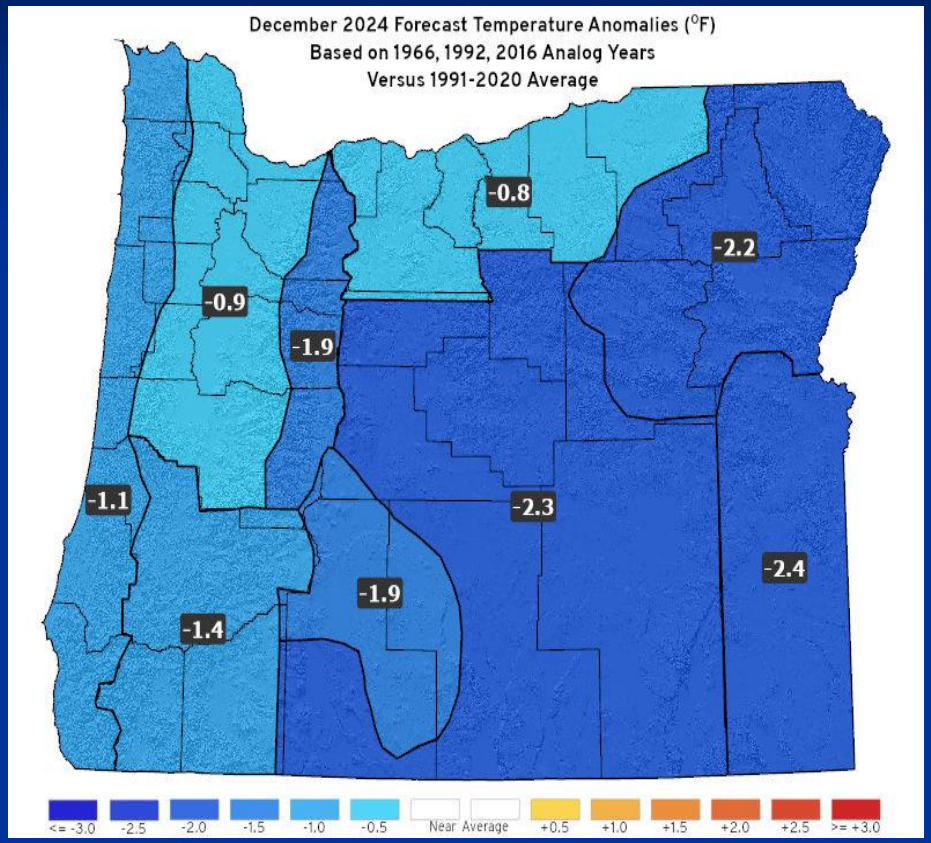
Upper-Air Anomalies



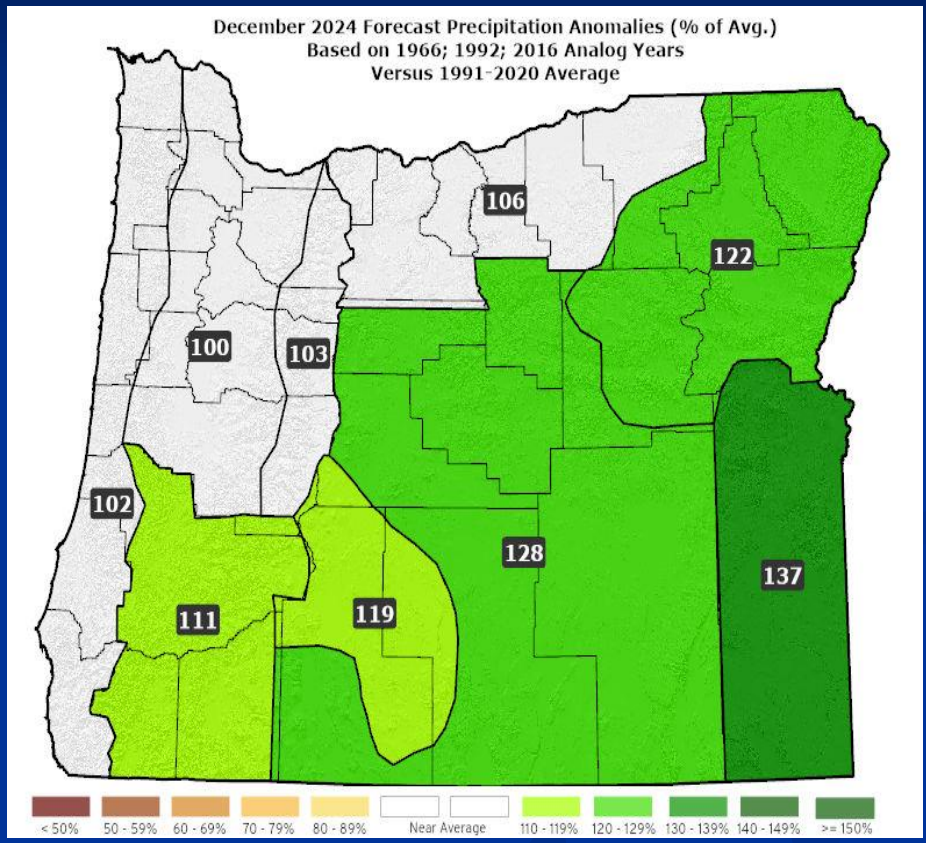
- Analogs had anomalous troughing centered just offshore (1966), over Oregon (1992), or just east of the Pacific Northwest (2016).
- The analog blend (above) puts highly anomalous ridging in the Gulf of Alaska with corresponding troughing over the Pacific Northwest.

December 2024 Forecast

Temperatures



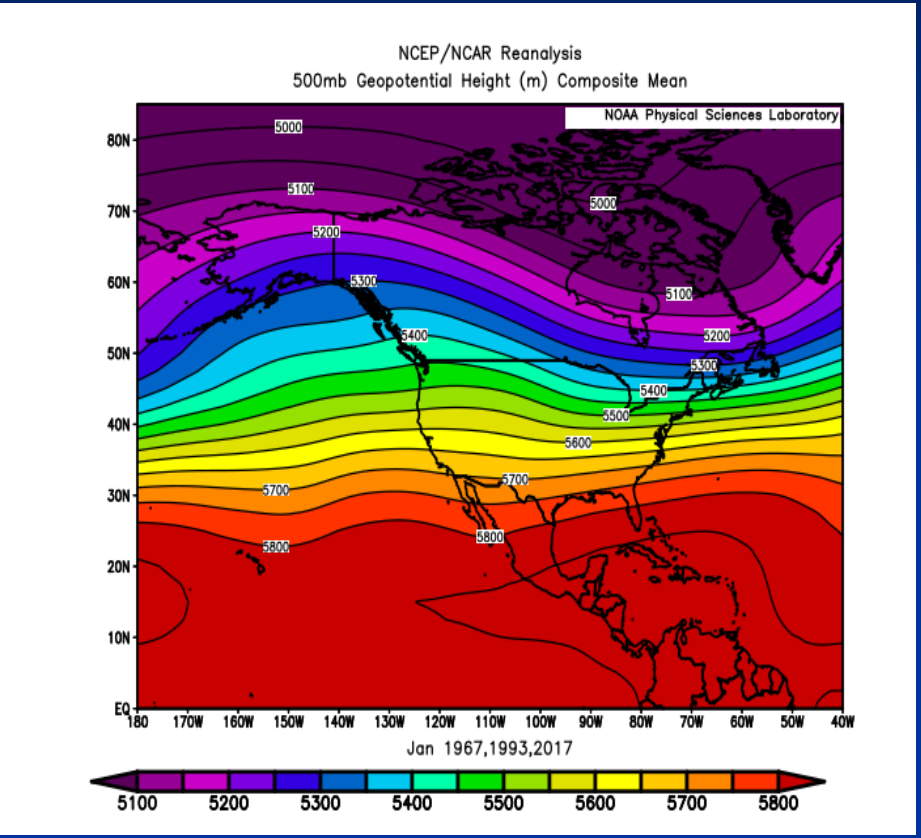
Precipitation



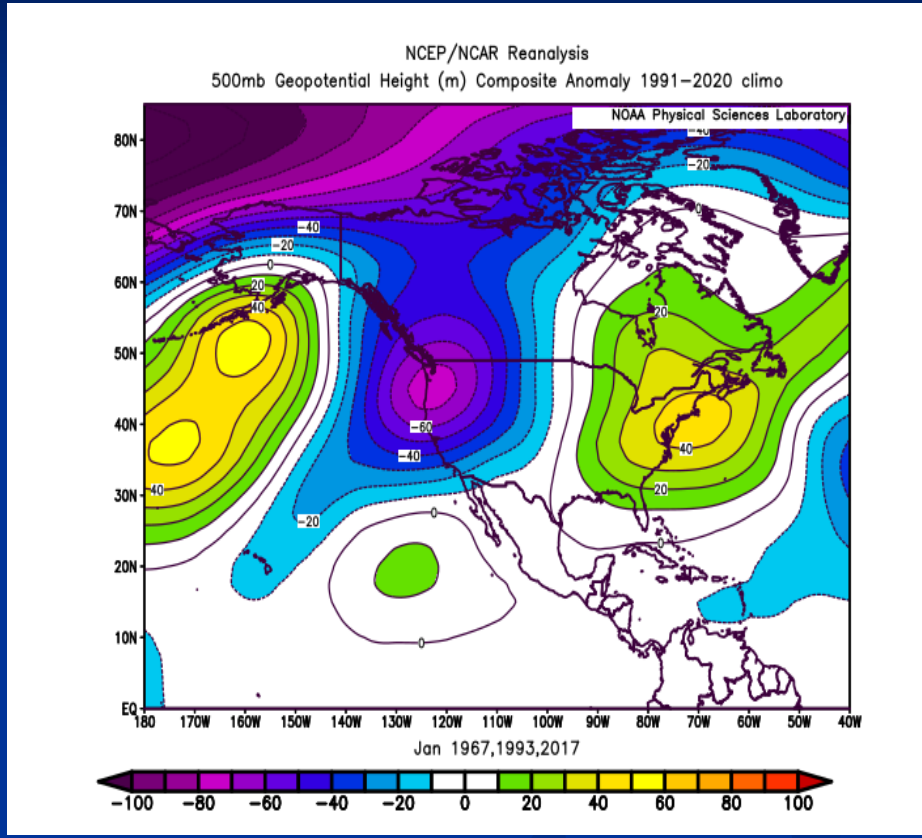
- A slightly mild 1966 is offset (above) by progressively colder 1992 and 2016 analogs, which included arctic air and lowland snow/ice events.
- Analogs were more consistent on precipitation with near or above-average rain and mountain snow.

January 2025 Forecast

Mean Upper-Air Pattern



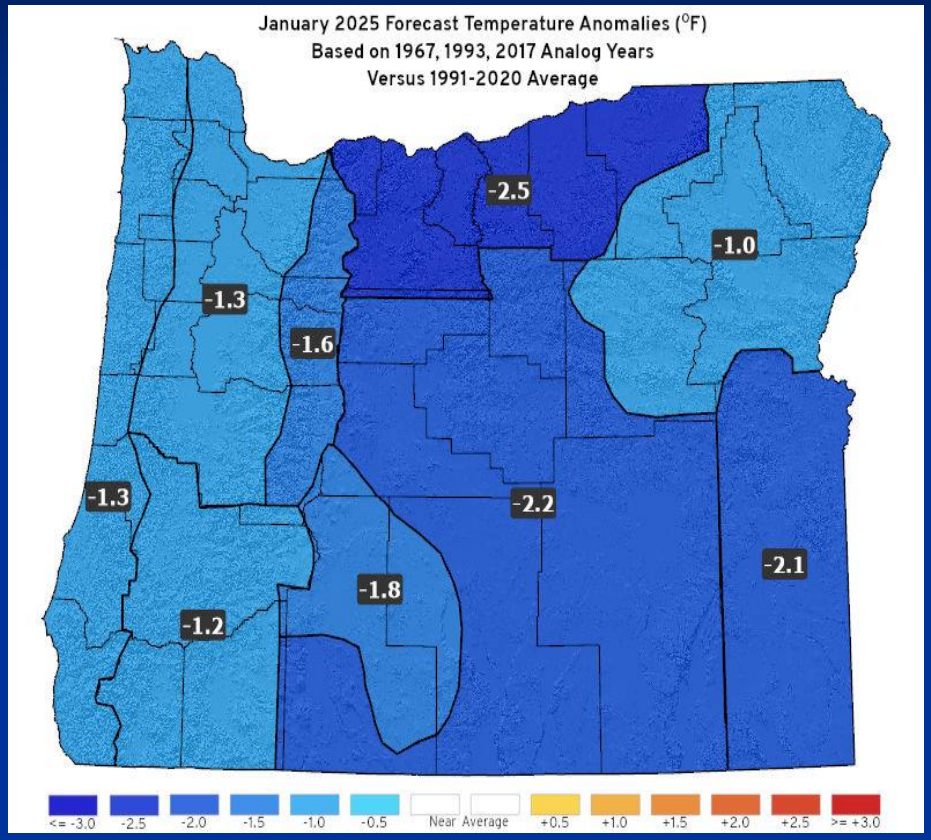
Upper-Air Anomalies



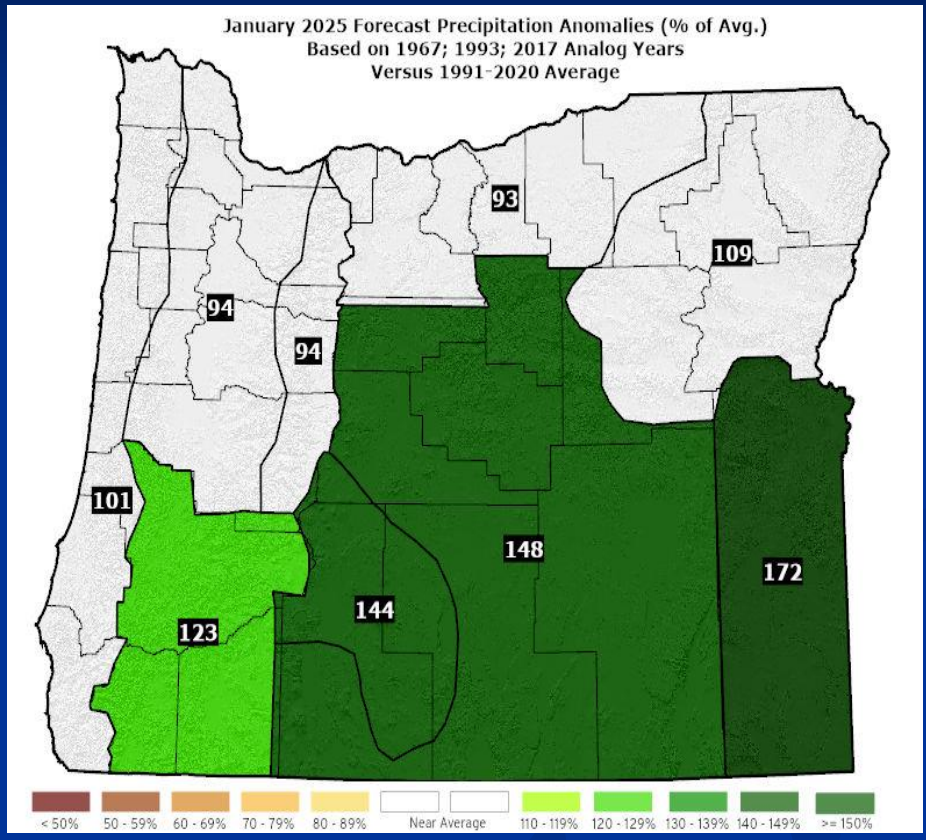
- Analogs all had anomalous mean ridging in the Gulf of Alaska with subsequent downstream troughing over the Pacific Northwest.
- The composite (above) shows anomalous troughing centered on NW Oregon, but analogs had significant variation in its location.

January 2025 Forecast

Temperatures



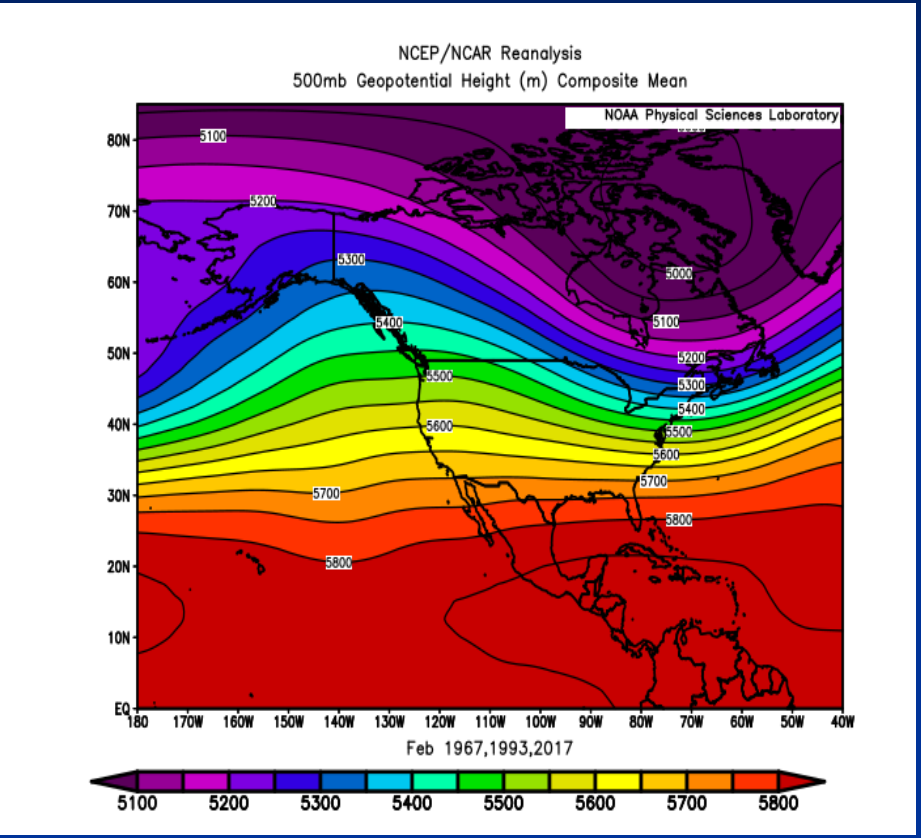
Precipitation



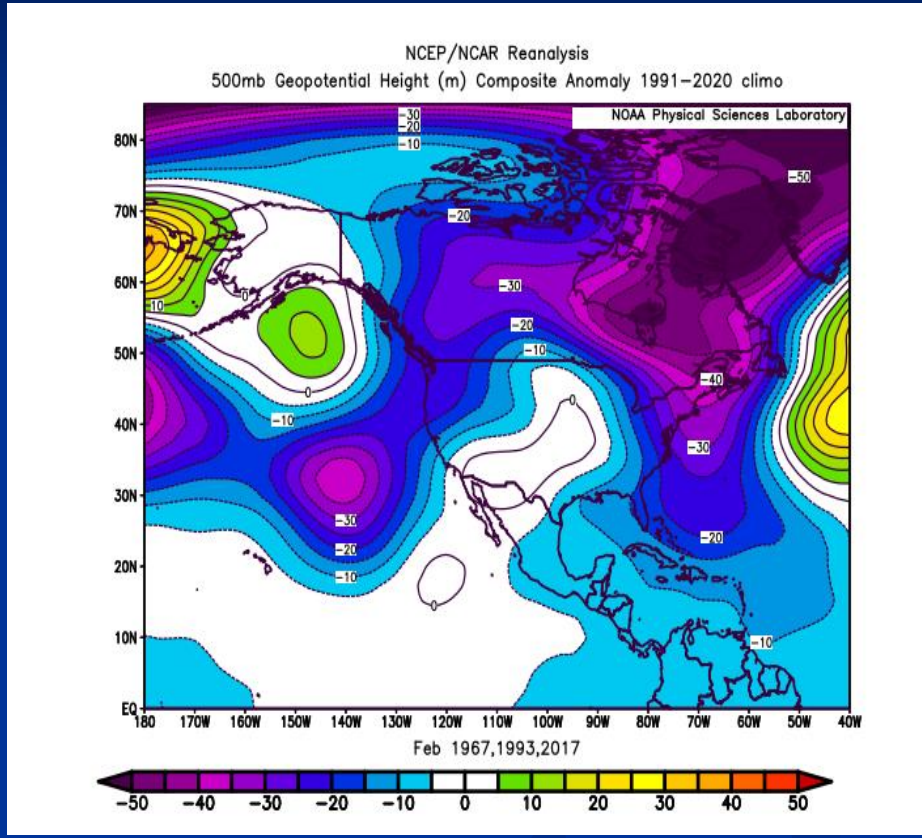
- 1967 centered anomalous troughing offshore. Strong storms produced high winds & heavy mountain snow, especially south…lowlands stayed mild. 1993 & 2017 had troughing centered over Oregon, bringing less precipitation but much colder temperatures and lowland snow.

February 2025 Forecast

Mean Upper-Air Pattern



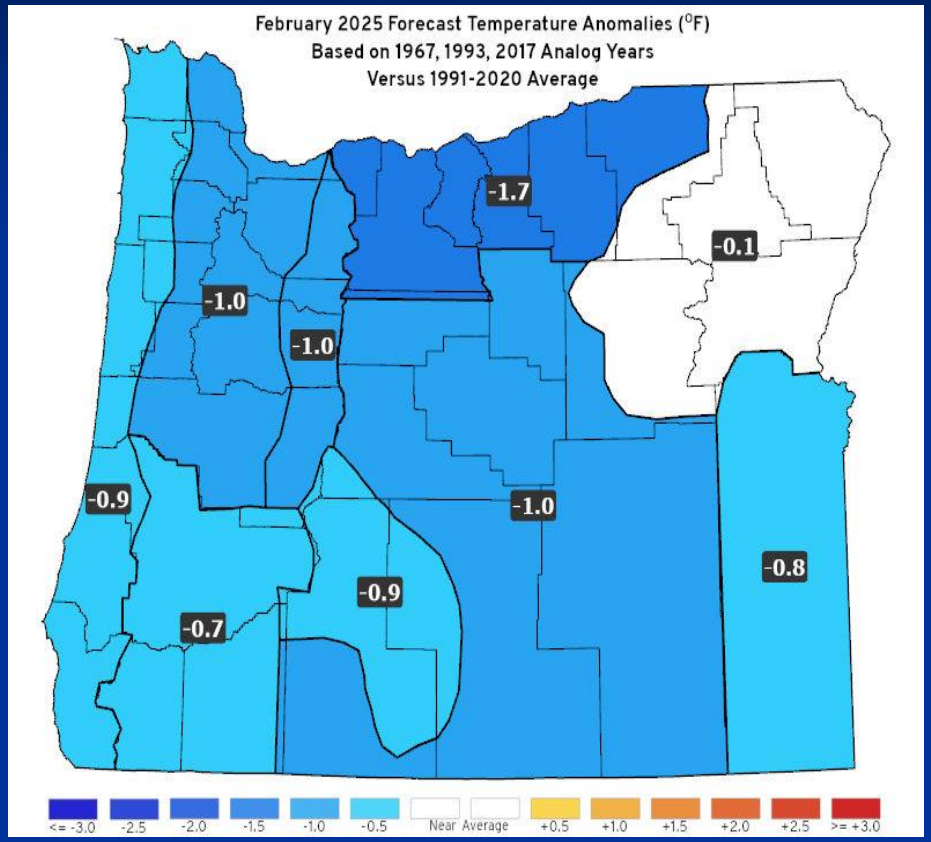
Upper-Air Anomalies



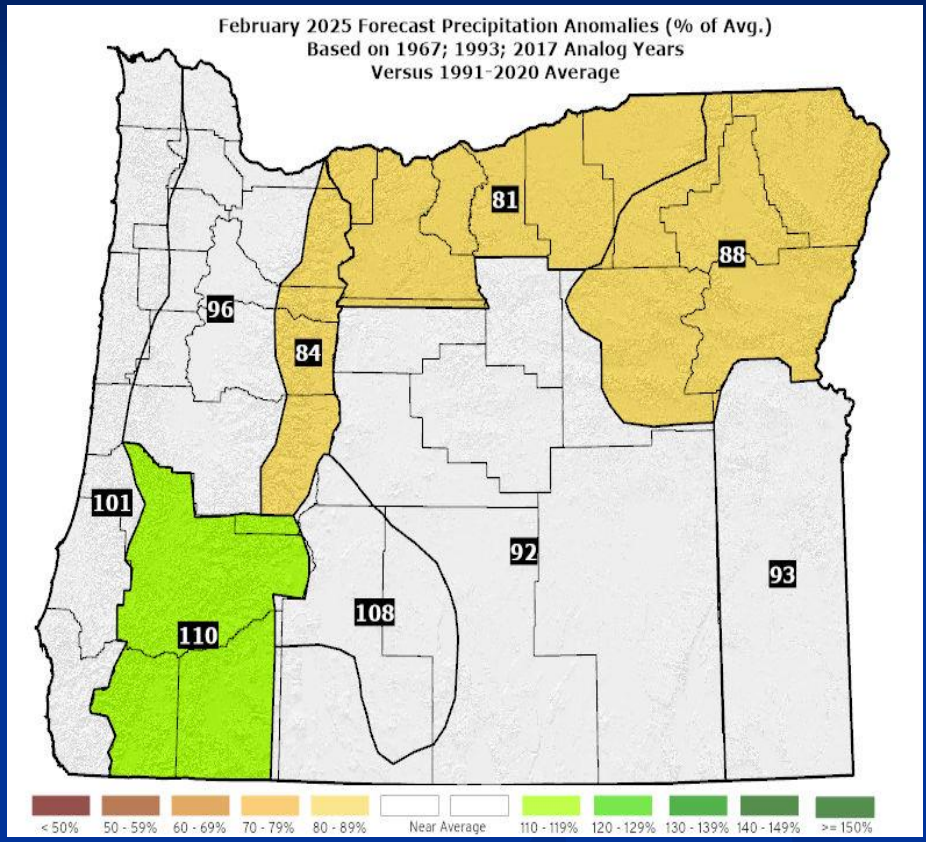
- Huge variation among analogs... 1967 had anomalous ridging over Oregon, while 1993 & 2017 maintained anomalous troughing.
- A blend of the analog years (shown above) favors more upper-level troughing than normal.

February 2025 Forecast

Temperatures



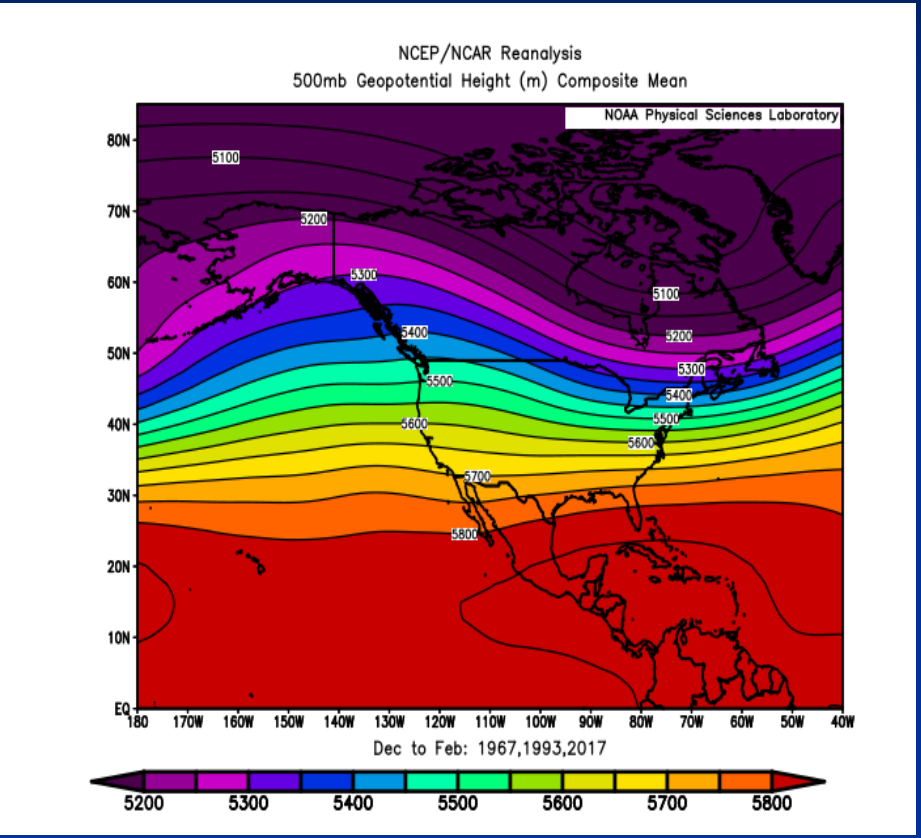
Precipitation



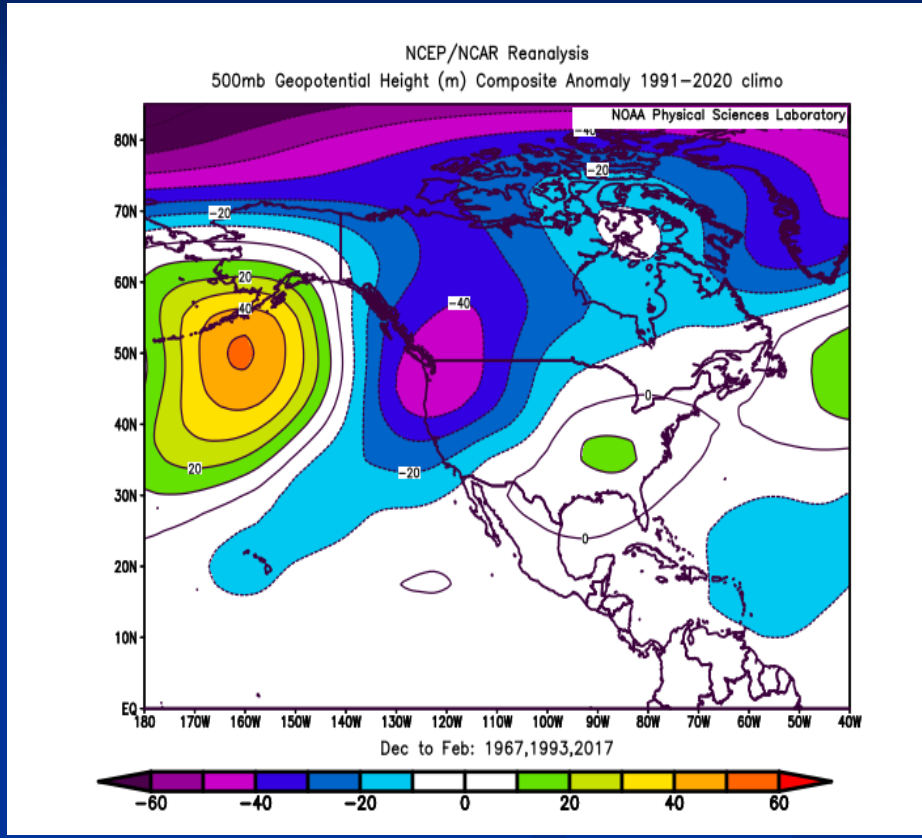
- Huge variation among the analog years, ranging from a warm & dry 1967 to a cool & very wet 2017.
- Current analog "blend" favors slightly cooler than average with near-normal precipitation, but an analog update is likely prior to February…

Dec. 2024 – Feb. 2025 Forecast

Mean Upper-Air Pattern



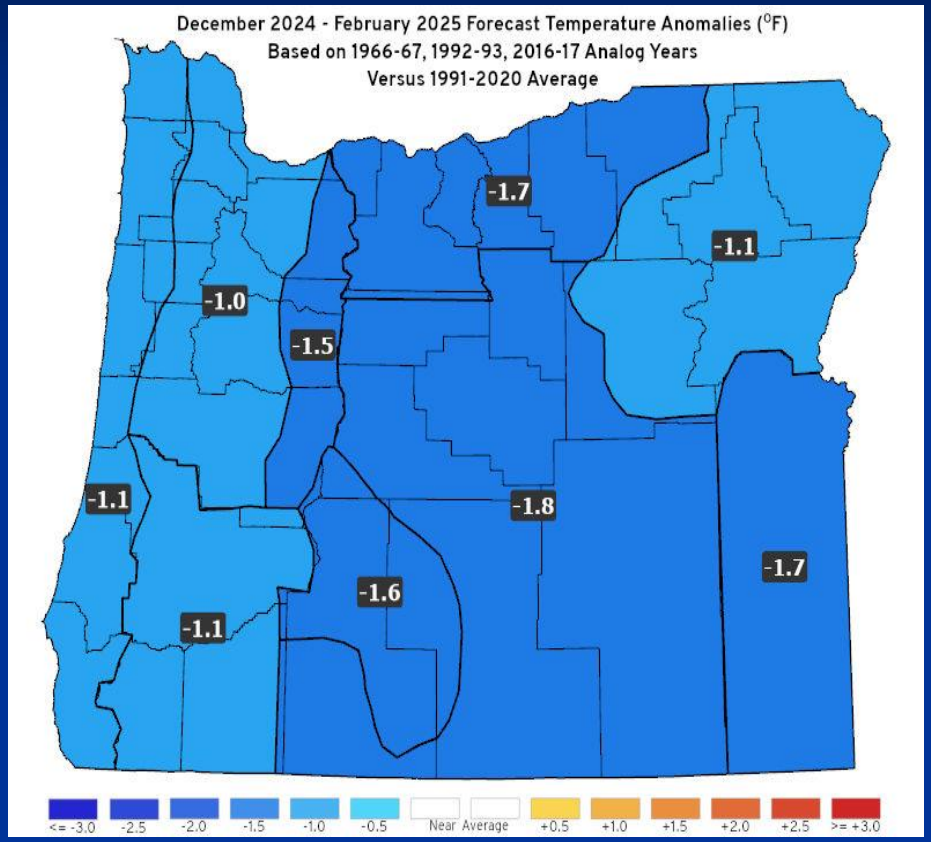
Upper-Air Anomalies



- Analogs all had anomalous ridging in the western Gulf of Alaska and downstream troughing centered near the Pacific Northwest.
- December & January should bring some degree of anomalous troughing over Oregon with the analogs diverging by February.

Dec. 2024 – Feb. 2025 Forecast

Temperatures



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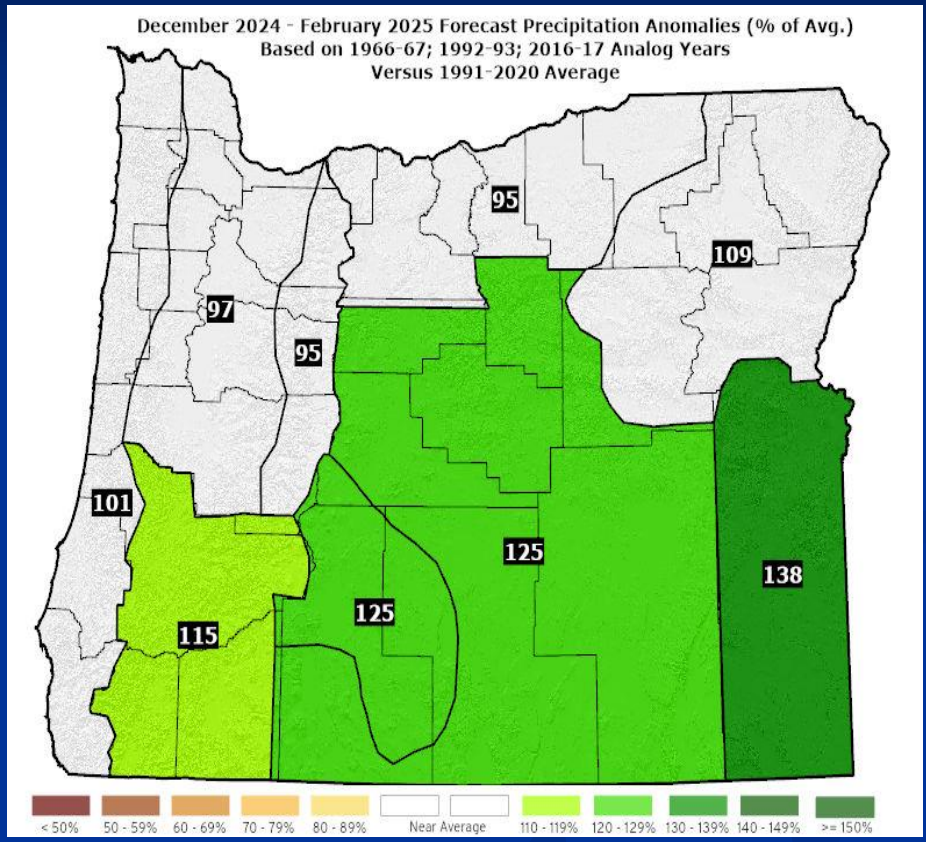

- Volatile weather likely in December & January (mild/stormy or cold/snowy at times). Lower confidence in the February forecast.
- Near-to-above average precipitation with above-average snowfall in the mountains. Increased chances for lowland snow and coastal storms.

Forecast Highlights

- This forecast is based on weather that occurred during the (1966-67; 1992-93; 2016-17) analog years (unchanged from last month).
- Expect the 2024-25 winter to behave markedly different from last winter, which was influenced by a strong El Niño.
- Cold ENSO-neutral conditions are present and may transition to weak La Niña during this forecast period. 1966-67 and 1992-93 remained in ENSO-neutral, while 2016-17 transitioned into weak La Niña.
- Increased chances for stormy or cold/snowy periods in December and January with above-average mountain snow. Forecast confidence drops in February (analog diverge). Analog update likely before then…

Disclaimer: This forecast is not associated with NOAA's CPC (see "Forecasting Methods…" at: https://oda.direct/Weather) nor the official CPC "Three-Month Outlooks," which are available at: https://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=1

Forecast Resources

- ODA Seasonal Climate Forecast Home:

https://www.oregon.gov/ODA/programs/NaturalResources/Pages/Weather.aspx

- CPC Official US Three-Month Forecasts (Graphics):

https://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=01

- CPC US 30-Day & 90-Day Forecasts (Discussions):

https://www.cpc.ncep.noaa.gov/products/predictions/long_range/fxus07.html

- CPC Weekly & Monthly ENSO Discussions:

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

- Australian Government Climate Model Summary:

http://www.bom.gov.au/climate/model-summary/#region=NINO34&tabs=Overview

- Australian Government ENSO Wrap-Up:

http://www.bom.gov.au/climate/enso

- IRI ENSO Quick Look:

https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/

Water Supply / Fire-Potential Outlook

- CPC U.S. Seasonal Drought Outlook:

https://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.png

- NRCS Snow Water Equivalent Oregon Map:

https://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/or_swepctnormal_update.pdf

- NRCS/USDA Snow Water Equivalent Products:

https://www.nrcs.usda.gov/wps/portal/wcc/home/snowClimateMonitoring/snowpack/

- NDMC U.S. Drought Monitor:

https://droughtmonitor.unl.edu/

- NIDIS North American Drought Portal:

https://www.drought.gov/nadm/content/percent-average-precipitation

- WRCC WestWideDroughtTracker:

https://www.wrcc.dri.edu/wwdt/

- NWCC Northwest Interagency Coordination Center (video)

https://gacc.nifc.gov/nwcc/predict/outlook.aspx

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