



Center for Western Weather
and Water Extremes

SCRIPPS INSTITUTION OF OCEANOGRAPHY
AT UC SAN DIEGO

CW3E Subseasonal Outlook: 6 January 2026

Prepared by: C. Castellano, J. Wang, Z. Yang, M. DeFlorio, J. Kalansky

UC San Diego



CW3E Subseasonal Outlooks: Glossary & Context

- The outlooks are based on CW3E subseasonal forecast products that can be found here: https://cw3e.ucsd.edu/s_and_s_forecasts/
- CW3E subseasonal (2–6 weeks lead time) atmospheric river, ridging, and circulation regime products use three different global ensemble prediction systems to create these products:
 - NCEP CFSv2 (US Model): Weeks 2–4
 - ECCO (Canadian Model): Weeks 2–4
 - ECMWF (European model): Weeks 2–4
- *On the following slides, the term confidence refers to the forecasters' interpretation of the magnitude of the anomalies, the level of ensemble agreement, and the skill of the products used to generate the forecasts. All the tools used are shown in the outlook presentation.*
- *The thresholds for below-normal, near-normal, and above-normal conditions are determined by forecast product and noted on each forecast product slide*

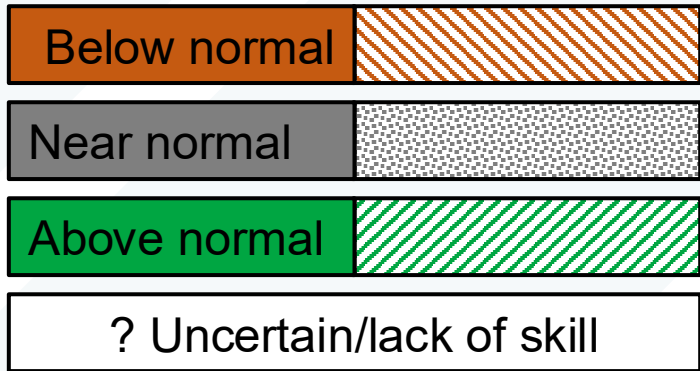
Summary: Subseasonal Precipitation Outlook by Model

This slide shows the CW3E synthesis of subseasonal products by model

Forecasts Initialized 5 Jan 2026

Region	Week 2 (12–18 Jan)				Week 3 (19–25 Jan)				Week 4 (26 Jan – 1 Feb)			
	NCEP ^{1,2,3}	ECCC ¹	ECMWF ^{1,2}	Multi-Model Forecast	NCEP ^{1,2,3}	ECCC ¹	ECMWF ^{1,2}	Multi-Model Forecast	NCEP ^{1,2,3}	ECCC ¹	ECMWF ^{1,2}	Multi-Model Forecast
WA/OR	Below normal	Below normal	Below normal	Below normal	Below normal	Near normal	Below normal	Below normal	Above normal	Above normal	Below normal	Above normal
Northern CA	Below normal	Below normal	Below normal	Below normal	Below normal	Near normal	Below normal	Below normal	Above normal	Above normal	Below normal	Above normal
Central CA	Below normal	Below normal	Below normal	Below normal	Below normal	Above normal	Below normal	Below normal	Below normal	Above normal	Below normal	Below normal
Southern CA	Below normal	Below normal	Below normal	Below normal	Below normal	Above normal	Below normal	Below normal	Below normal	Above normal	Below normal	Below normal

Higher Confidence | Lower Confidence



- Forecasts show high confidence in below-normal precipitation in all of CA during Week 2
- More uncertainty during Weeks 3–4, but NCEP and ECCC lean towards above-normal precipitation in Northern CA during Week 4

Subseasonal products included in this Outlook:

¹CW3E/JPL Atmospheric River Activity Forecasts ([DeFlorio et al. 2019](#), [Zhang et al. 2023](#))

²CW3E/JPL Ridging Forecasts ([Gibson et al. 2020](#))

³CW3E West Coast Weather Regime Forecasts (Guirguis et al. [2023a](#) and [2023b](#))

Summary

MJO/QBO Conditions

- Weak MJO convection is currently located over the Western Pacific; QBO is in the easterly phase
 - Weak MJO has limited impacts on mid-latitude weather and climate
- NCEP is forecasting MJO convection to remain weak during Week 1, then strengthen over the Western Pacific during Week 2

Week 2 Forecasts (12–18 Jan):

- Models generally agree on high confidence in below-normal AR activity over CA
- Ridging outlooks show high likelihood of persistent North-ridge activity (ridging centered over Pacific Northwest) during Weeks 1–2
 - North-ridge type is associated with dry conditions over all of CA
- CW3E West Coast weather regime tool shows high likelihood of patterns associated with below-normal precipitation in all of CA

Summary

Week 3 Forecasts (19–25 Jan):

- Models generally disagree on AR activity over CA
 - In Northern CA, NCEP is forecasting slightly below-normal AR activity with high confidence, ECCC is forecasting near-normal to slightly-above normal AR activity, and ECMWF is forecasting near-normal to slightly below-normal AR activity
 - In Central CA, NCEP is forecasting near-normal to slightly below-normal AR activity, ECCC is forecasting above-normal AR activity, and ECMWF is forecasting near-normal AR activity
 - In Southern CA, NCEP and ECMWF are forecasting near-normal to slightly above-normal AR activity, whereas ECCC is forecasting above-normal AR activity
- Ridging outlooks show some uncertainty in frequency and location of ridging activity during Weeks 3–4
 - NCEP is forecasting above-normal South-ridge activity (dry conditions over Southern CA; wet conditions over Northern CA) with moderate confidence
- CW3E West Coast weather regime tool shows moderate-to-high likelihood of patterns associated with below-normal precipitation in Northern and Central CA

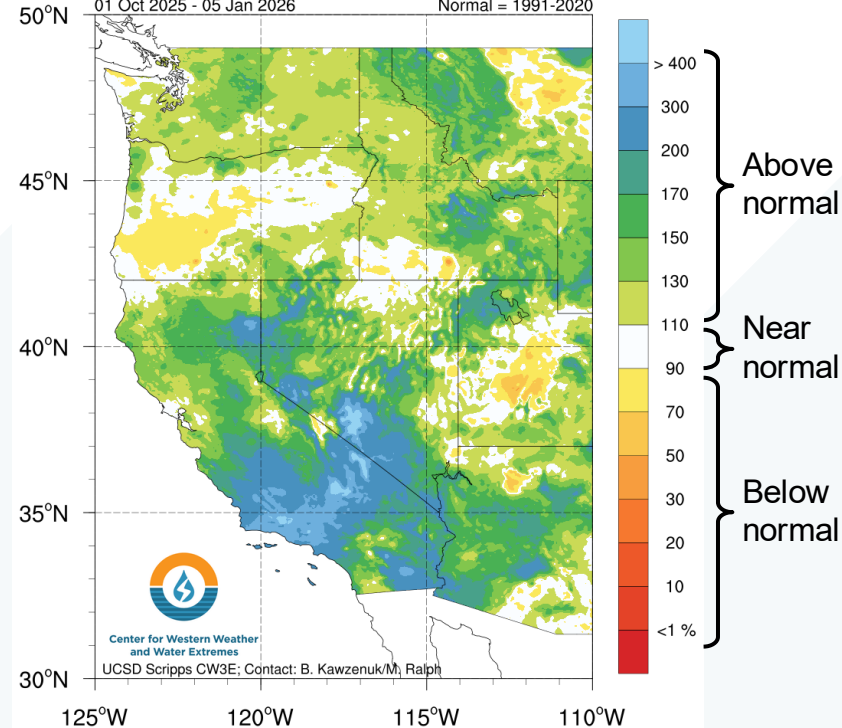
Week 4 Forecasts (26 Jan – 1 Feb):

- Models generally agree on above-normal AR activity in Central and Southern CA; some disagreement in Northern CA
 - In Northern CA, NCEP and ECCC are both forecasting on above-normal AR activity, whereas ECMWF is forecasting near-normal to slightly above-normal AR activity
- CW3E West Coast weather regime tool shows a high degree of uncertainty during Week 4

Hydrologic Summary

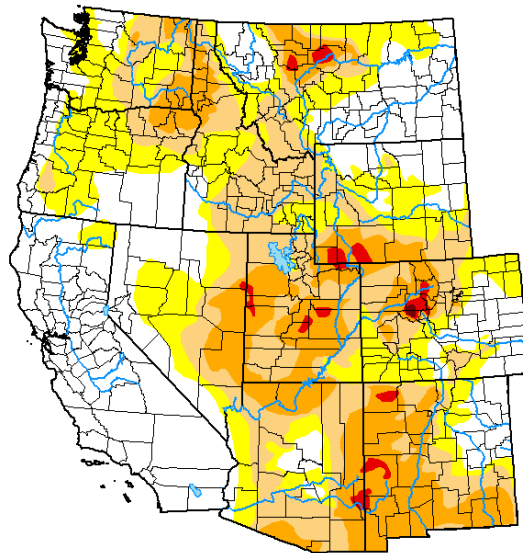
Precipitation

PRISM Water Year to Date Precipitation Anomaly (%)
01 Oct 2025 - 05 Jan 2026 Normal = 1991-2020



Drought Conditions

U.S. Drought Monitor Western U.S.



December 30, 2025

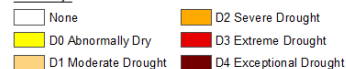
(Released Wednesday, Dec. 31, 2025)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	35.59	64.41	41.04	18.59	1.33	0.05
Last Week 12-23-2025	31.66	68.34	44.23	19.68	1.81	0.05
3 Months Ago 09-30-2025	18.15	81.85	64.82	44.12	12.00	0.69
Start of Calendar Year 01-01-2025	32.22	67.78	39.02	20.30	6.87	0.00
Start of Water Year 09-30-2025	18.15	81.85	64.82	44.12	12.00	0.69
One Year Ago 12-31-2024	29.66	70.34	39.86	19.17	6.85	0.00

Intensity:



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:
Rocky Bilotta
NCEI/NOAA



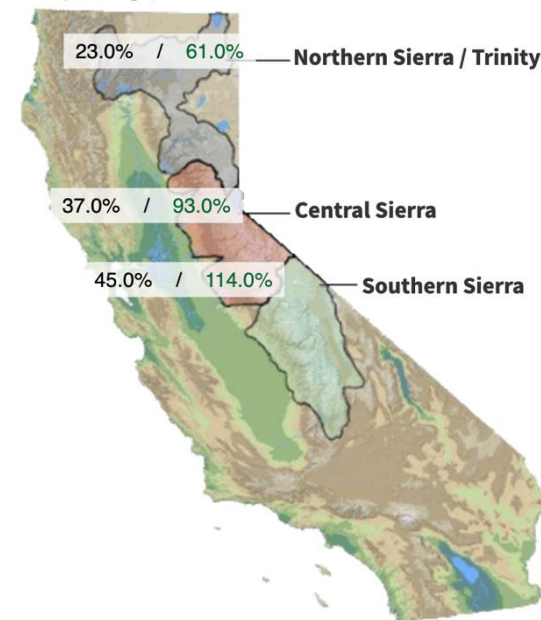
droughtmonitor.unl.edu

Snowpack Conditions

Provided by the California Cooperative Snow Surveys

Data For: 05-Jan-2026

% Apr 1 Avg. / % Normal for this Date



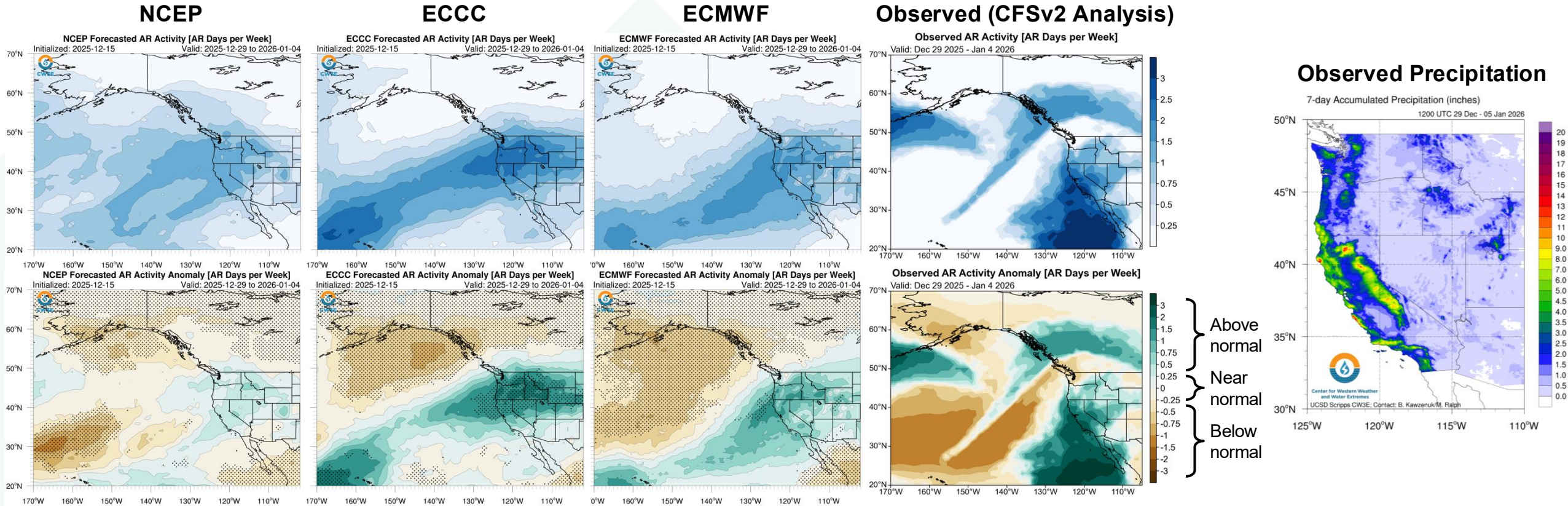
Source: California DWR

Disclaimer: In addition to climate indicators, the U.S. Drought Monitor also uses impact reports from local observers about crop failures or water restrictions to quantify drought.

- As of 5 Jan, water-year-to-date precipitation is running **above normal (>130% of normal)** in much of Northern CA and **well-above normal (>150% of normal)** in Central and Southern CA
- The most recent drought monitor update is showing no drought over nearly all of CA
- As of 5 Jan, estimated snowpack is slightly above normal in the Southern Sierra Nevada (**114% of normal**), near normal in the Central Sierra Nevada (**93% of normal**), and below normal in the Northern Sierra Nevada (**61% of normal**)
- Snowpack conditions have improved substantially in recent weeks due to storms in late December and early January

Looking Back: Week 3 AR Activity Forecasts

Forecasts Initialized 15 Dec 2025; Valid: Dec 29 2025 – 4 Jan 2026

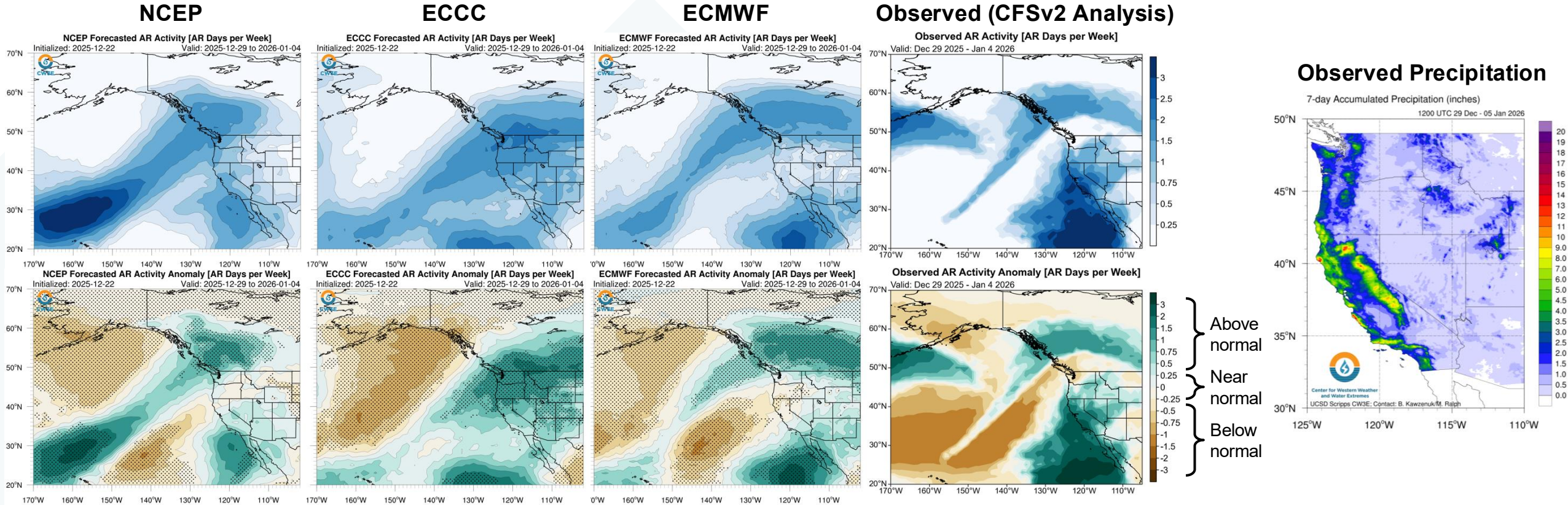


Shading: Fractional # of AR days forecast over a 7-day period (top) and forecast minus model climatology (bottom; green/blue = higher than climatology; brown = lower than climatology)

- At 3-week lead times, all models correctly predicted above-normal AR activity over much of California, but the axis of forecast AR activity was more zonal than observed
- All models struggled to predict the overall large-scale circulation pattern and underestimated the region of enhanced AR activity extending from west of the Baja Peninsula northward into Southern CA
- Multiple ARs and low-pressure systems produced at least 5–10 inches of precipitation in the California Coast Ranges, Sierra Nevada, and Transverse Ranges during 31 Dec – 5 Jan

Looking Back: Week 2 AR Activity Forecasts

Forecasts Initialized 22 Dec 2025; Valid: Dec 29 2025 – 4 Jan 2026

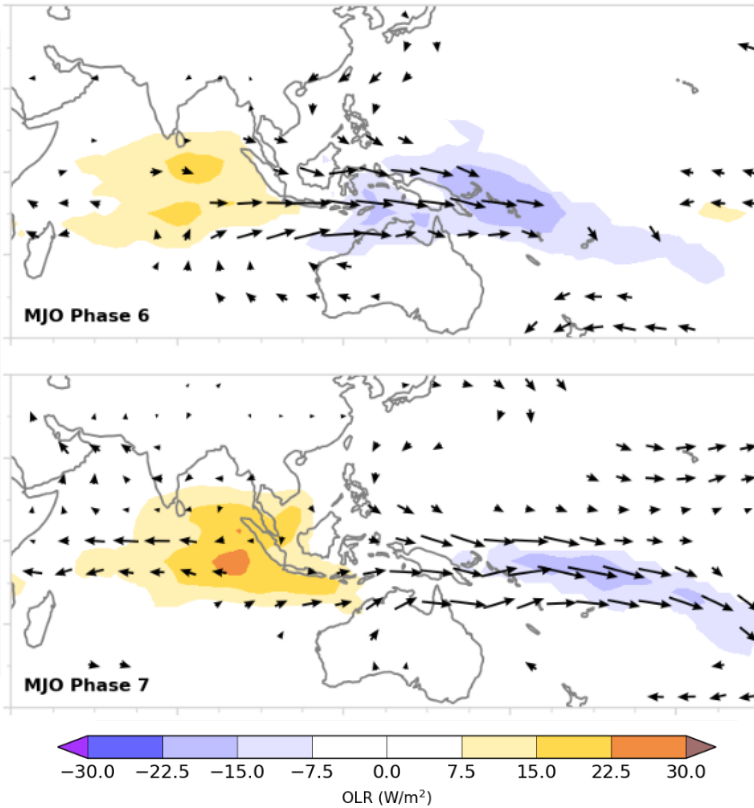


Shading: Fractional # of AR days forecast over a 7-day period (top) and forecast minus model climatology (bottom; green/blue = higher than climatology; brown = lower than climatology)

- At 2-week lead times, all models captured the region of enhanced AR activity west of the Baja Peninsula, but generally underestimated AR activity over California
- Multiple ARs and low-pressure systems produced at least 5–10 inches of precipitation in the California Coast Ranges, Sierra Nevada, and Transverse Ranges during 31 Dec – 5 Jan

Dynamical Model MJO Forecasts (NCEP)

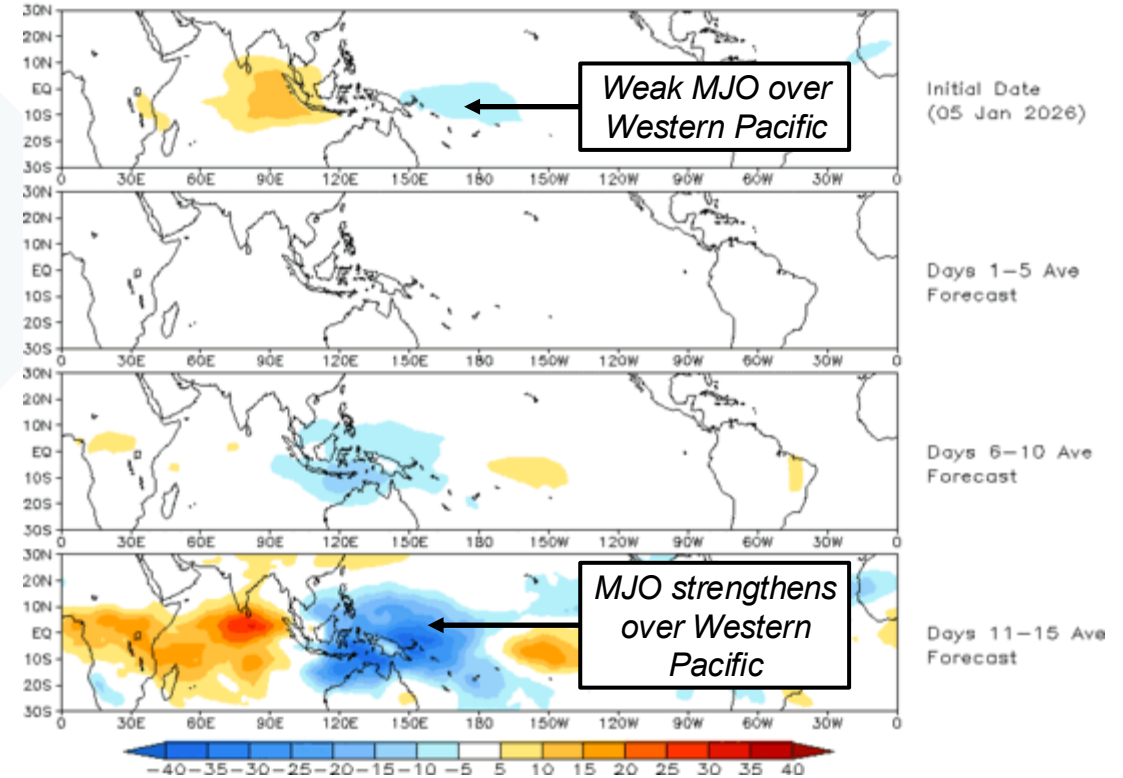
Observed MJO
Phases 6&7 (Western Pacific)



OLR = Outgoing longwave radiation

Weeks 1–2 MJO Prediction

Prediction of MJO-related anomalies using GEFS operational forecast
Initial date: 05 Jan 2026
OLR

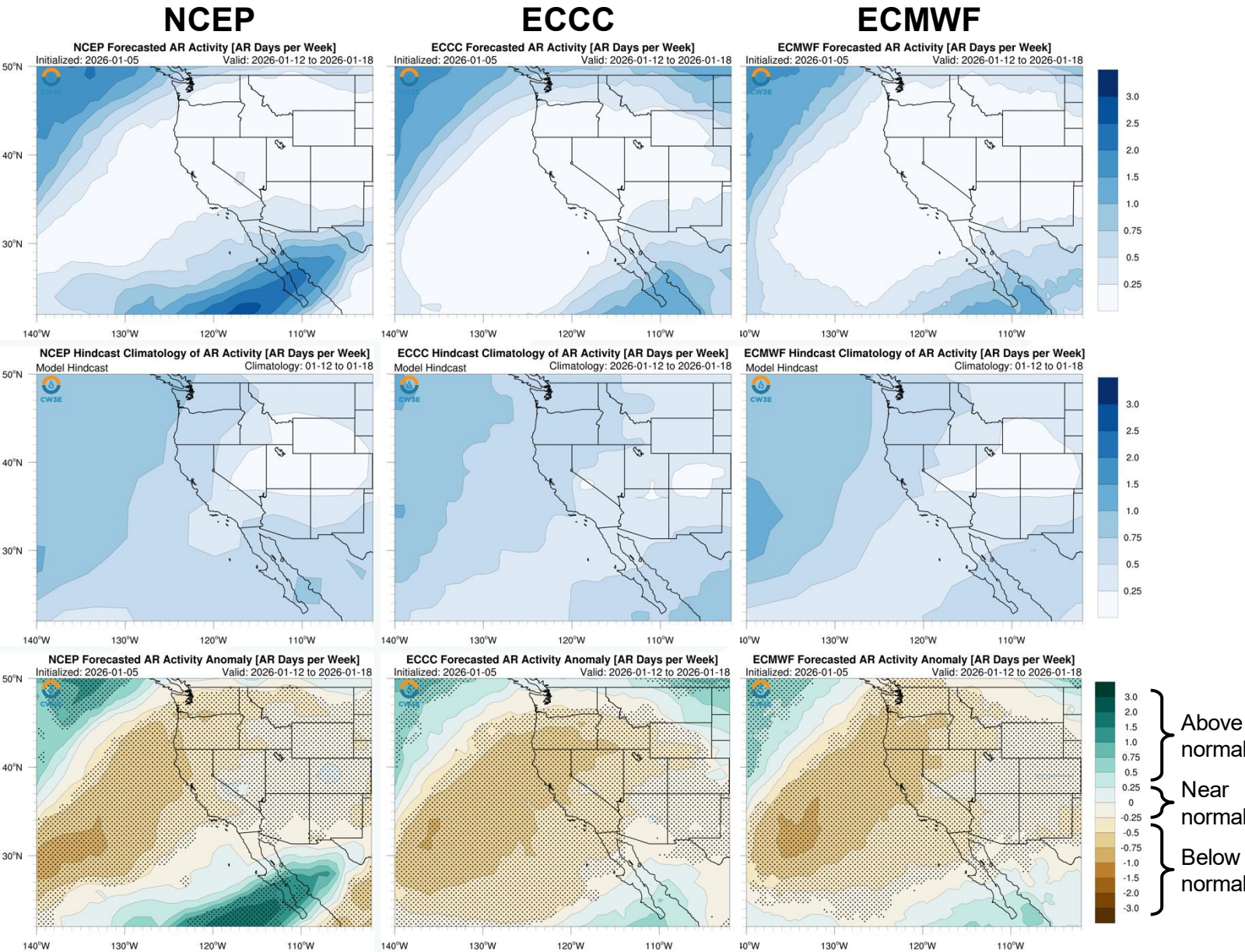


- As of 5 Jan, weak MJO convection is currently located over the Western Pacific
- NCEP is forecasting MJO convection to remain very weak through Week 1, then re-emerge over the Western Pacific slightly west of its current location during Week 2
- Weak MJO has limited impacts on mid-latitude weather and climate

AR Activity Forecasts: Week 2 (NCEP vs. ECCC vs. ECMWF)

Forecasts Initialized 5 Jan 2026

- All models show high confidence in slightly below-normal to below-normal AR activity over CA during Week 2 (12–18 Jan)

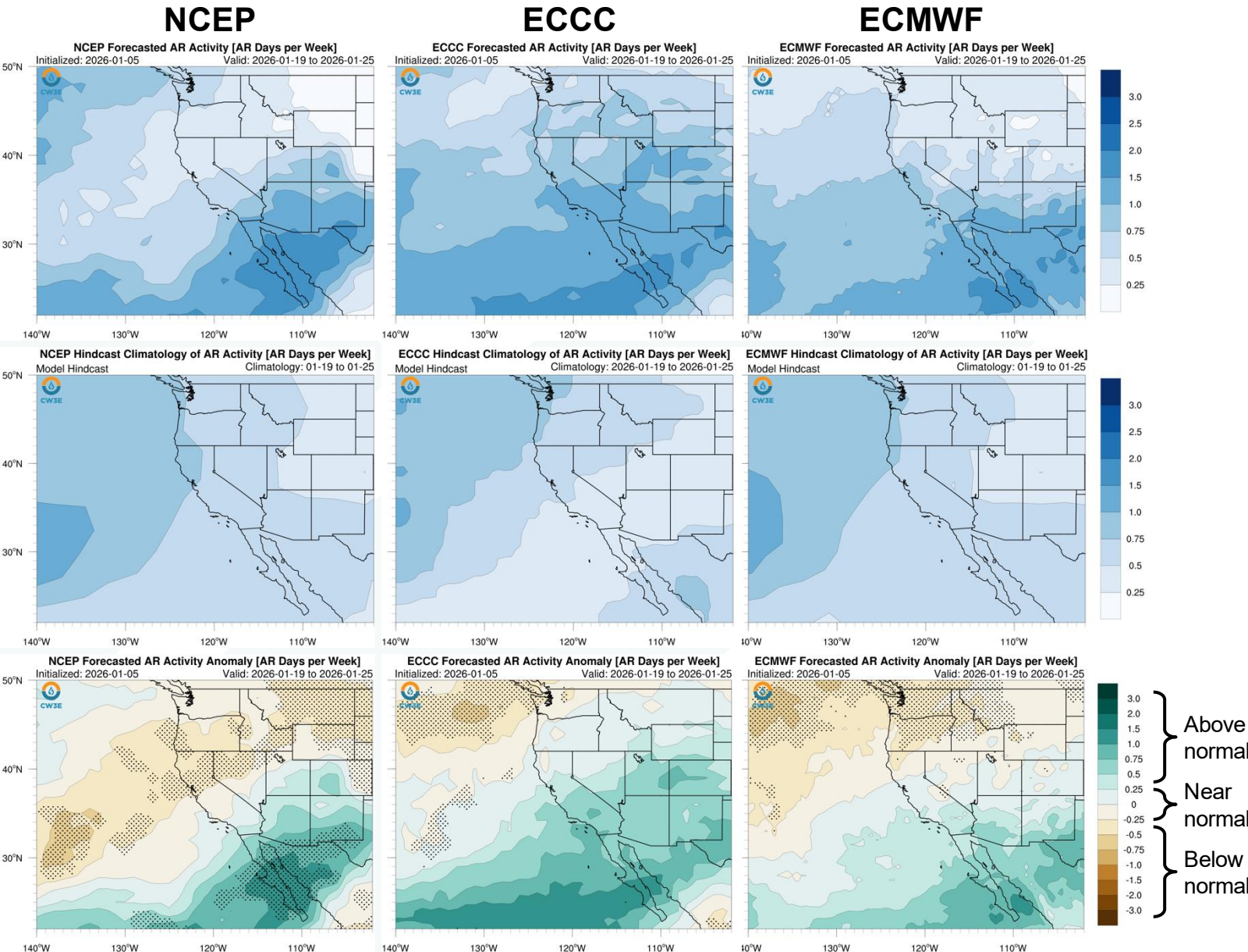


Models generally agree on high confidence in below-normal AR activity over CA during Week 2 (12–18 Jan)

Shading: Fractional # of AR days forecast over a 7-day period (top), model climatology (middle), and forecast minus model climatology (bottom; green/blue = higher than climatology; brown = lower than climatology)

AR Activity Forecasts: Week 3 (NCEP vs. ECCC vs. ECMWF)

Forecasts Initialized 5 Jan 2026



- In Northern CA, NCEP is forecasting slightly below-normal AR activity with high confidence during Week 3 (19–25 Jan), ECCC is forecasting near-normal to slightly above normal AR activity, and ECMWF is forecasting near-normal to slightly below-normal AR activity
- In Central CA, NCEP is forecasting near-normal to slightly below-normal AR activity, ECCC is forecasting above-normal AR activity, and ECMWF is forecasting near-normal AR activity
- In Southern CA, NCEP and ECMWF are forecasting near-normal to slightly above-normal AR activity, whereas ECCC is forecasting above-normal AR activity

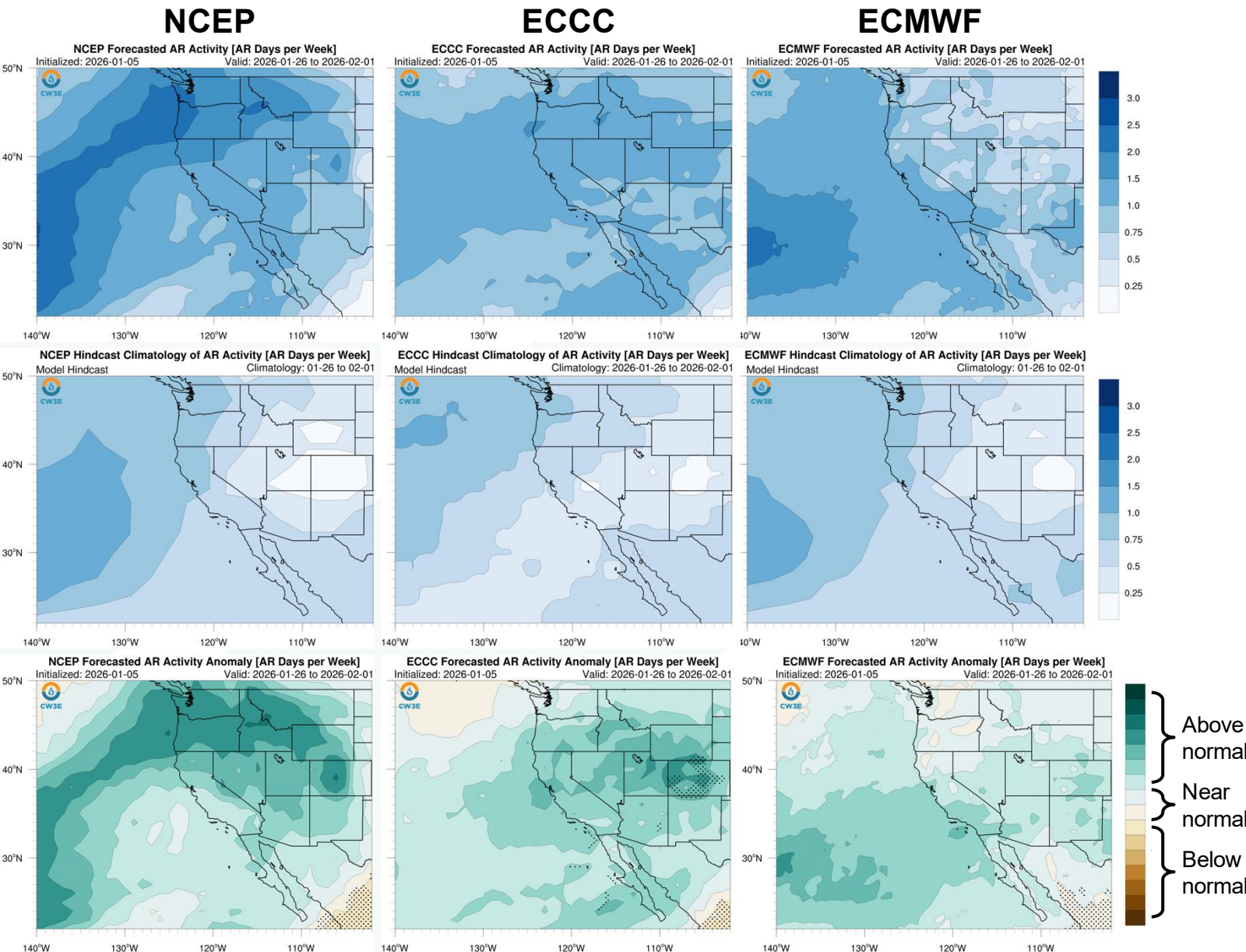
Models generally disagree on AR activity over CA during Week 3 (19–25 Jan)

Shading: Fractional # of AR days forecast over a 7-day period (top), model climatology (middle), and forecast minus model climatology (bottom; green/blue = higher than climatology; brown = lower than climatology)

AR Activity Forecasts: Week 4 (NCEP vs. ECCC vs. ECMWF)

Forecasts Initialized 5 Jan 2026

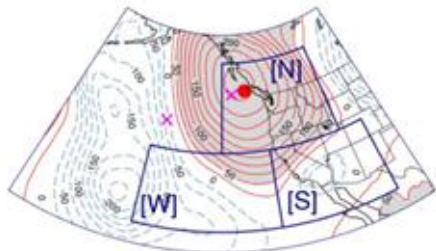
- NCEP and ECCC are both forecasting above-normal AR activity in Northern CA during Week 4 (26 Jan – 1 Feb), whereas ECMWF is forecasting near-normal to slightly above-normal AR activity
- All models are forecasting slightly above-normal to above-normal AR activity over Central and Southern CA



Models generally agree on above-normal AR activity in Central and Southern CA during Week 4 (26 Jan – 1 Feb); NCEP and ECCC agree on above-normal AR activity over Northern CA

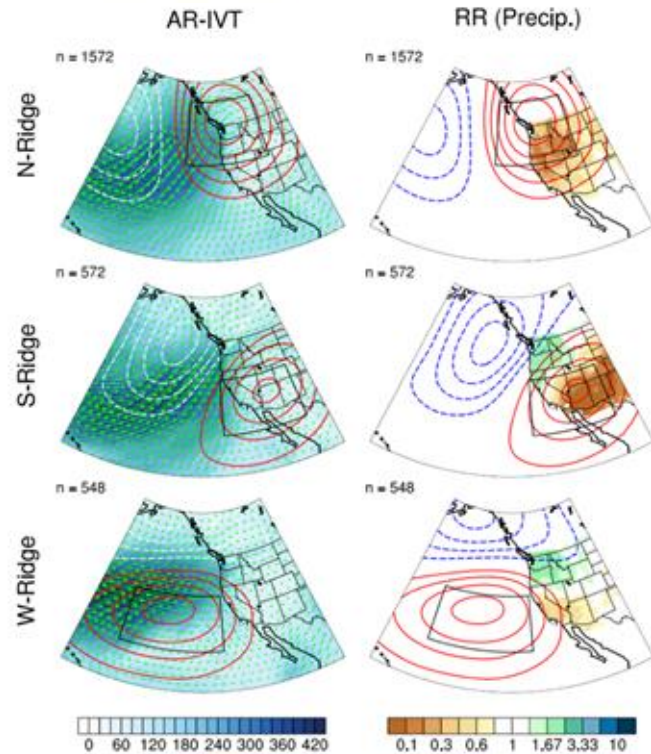
Shading: Fractional # of AR days forecast over a 7-day period (top), model climatology (middle), and forecast minus model climatology (bottom; green/blue = higher than climatology; brown = lower than climatology)

Background Info: Subseasonal Ridging Outlooks



N = North Ridge
S = South Ridge
W = West Ridge

This slide contains background information about the three different ridge types in CW3E's subseasonal ridging outlook tool



- The North-Ridge type is typically associated with widespread dry conditions across the entire western US
- The South-Ridge type is typically associated with dry conditions in Southern CA and the Colorado River Basin and wet conditions in the Pacific Northwest
- The West-Ridge type is typically associated with dry conditions over Central and Southern CA and wet conditions over the Pacific Northwest

How each ridge type typically influences precipitation

Left: Maps showing the average influence of each ridge type (red contours) on integrated vapor transport (IVT, blue shading indicates greater moisture transport, arrows indicate direction) during atmospheric river events

Right: Maps showing the 'Relative Risk' (RR) of precipitation under each ridge type. Brown shading indicates a reduced chance of precipitation when ridging occurs. For example, a RR value of 0.2 indicates a 5-fold reduction in the likelihood of precipitation



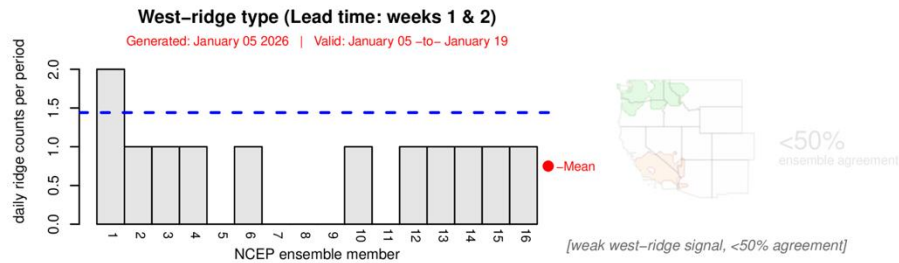
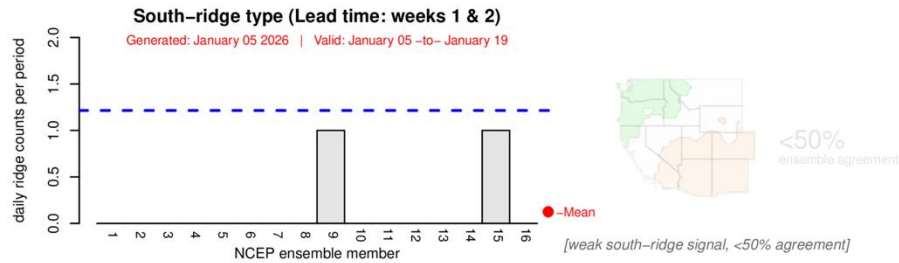
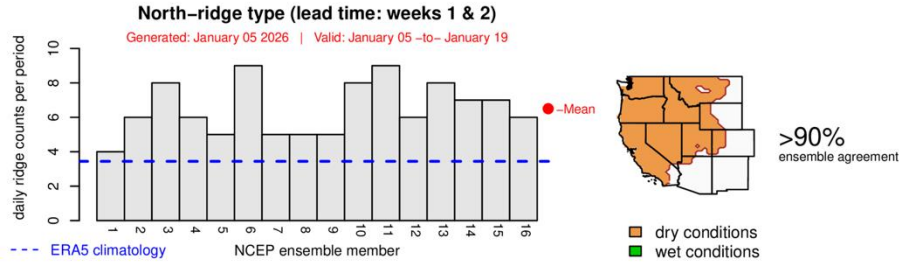
Contact: pgibson@ucsd.edu
Reference: Gibson et al. (2020)
Journal of Climate

Ridging Forecasts: Weeks 1–2 (NCEP vs. ECMWF)

Forecasts Initialized 5 Jan 2026

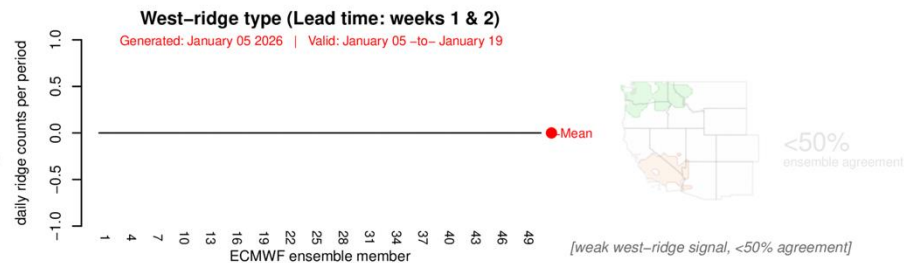
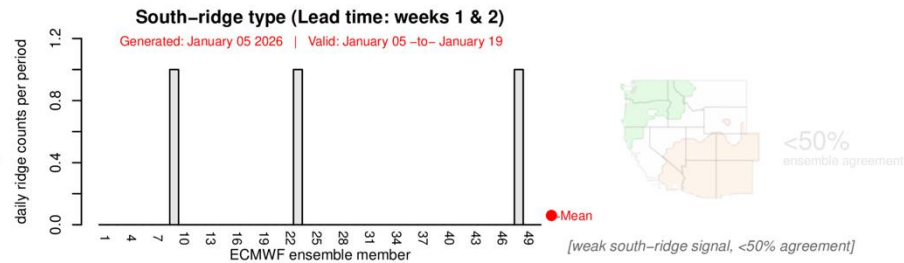
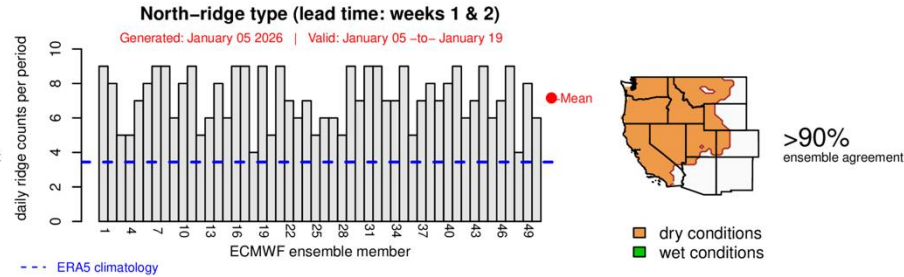
NCEP

CW3E Subseasonal Ridging Forecast (Uses NCEP CFSv2 model)



ECMWF

CW3E Subseasonal Ridging Forecast (Uses ECMWF model)



- Both models are forecasting above-normal North-ridge activity with high confidence (>90% ensemble agreement) during Weeks 1–2 (5–19 Jan)
- Both models are also forecasting below-normal South-ridge and West-ridge activity

Models show high likelihood of persistent ridging activity over the Pacific Northwest during Weeks 1–2 (5–19 Jan)

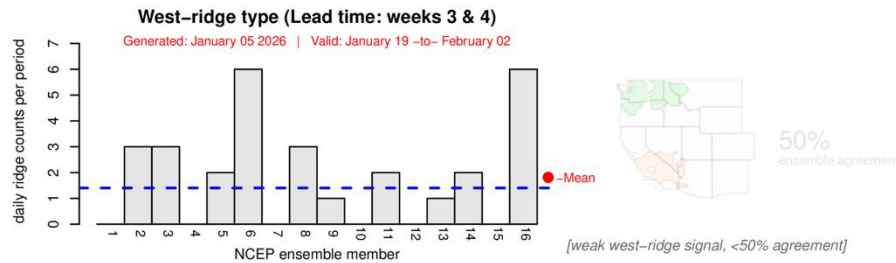
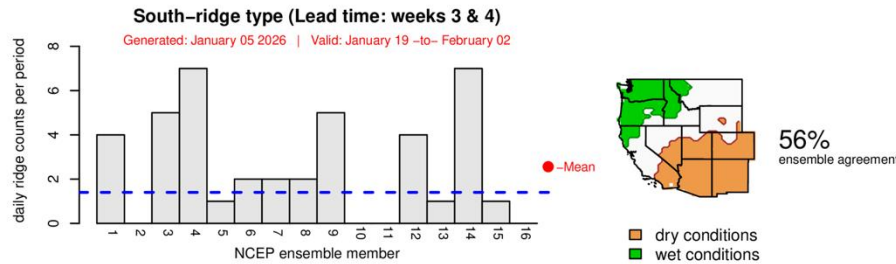
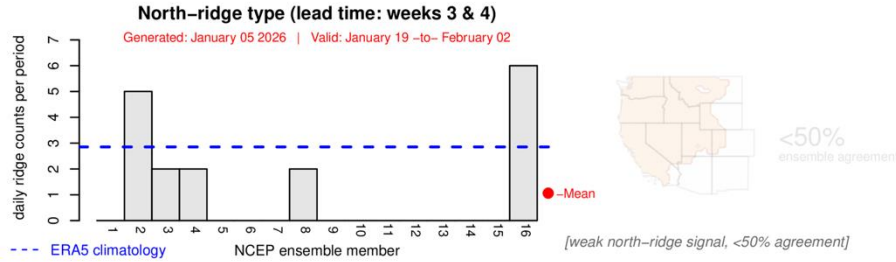


Ridging Forecasts: Weeks 3–4 (NCEP vs. ECMWF)

Forecasts Initialized 5 Jan 2026

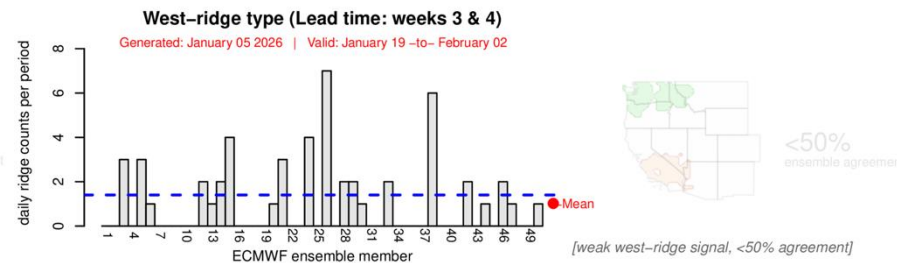
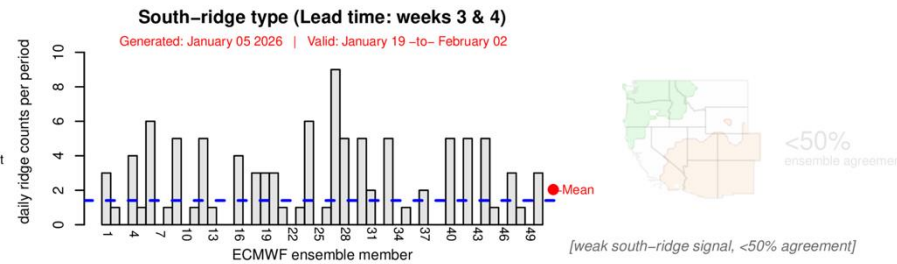
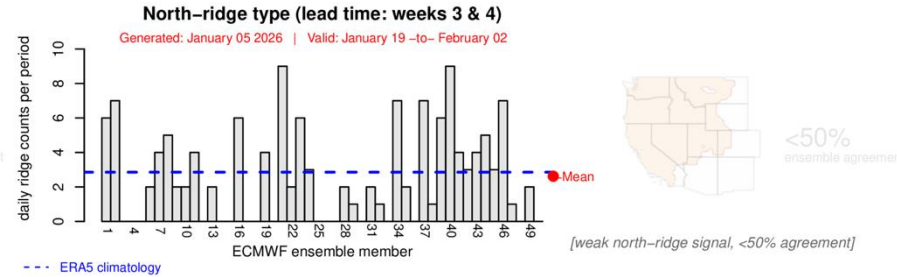
NCEP

CW3E Subseasonal Ridging Forecast (Uses NCEP CFSv2 model)



ECMWF

CW3E Subseasonal Ridging Forecast (Uses ECMWF model)



- NCEP is forecasting above-normal South-ridge activity with moderate confidence (56% ensemble agreement) during Weeks 3–4 (19 Jan – 2 Feb), whereas ECMWF is forecasting slightly above-normal South-ridge activity with low confidence
- NCEP is forecasting below-normal North-ridge activity and slightly above-normal West-ridge activity with low confidence
- ECMWF is forecasting near-normal North-ridge activity and slightly below-normal West-ridge activity

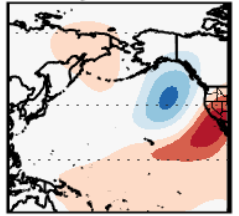
Models show some uncertainty in frequency and location of ridging activity during Weeks 3–4 (19 Jan – 2 Feb)



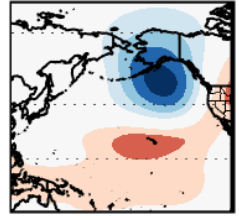
Background Info: Hybrid Weather Regime Impacts Forecast

a) NP4 Mode

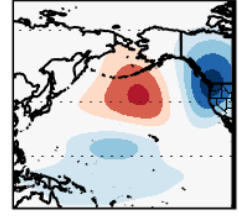
Patterns



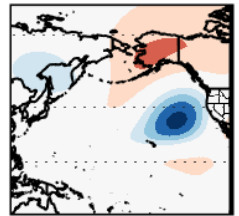
Alaskan-Pacific



Canadian-Pacific



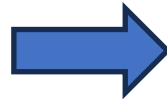
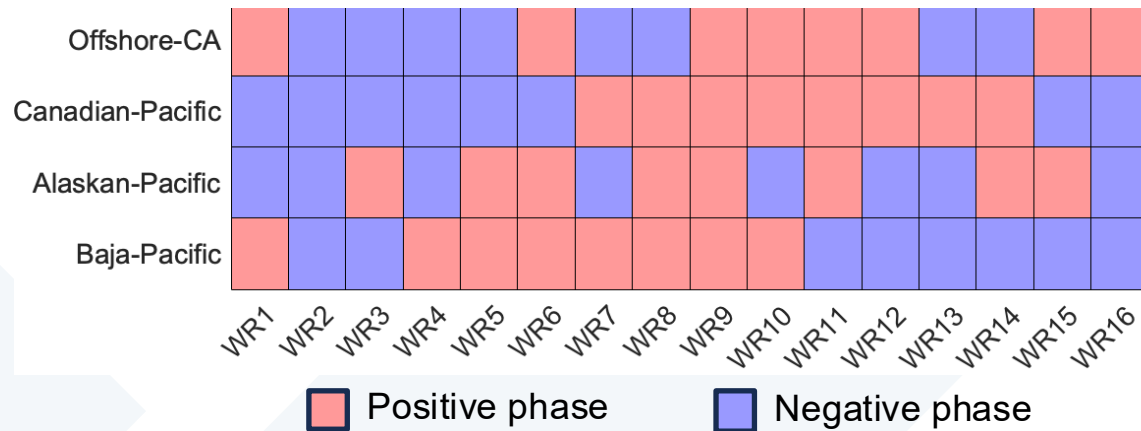
Offshore-CA



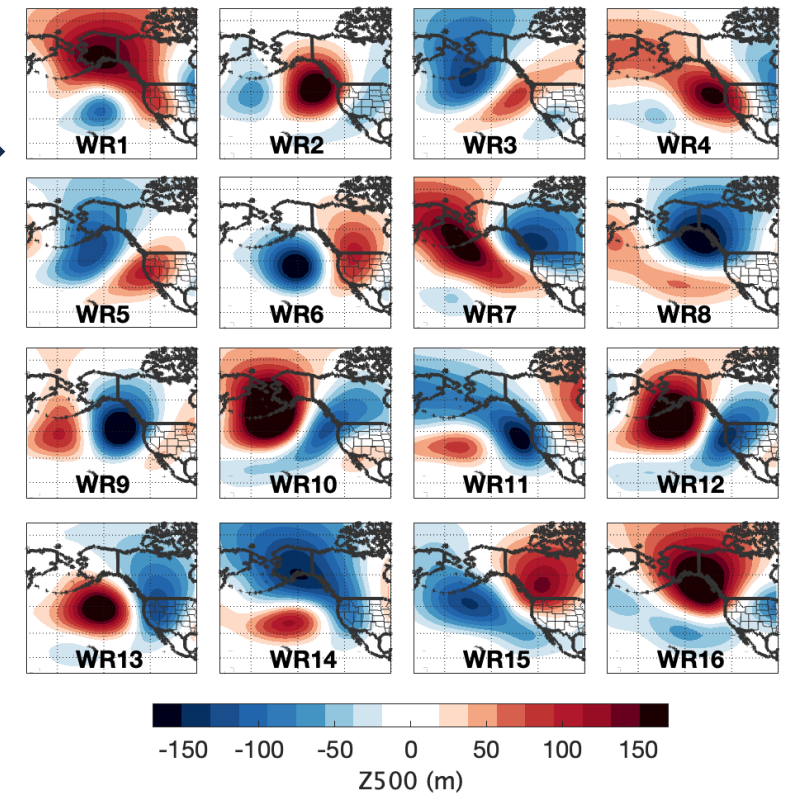
Z500 rEOFs



b) NP4 Mode Phase Combinations



c) Daily Weather Regimes



a) NP4 Mode Patterns

Four key modes of atmospheric variability over the North Pacific (called the “NP4 Modes”, shown in the positive phase) capture most of the variance in atmospheric circulation in this region.

b) NP4 Mode Phase Combinations

The day-to-day changes in the amplitude and phase of the NP4 modes control ridge-trough positioning over the West Coast.

c) Daily Weather Regimes

Sixteen daily weather regimes are defined by the joint phase state of the four NP4 modes. These represent short-duration daily weather patterns.

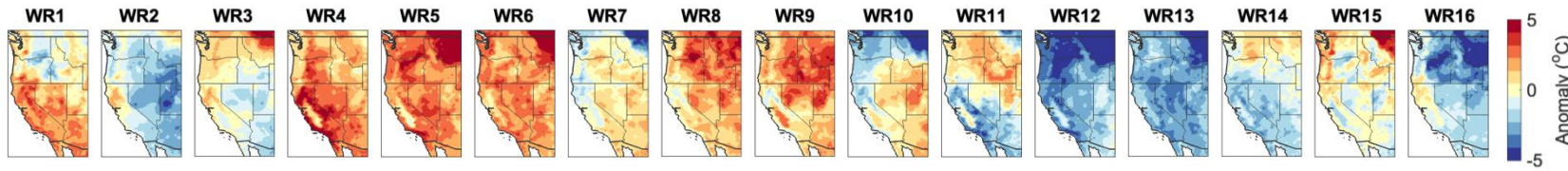
Relevance to West Coast Weather

These regimes are historically linked to impactful West Coast weather, including AR landfalls, precipitation and flooding, temperature extremes, Santa Ana winds, and wildfire conditions.

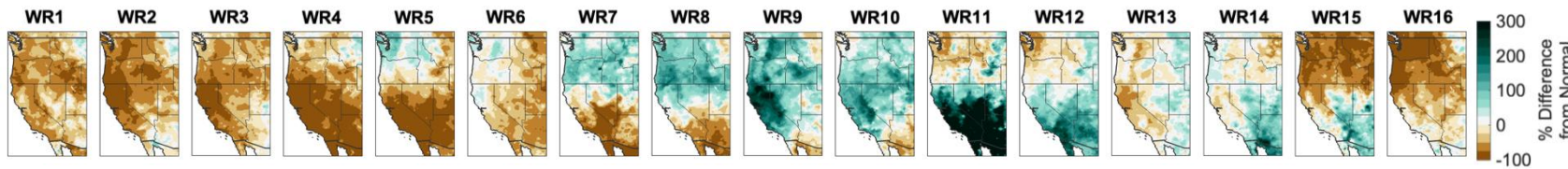
This slide contains background information about CW3E’s hybrid weather regimes forecast product.
Reference:
 Guirguis et al. [2023a](#) and [2023b](#)

Hybrid Weather Regime Impacts Forecast

a) Temperature Anomaly Associated With Each Weather Regime

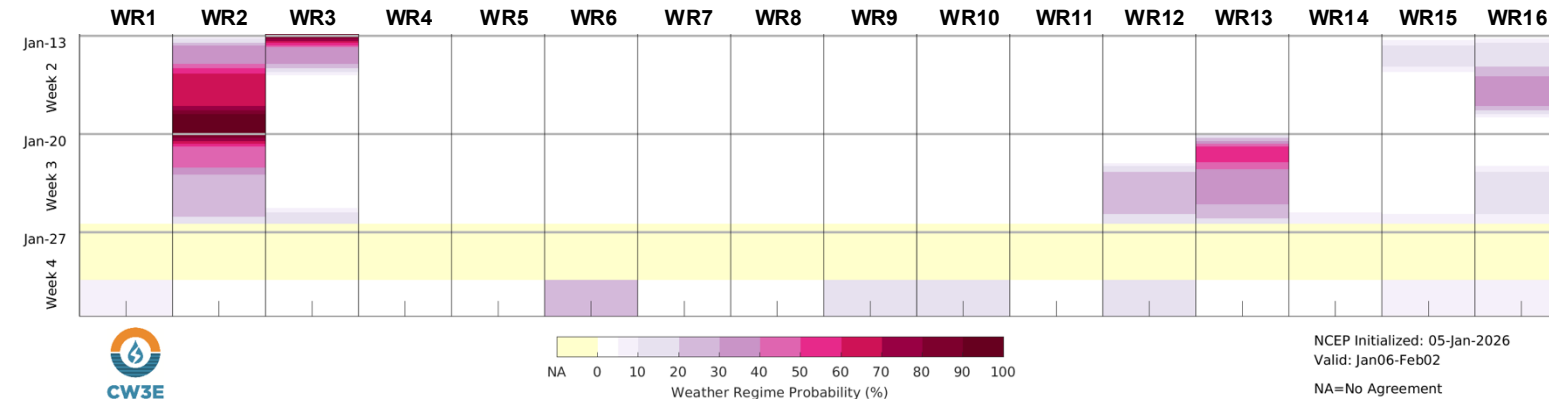


b) Precipitation Anomaly Associated With Each Weather Regime



Valid 6 Jan – 2 Feb

c) Weather Regime Forecast

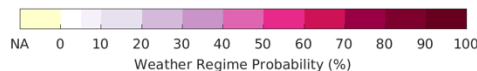


Forecasts Initialized 5 Jan 2026

Week 2 (13–19 Jan): Dominated by WRs 2&3, which are associated with below-normal precipitation over all of CA and above-normal temperature over Northern CA.

Week 3 (20–26 Jan): Dominated by WRs 2&13 during 20–22 Jan. These WRs are generally associated with below-normal precipitation in Northern and Central CA, and below-normal temperature in Southern CA. More uncertainty during 23–26 Jan, but a majority of ensemble members favor WRs associated with below-normal precipitation in Northern/Central CA and below-normal temperature in Southern CA.

Week 4 (27 Jan – 2 Feb): Uncertain



NCEP Initialized: 05-Jan-2026
Valid: Jan06-Feb02
NA=No Agreement

a-b: Weather regime impacts based on historical relationships
c: Forecast weather regime probability based on the NCEP dynamical model

NA=No Agreement/Uncertain