

CW3E AR Outlook: 28 October 2025

Two Atmospheric Rivers to Bring Precipitation to the Pacific Northwest

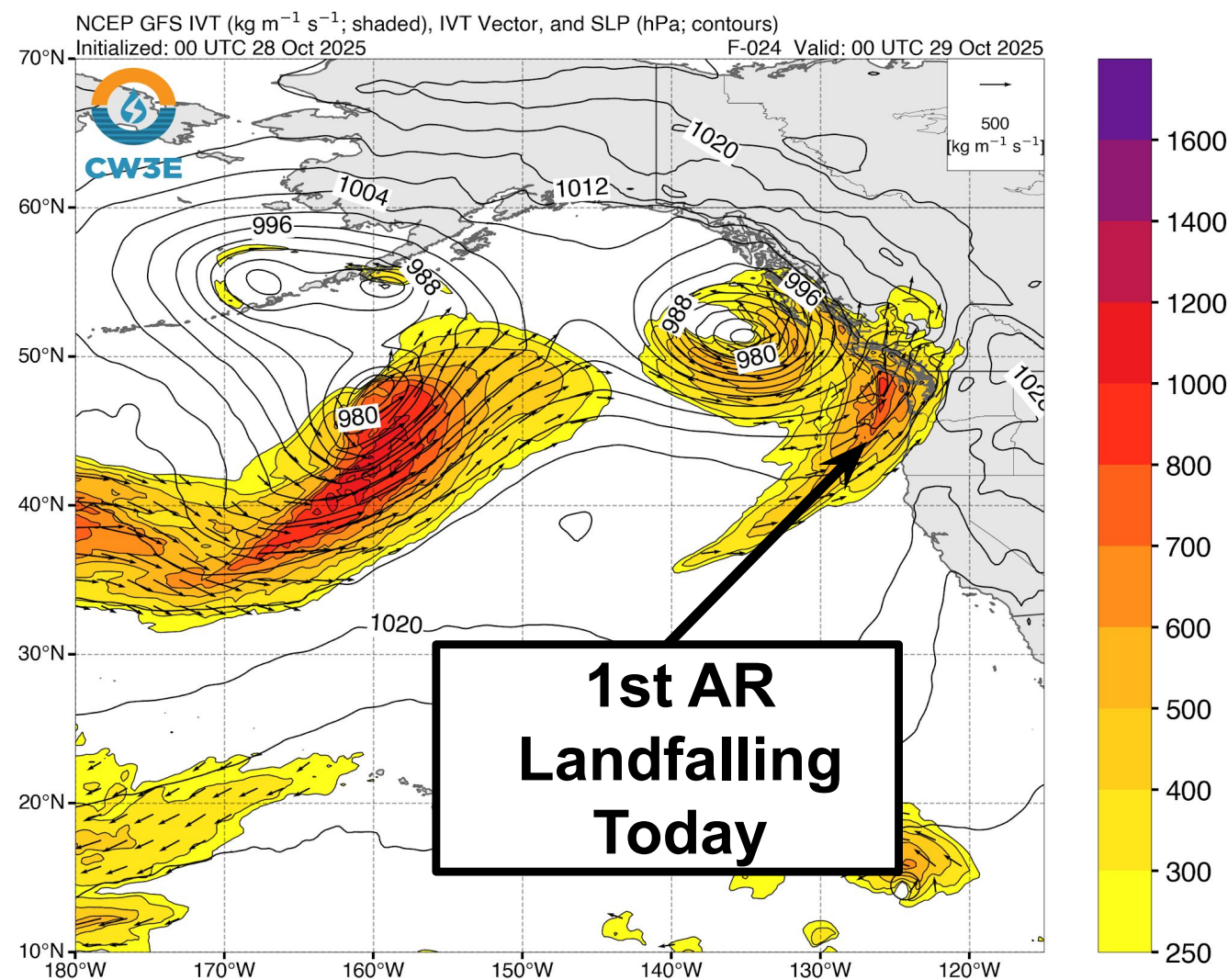
- Two atmospheric rivers are forecast to bring precipitation to the Pacific Northwest through Sun 2 Nov.
- The first AR is forecast to make landfall over the Pacific Northwest coast this evening (Tue 28 Oct). Both the EPS and GEFS are forecasting AR1 (according the Ralph et al. 2019 AR Scale) conditions across the Pacific Northwest coasts through 5 AM PT on 29 Oct.
- Precipitation from the first AR is forecast to fall mostly over the Washington, with the WPC forecasting the highest precipitation totals (1–2 in.) over the Olympic Peninsula and Washington Cascades.
- The second, stronger AR is forecast to propagate across the Northern Pacific alongside a strong low pressure system and impact the Pacific Northwest from midday Fri 31 Oct through midday Sun 2 Nov.
- There is uncertainty in the onset of AR conditions, duration of the event and timing of maximum IVT in the EPS and GEFS. ~90% of GEFS and EPS members are forecasting at least AR3 conditions over the Northern Oregon coast.
- Precipitation is forecast to be higher with the second AR but still primarily contained to Washington and Northern Oregon. The WPC is forecasting 2–4 in. of precipitation over the Olympic Peninsula and Washington Cascades for the 72-hour period ending 5 PM PT 2 Nov.
- The WPC issued a **marginal risk** (level 1 of 4; $\geq 5\%$ probability of flooding) excessive rainfall outlook (ERO) over the Olympic Peninsula and Washington Cascades for 5 AM PT Fri 31 Oct through Sat 1 Nov.
- Both the GEFS and EPS are showing an extended period in AR conditions along the Pacific Northwest coast in CW3E's landfall tool. The EPS is showing moderate to high (~60–80% probability) confidence in this period of AR conditions while the GEFS is only indicating low to moderate AR conditions (~40–60% probability). Additionally, the EPS is forecasting a higher likelihood of AR conditions over Northern California on 4–5 Nov.

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GFS IVT Forecast

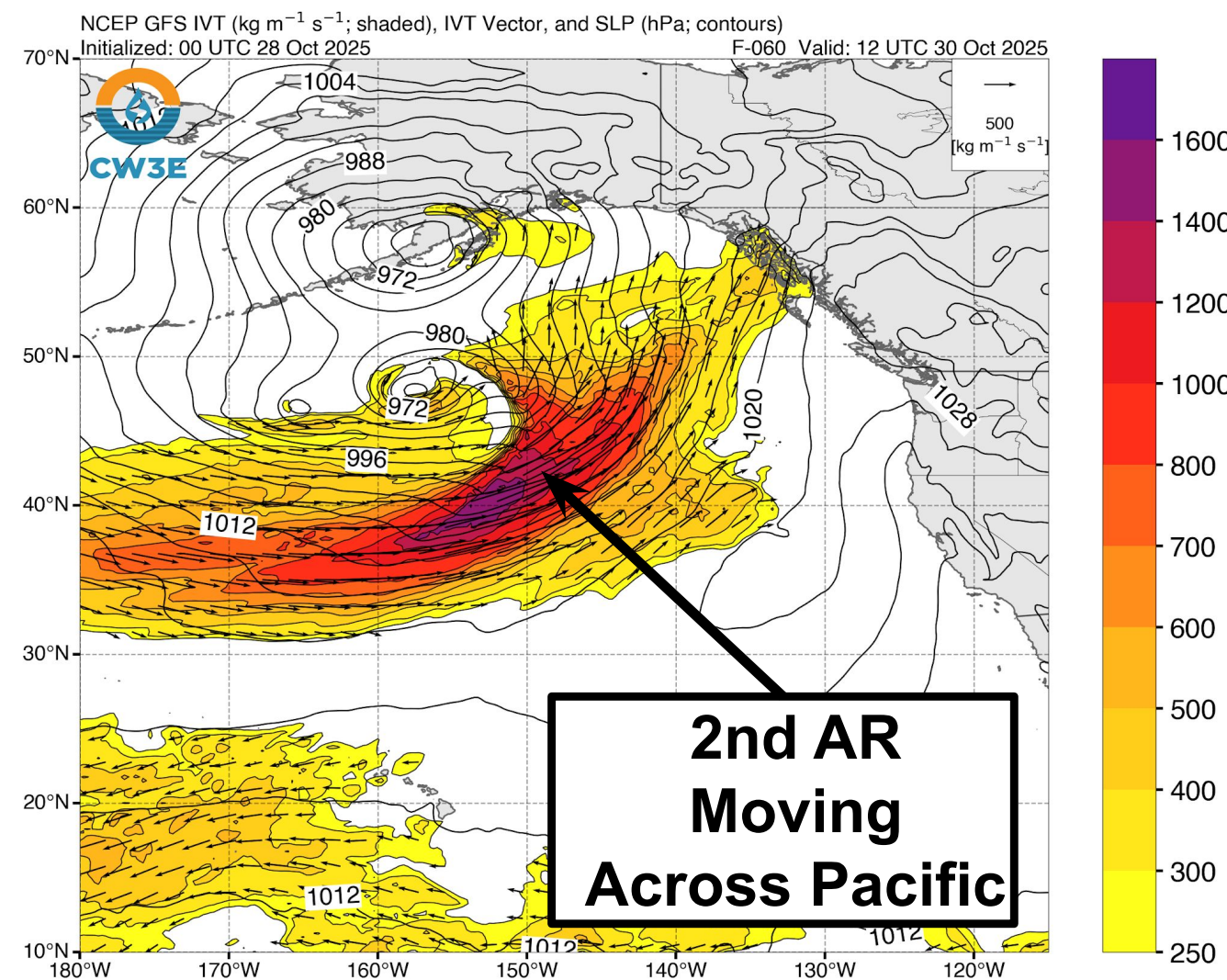
GFS IVT and SLP

Valid: 5 PM PDT Tue 28 Oct



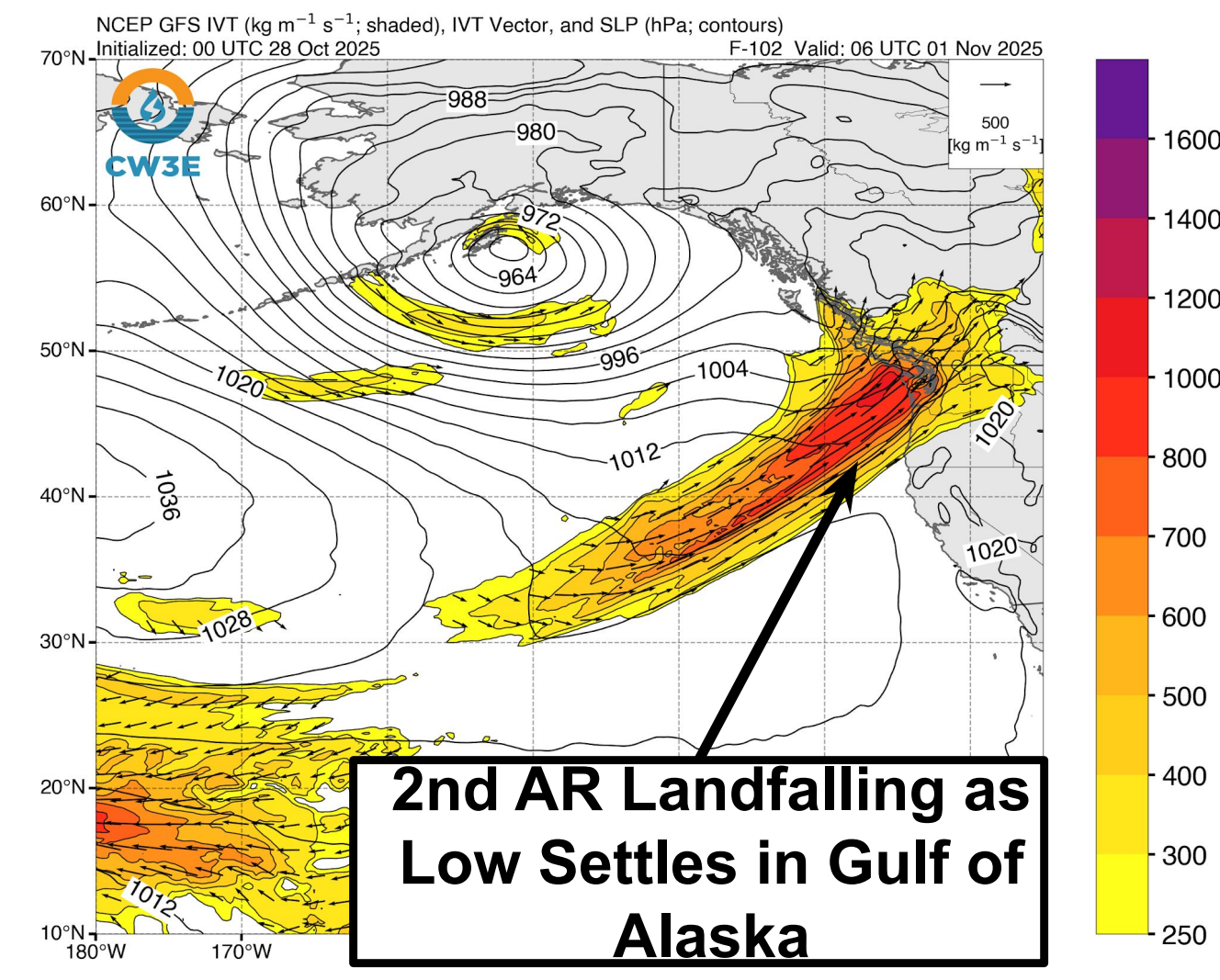
GFS IVT and SLP

Valid: 5 AM PDT Thu 30 Oct



GFS IVT and SLP

Valid: 11 PM PDT Fri 31 Oct

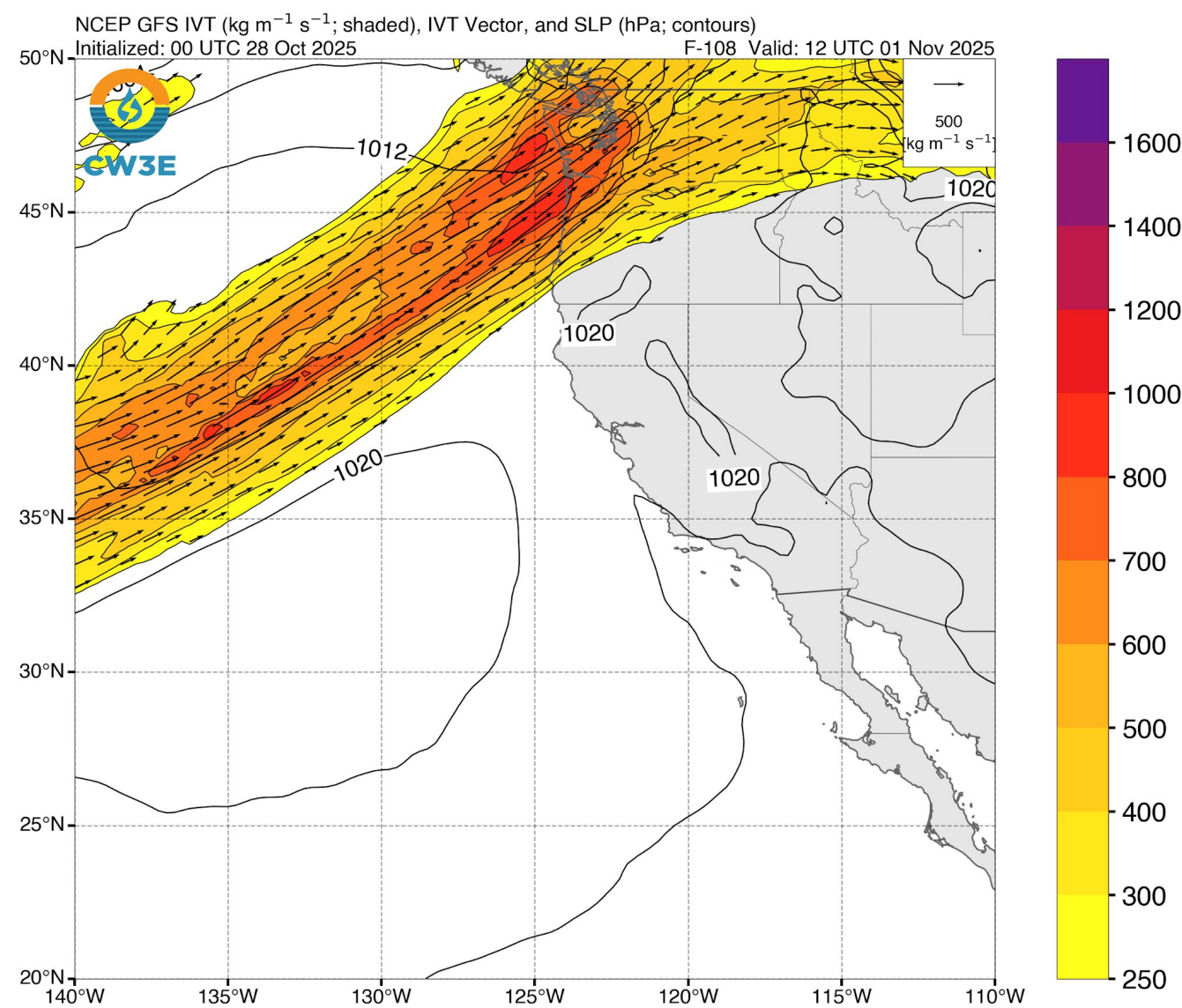


- An atmospheric river (AR) is forecast to make landfall over the Pacific Northwest later today, Tue 28 Oct, and continue impacting the region through early Wed 29 Oct.
- A second, stronger AR is forecast to propagate across the Northern Pacific alongside a strong low-pressure system. This low recurves north and settles in the Gulf of Alaska as the AR is driven into the Pacific Northwest.
- The second AR is forecast to impact the Pacific Northwest from midday Fri 31 Oct through midday Sun 2 Nov.

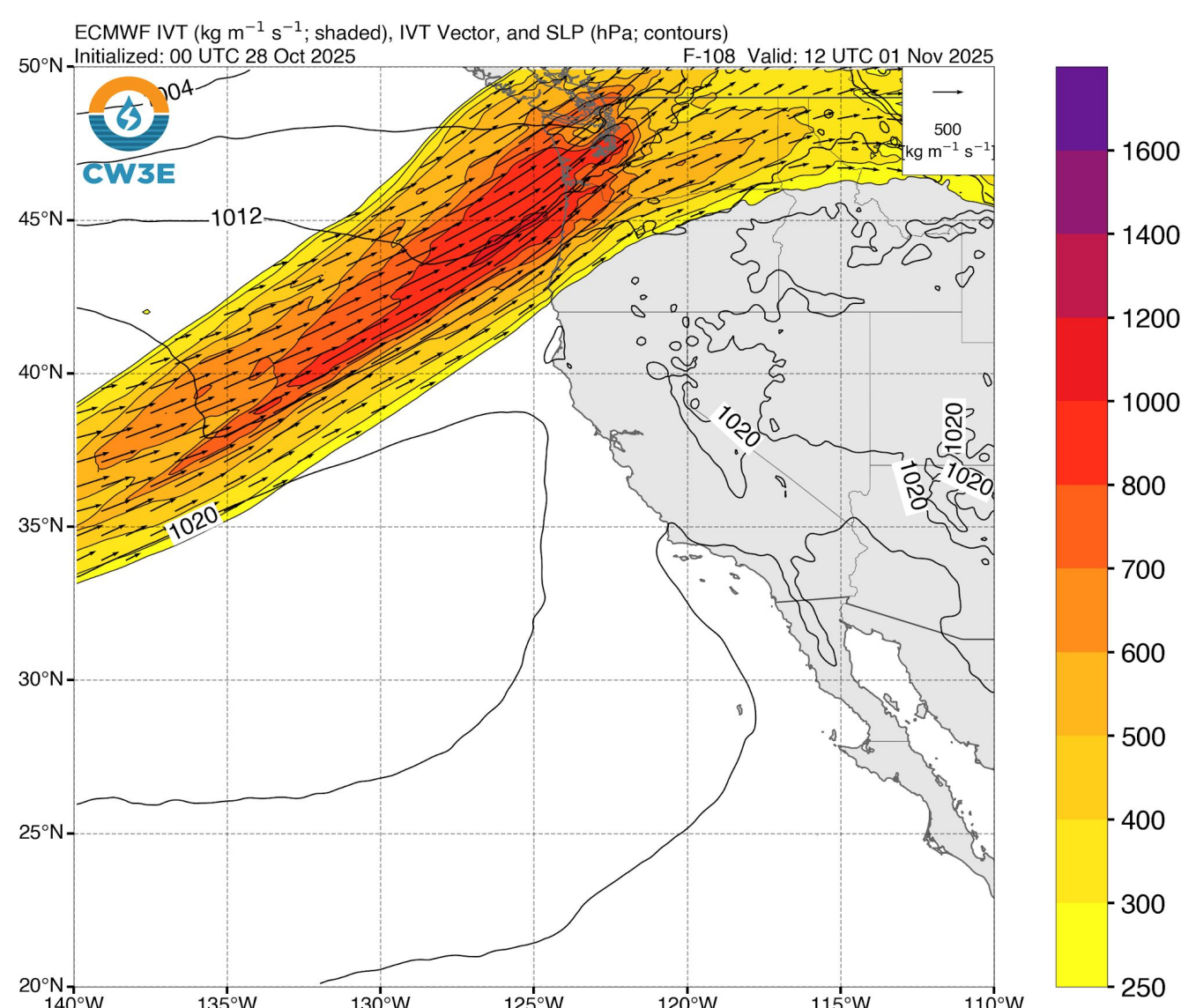
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ECMWF and GFS IVT Forecast Comparison: Second AR

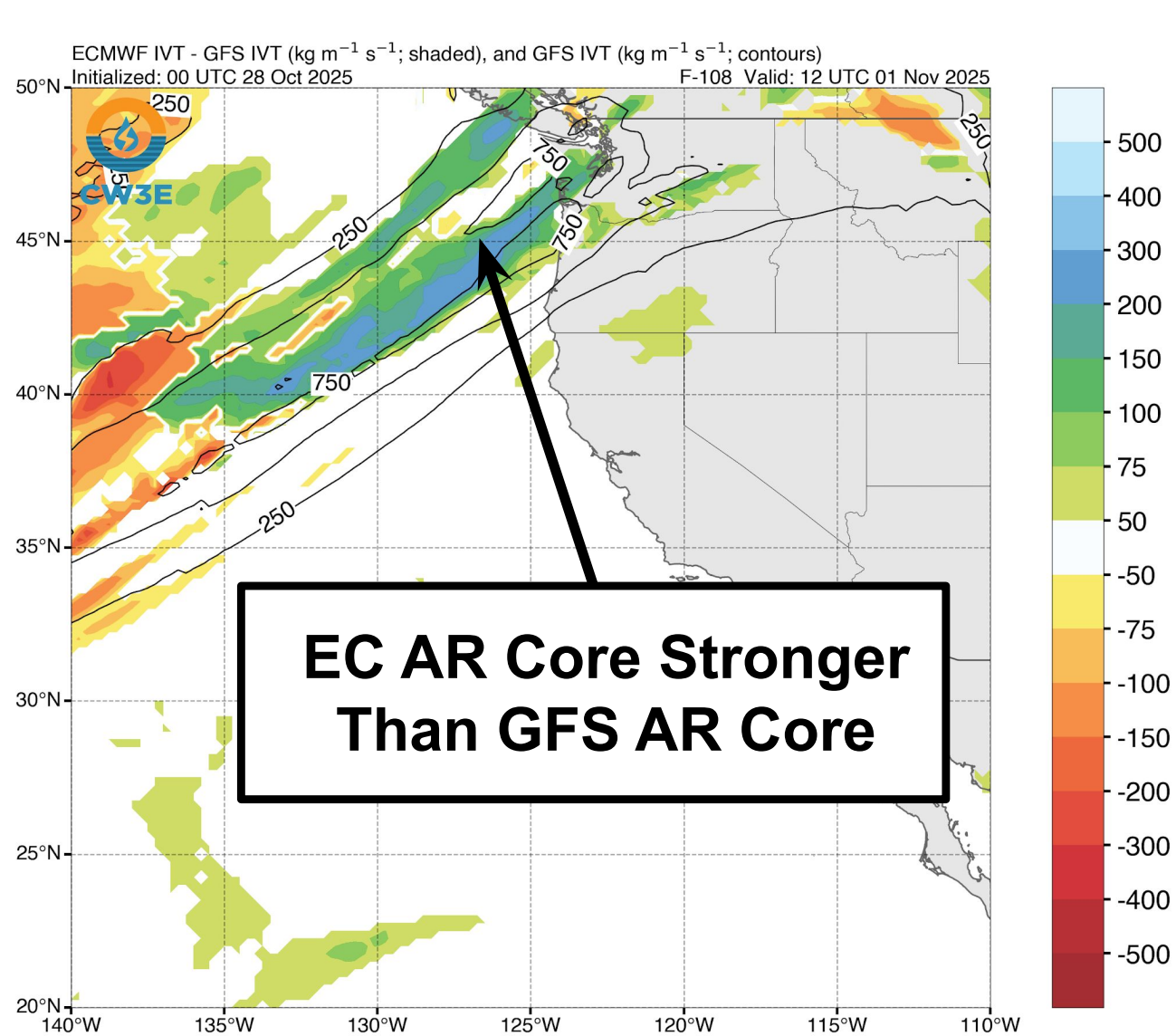
GFS IVT and SLP
Valid: 5 AM PDT Sat 1 Nov



ECMWF IVT and SLP
Valid: 5 AM PDT Sat 1 Nov



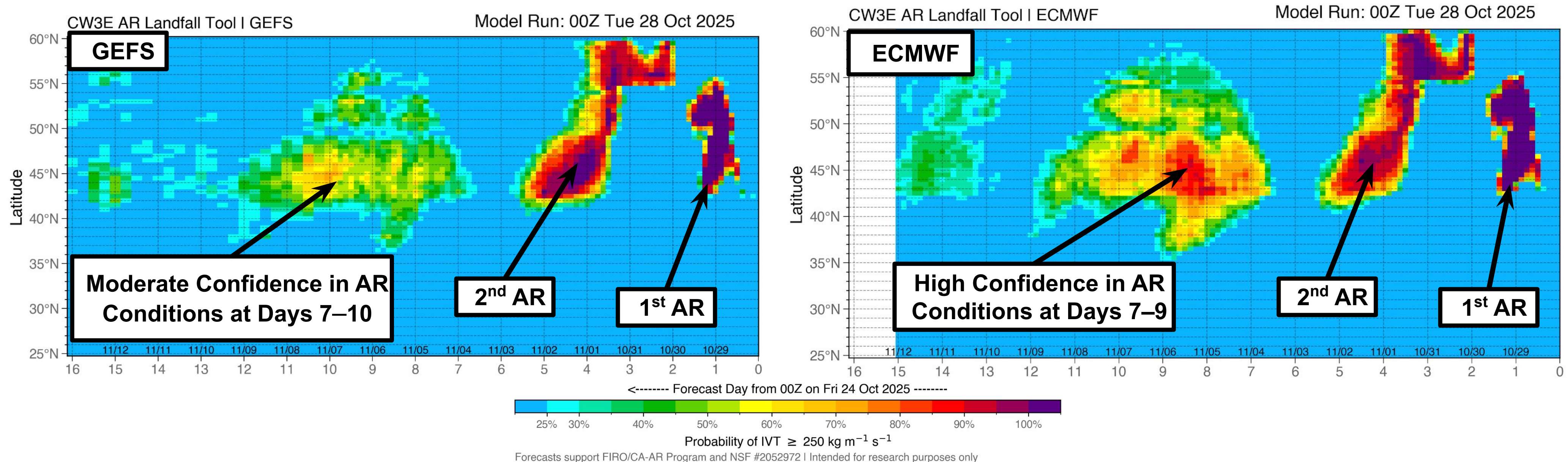
ECMWF-GFS IVT
Valid: 5 AM PDT Sat 1 Nov



- While the deterministic ECMWF and GFS are forecasting the second AR to be in a similar location at landfall, there are significant differences in the strength of the AR core. The IVT is 200+ $\text{kg m}^{-1} \text{s}^{-1}$ higher in ECMWF AR core than the GFS AR core.

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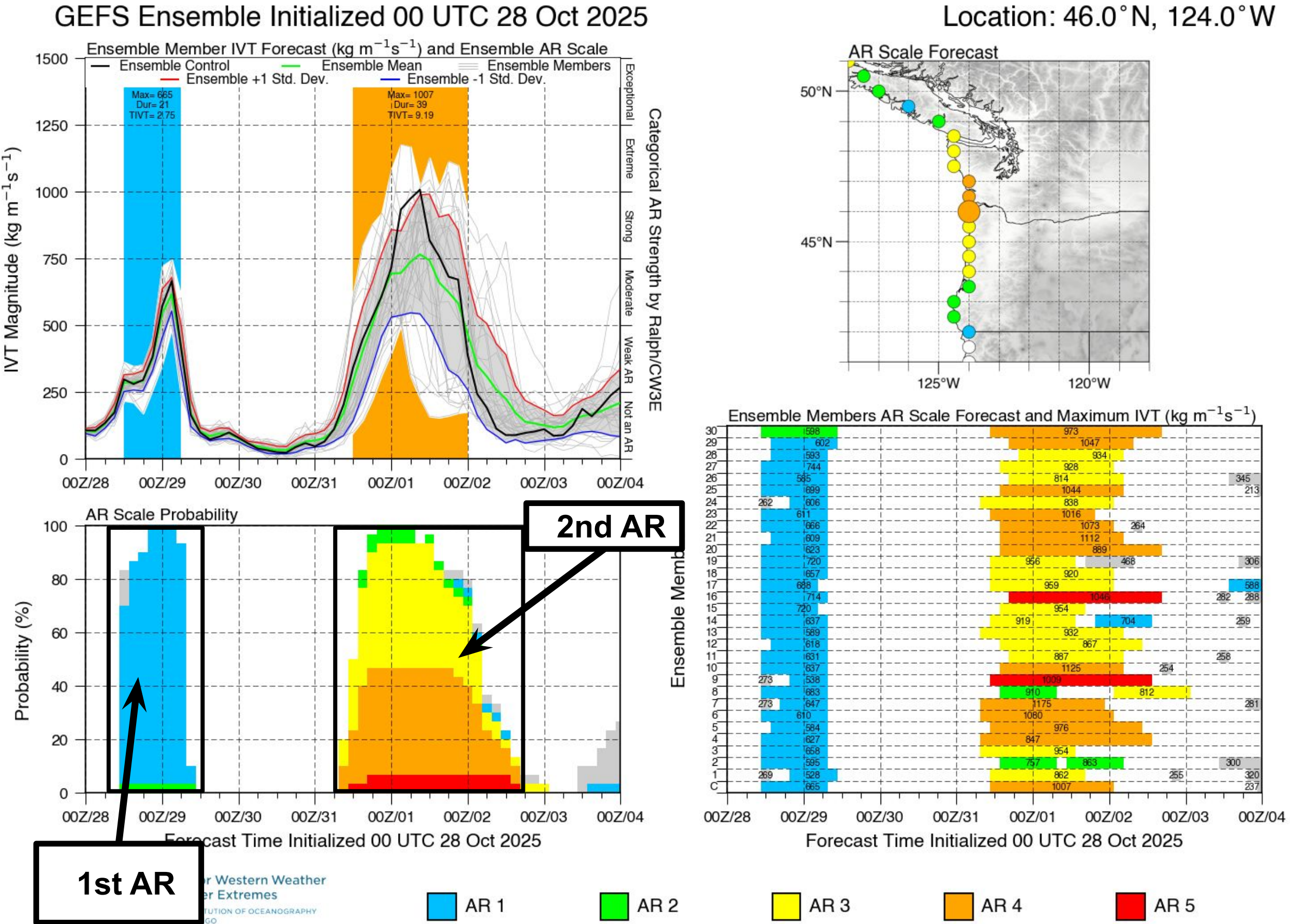
GEFS vs. ECMWF Coastal AR Landfall Tool



- The 00Z GEFS and EPS are both showing very high confidence ($>90\%$ probability) in AR conditions ($\text{IVT} \geq 250 \text{ kg m}^{-1} \text{ s}^{-1}$) along the Pacific Northwest coast with both the first AR (28–29 Oct) and second AR (31 Oct – 2 Nov)
- Both ensembles are showing potential for an extended period of AR activity along the Pacific Northwest coast beyond day 7 (4–8 Nov). The EPS is showing moderate to high ($\sim 60\text{--}80\%$ probability) confidence in this period of AR conditions while the GEFS is only indicating moderate confidence ($\sim 40\text{--}60\%$ probability). Additionally, the EPS is forecasting a higher likelihood of AR conditions over Northern California on 4–5 Nov.

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GEFS AR Scale and IVT Forecasts

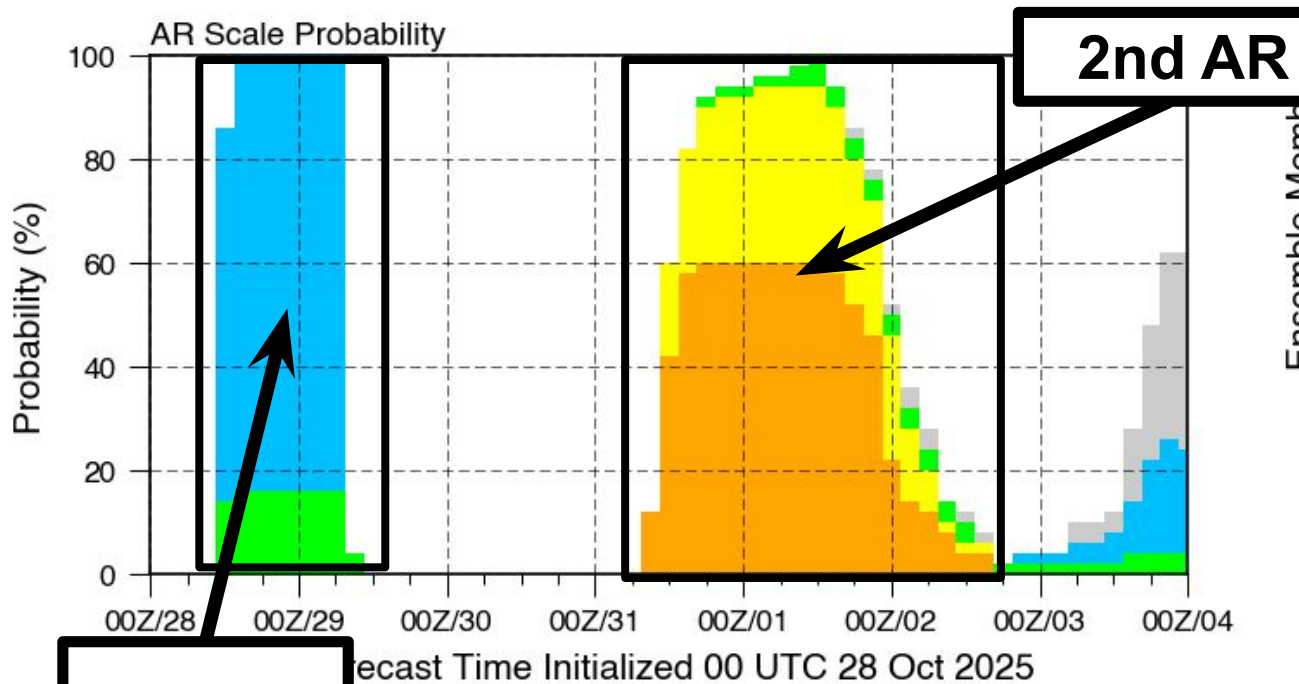
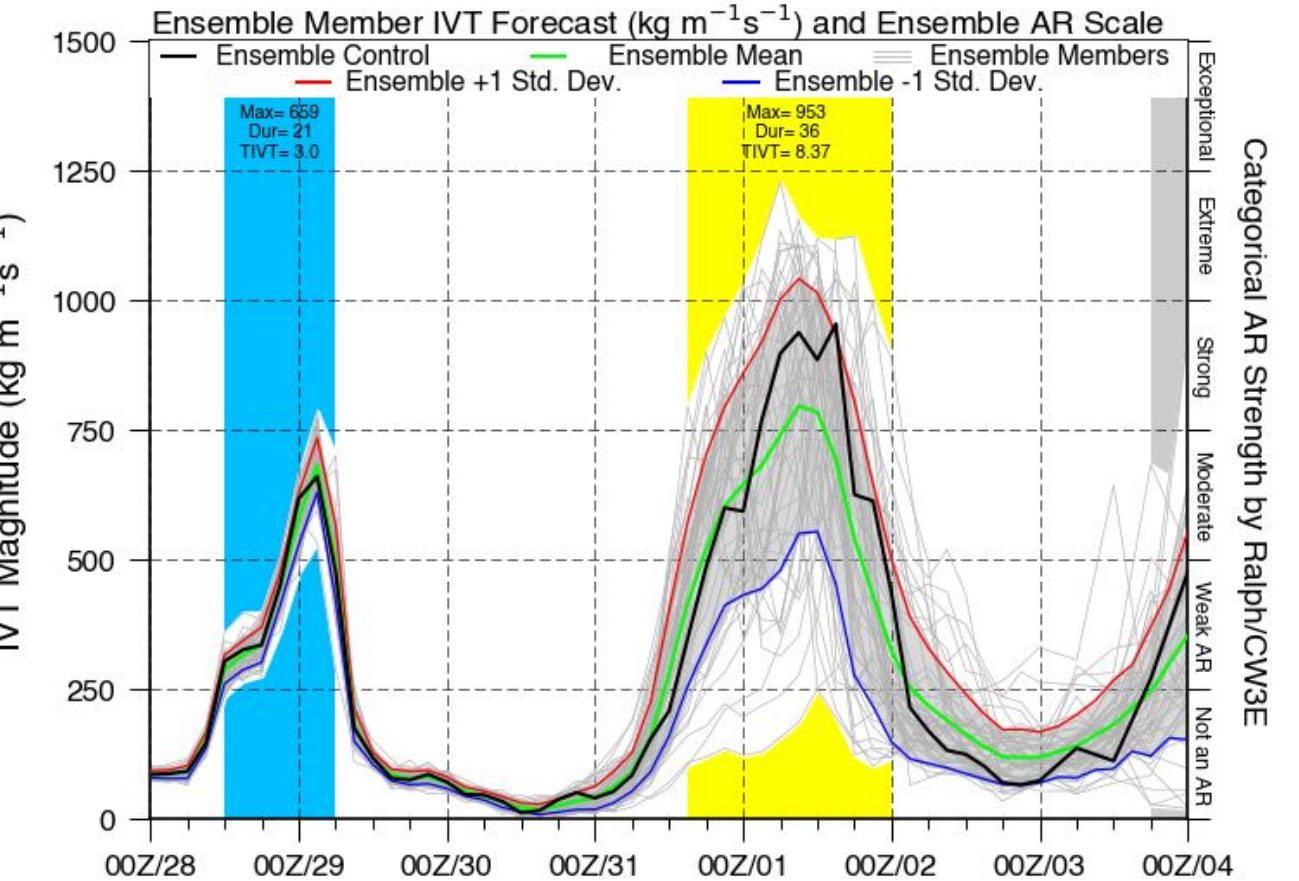


- The GEFS control member is forecasting an AR 1 during the first AR and and AR 4 during the second AR at this location. for a point 46.0°N, 124°W (near Sunset Beach, OR).
- Every GEFS member is forecasting at least AR1 conditions with the first AR. There is very good agreement amongst GEFS members in the timing of maximum IVT at this location.
- 29/31 (~90%) GEFS members are forecasting at least AR3 conditions for this location with the second AR, including 2 members forecasting AR5 conditions. 11/31 (~35%) members are forecasting maximum IVT $>1000 \text{ kg m}^{-1} \text{ s}^{-1}$.
- There is still uncertainty in the onset of AR conditions, duration of the event and timing of maximum IVT for this location.

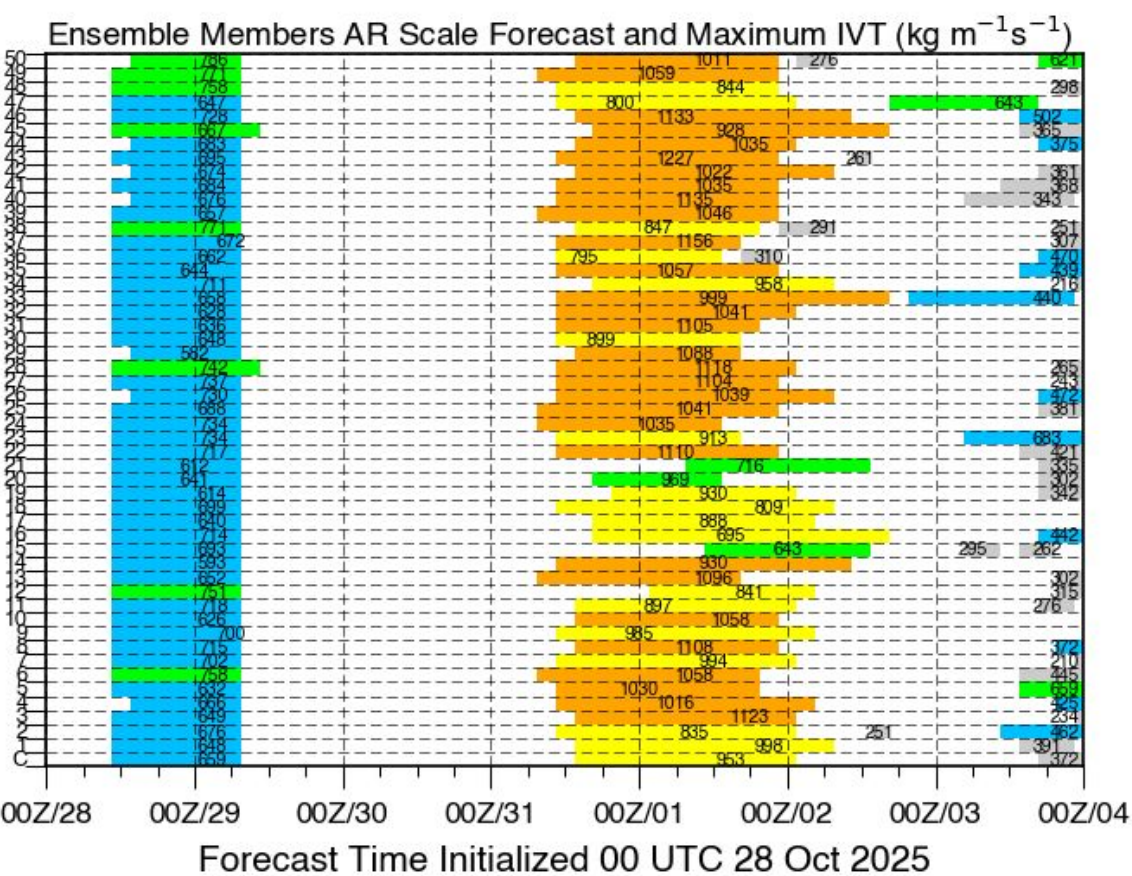
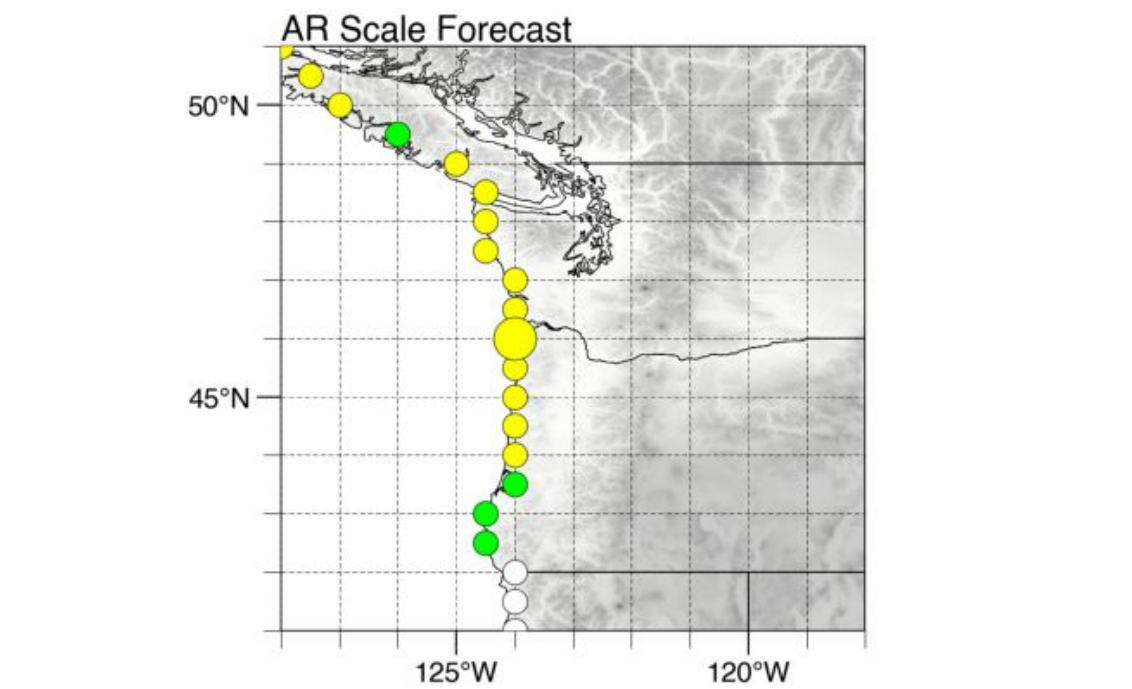
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EPS AR Scale and IVT Forecasts

ECMWF Ensemble Initialized 00 UTC 28 Oct 2025



Location: 46.0°N, 124.0°W



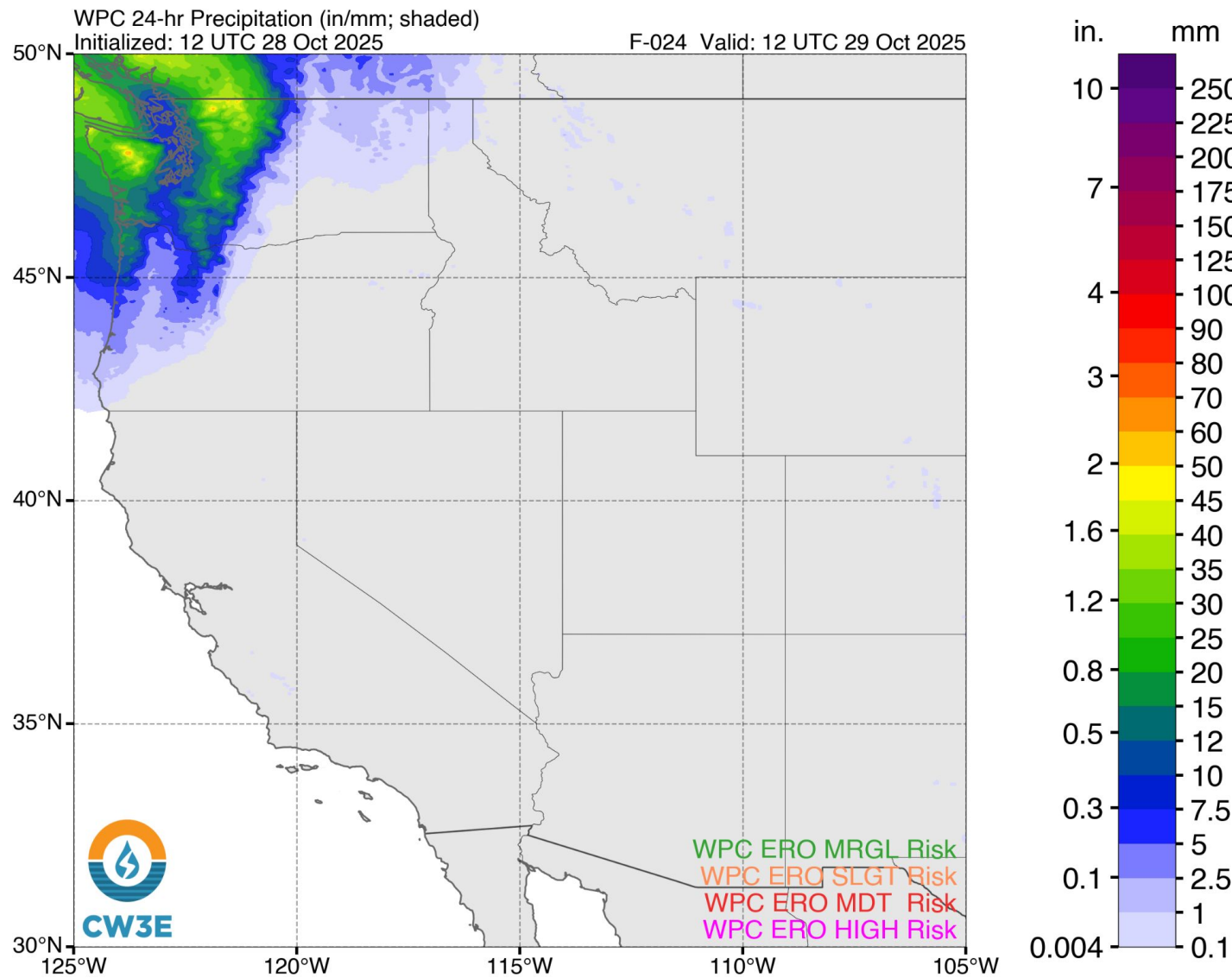
- The EPS control member is also forecasting an AR 1 during the first AR and and AR 3 during the second AR at this location. for a point 46.0°N, 124°W (near Sunset Beach, OR).
- Every EPS member is forecasting at least AR1 conditions with the first AR. Timing and intensity of maximum IVT in EPS members is comparable to GEFS members
- 48/51 (~95%) EPS members are forecasting at least AR3 conditions for this location with the second AR. A higher percentage of EPS (~50%) members are forecasting maximum IVT >1000 kg m⁻¹ s⁻¹ compared to the GEFS (~33%).
- EPS members also show uncertainty in the onset of AR conditions, duration of the event and timing of maximum IVT for this point.

Image created 08 UTC 28 Oct 2025

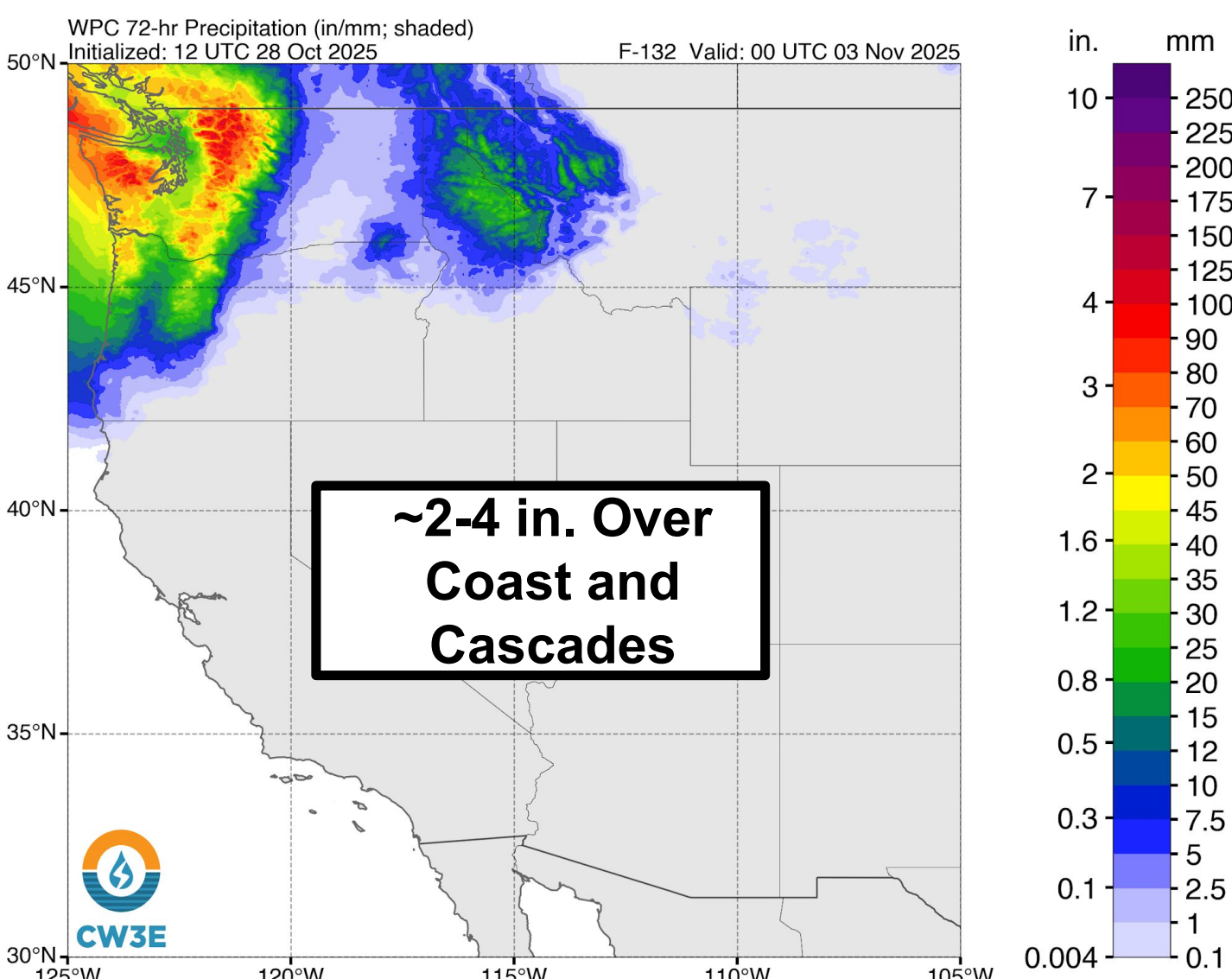
More information: <https://cw3e.ucsd.edu> AR Scale based on Ralph et al. (2019; BAMS)

WPC Precipitation Forecasts and Excessive Rainfall Outlook

WPC 24-h Total QPF
Valid: 5 AM PT 29 Oct



WPC 72-h Total QPF
Valid: 5 PM PT 2 Nov



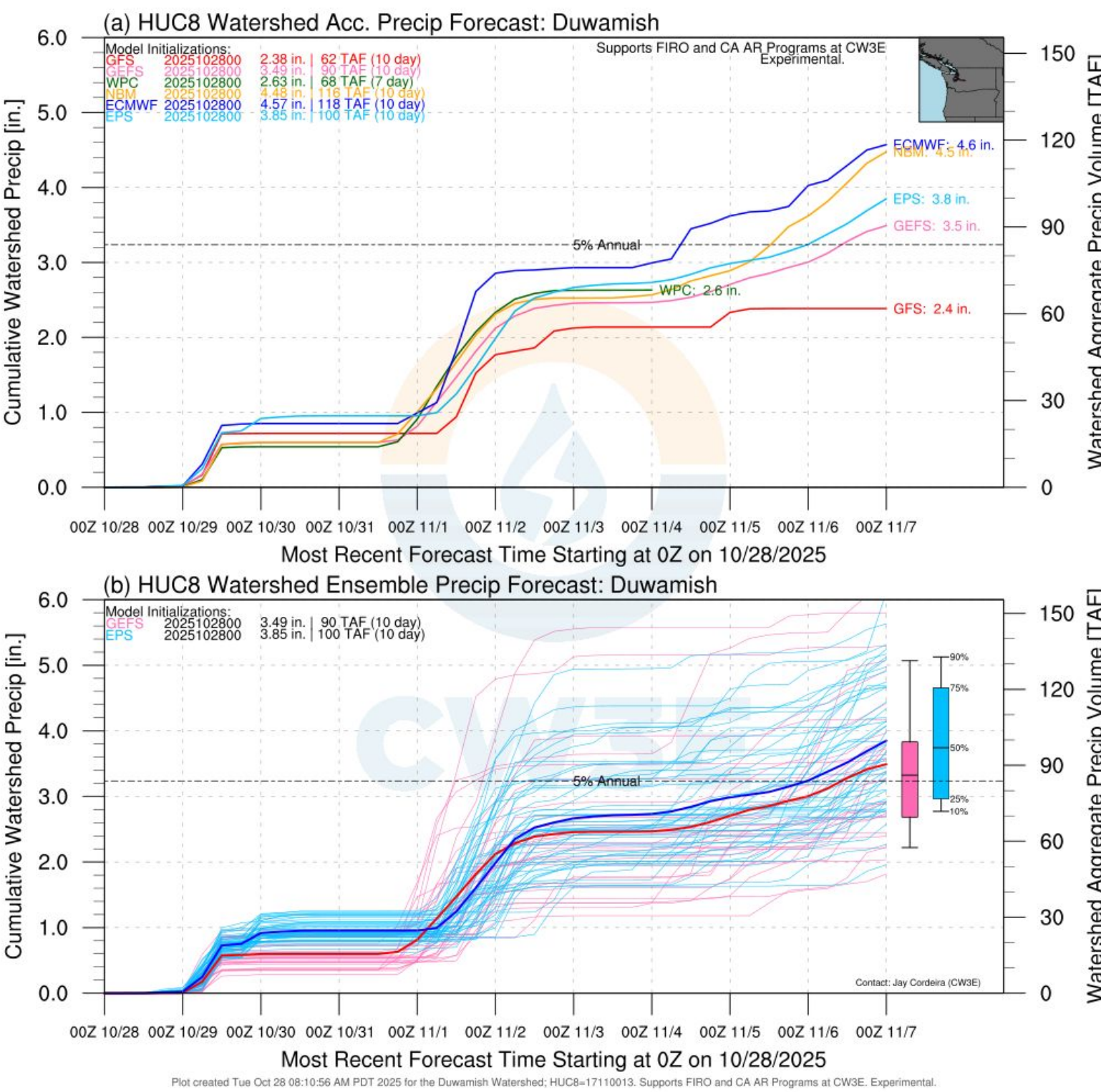
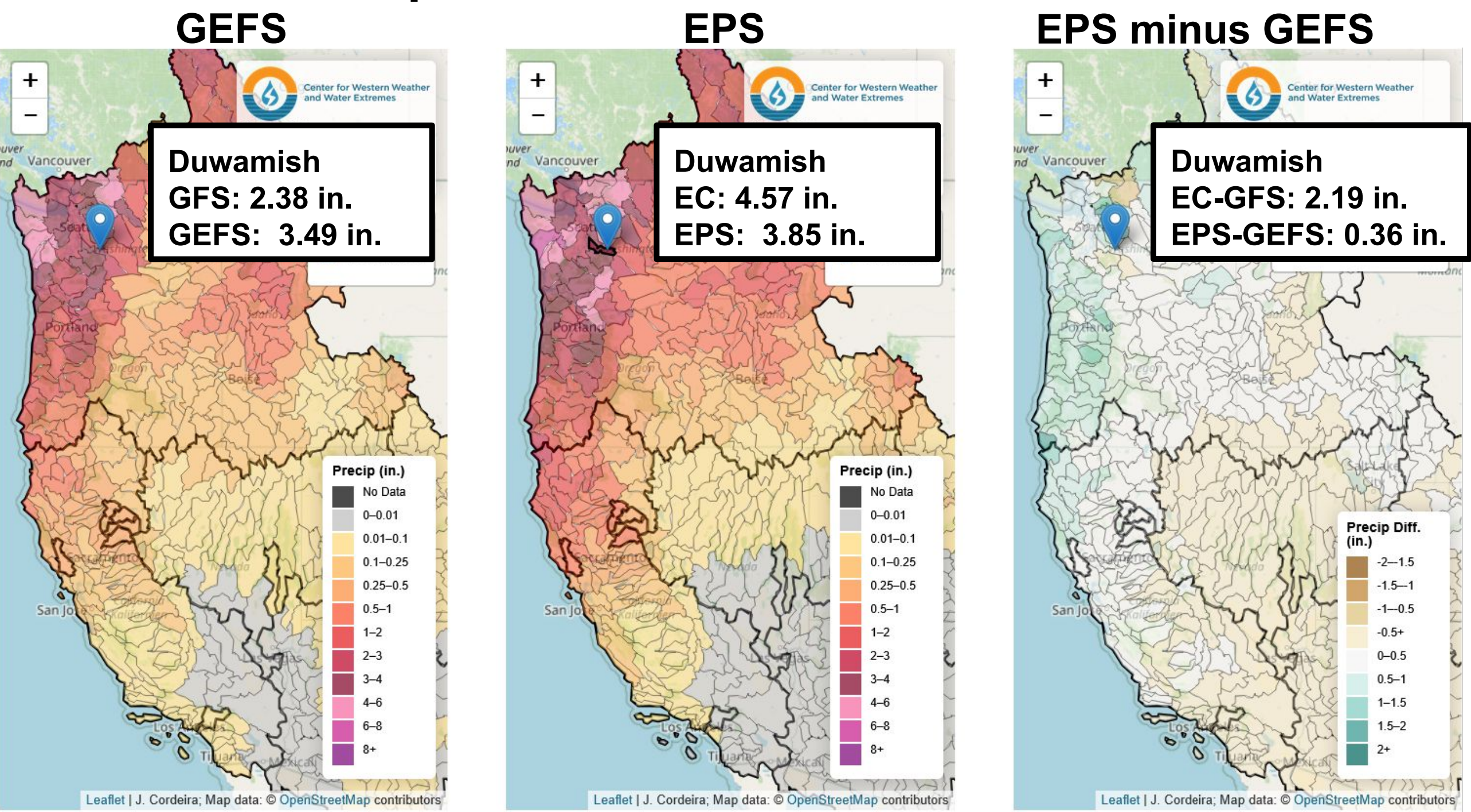
Day 4 ERO
Valid: 5 AM PT 1 Nov



- Precipitation from the first AR is forecast to fall mostly over the Washington, with the Weather Prediction Center (WPC) forecasting the highest precipitation totals (1–2 in.) over the Olympic Peninsula and Washington Cascades.
- Precipitation is forecast to be higher with the second AR but still primarily contained to Washington and Northern Oregon. The WPC is forecasting 2–4 in. of precipitation over the Olympic Peninsula and Washington Cascades for the 72-hour period ending 5 PM PT 2 Nov.
- The WPC issued a **marginal risk** (level 1 of 4; $\geq 5\%$ probability of flooding) excessive rainfall outlook (ERO) over the Olympic Peninsula and Washington Cascades for 5 AM PT Fri 31 Oct through Sat 1 Nov.

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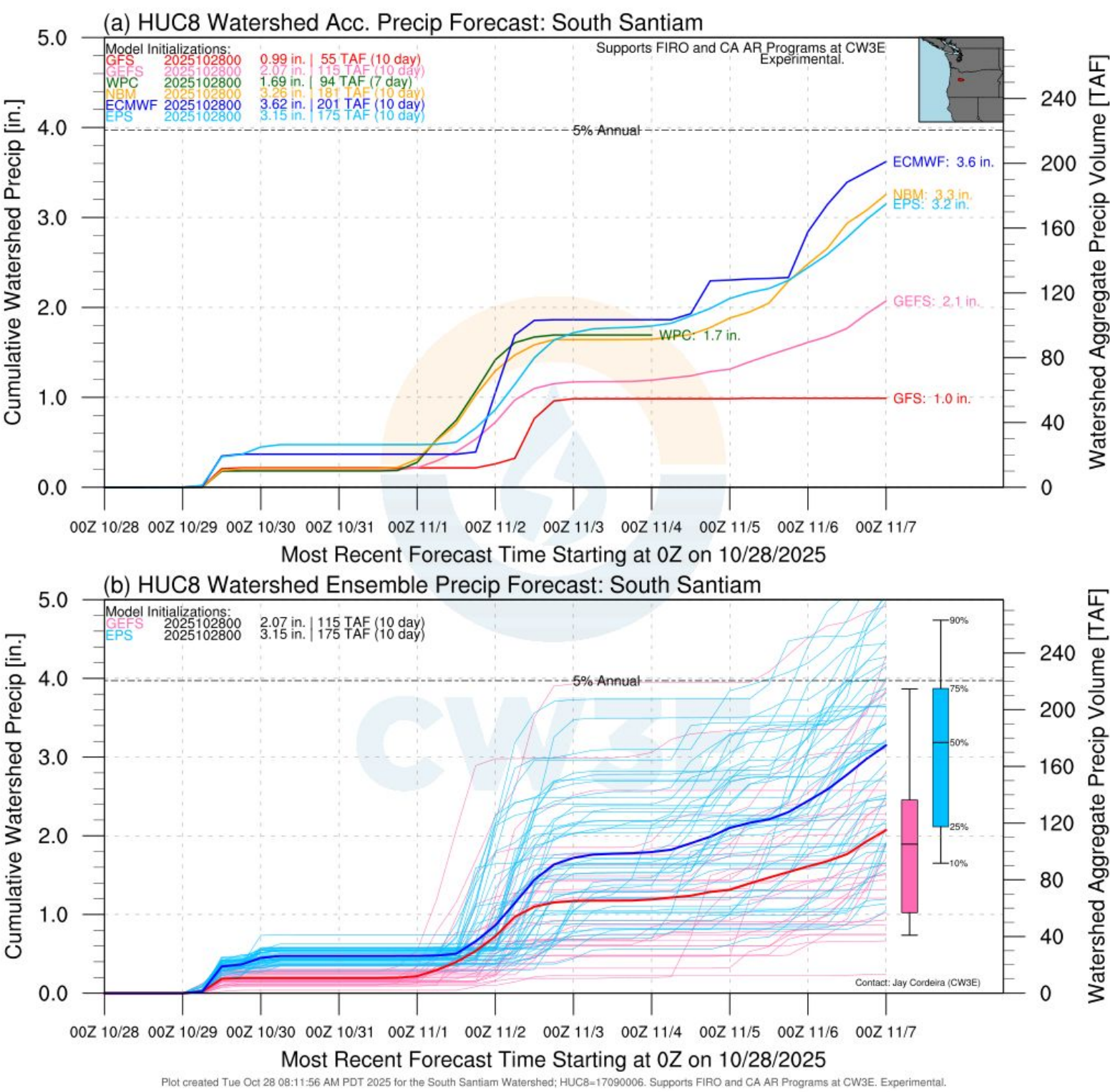
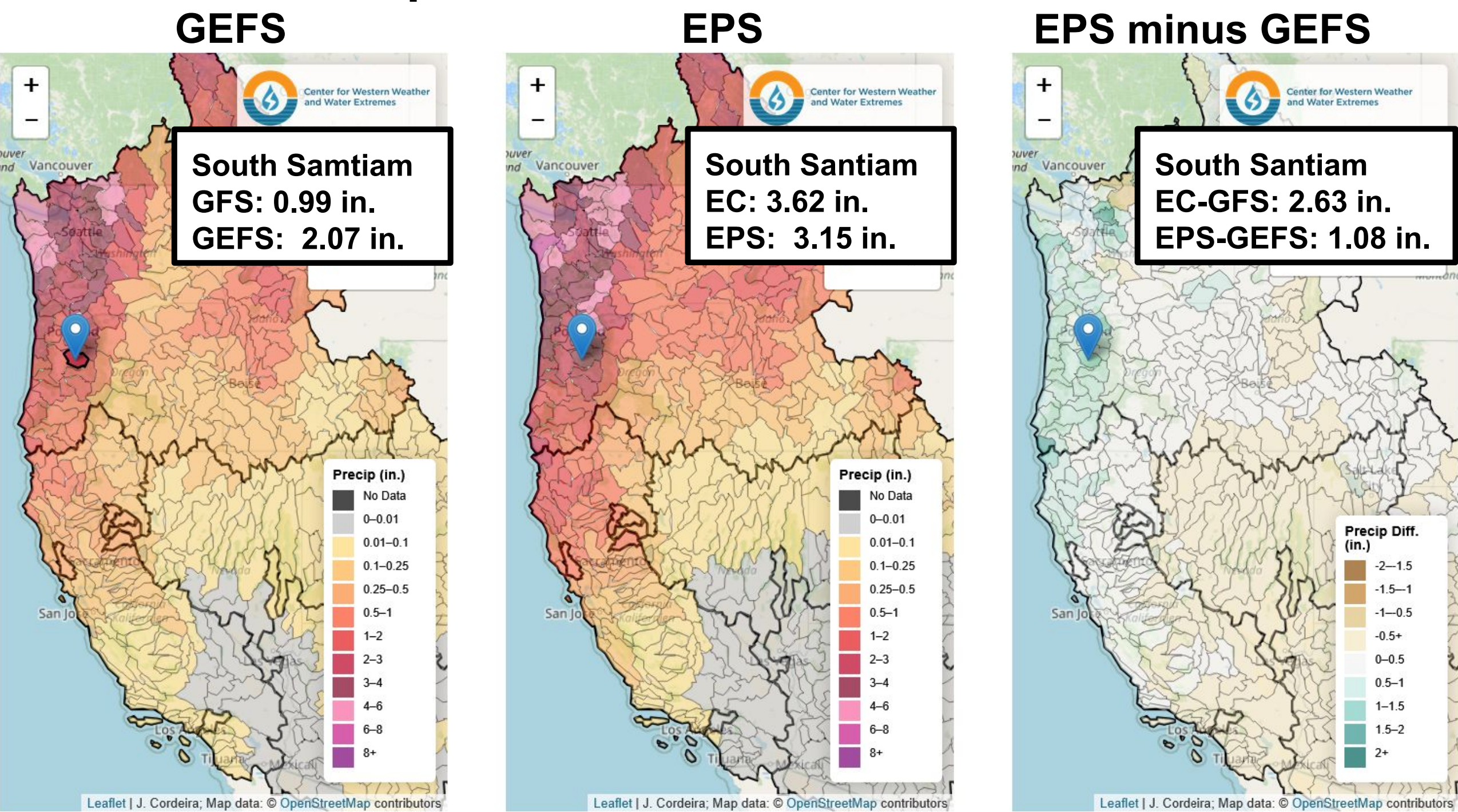
Watershed Precipitation Forecasts: Duwamish



- >50% of EPS and GEFS members are forecasting 10-day precipitation totals exceeding 5% normal annual precipitation (~3.3 in.) over the Duwamish watershed.
- Both ensembles are showing significant spread in the forecast precipitation by 5 PM PT 2 Nov due to uncertainty associated with the second AR. Total accumulated forecast precipitation by this time ranges from 1.2 inches to 5.5 inches among the GEFS members and from 1.6 inches to 4.9 inches among the EPS members..

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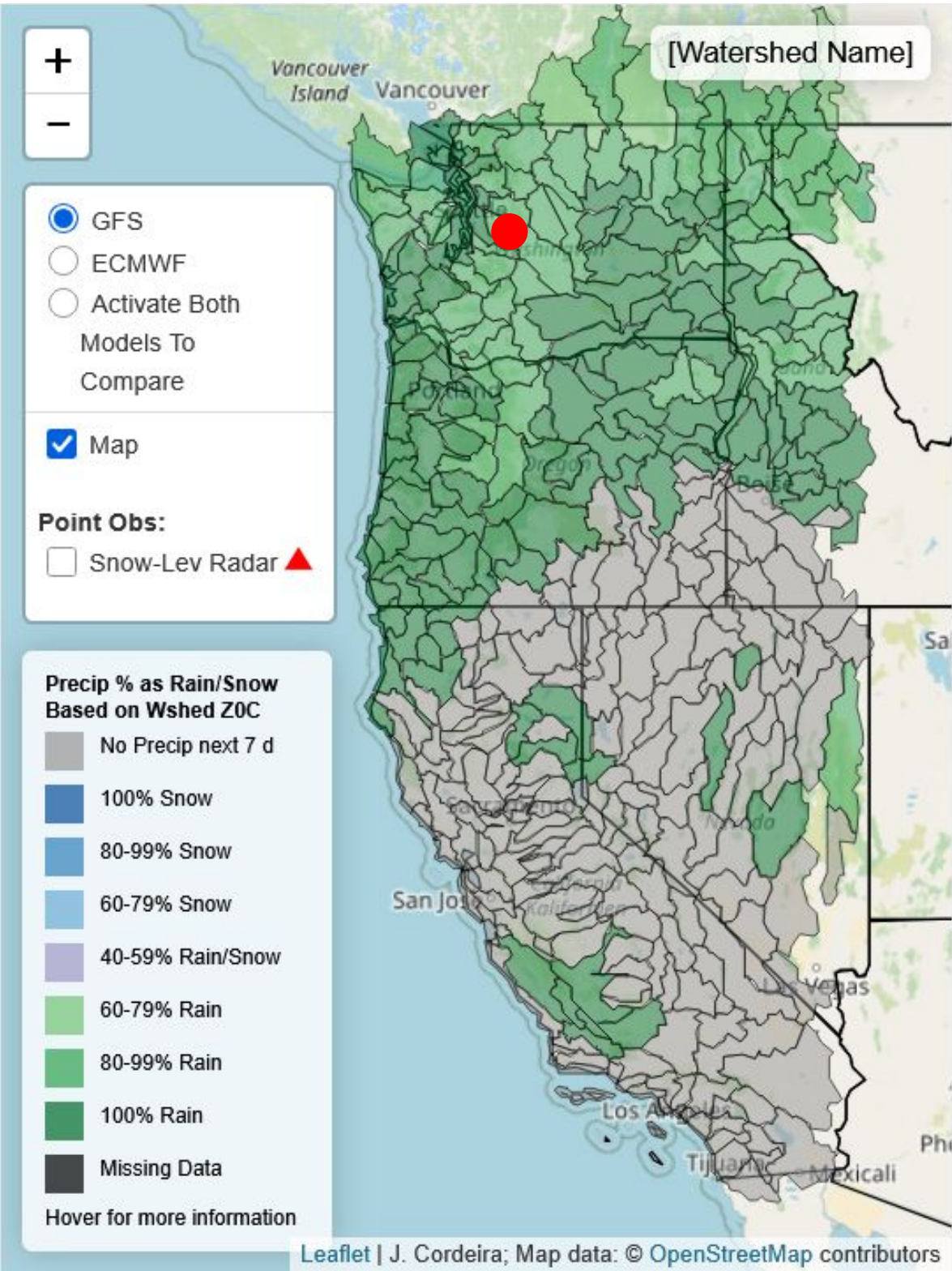
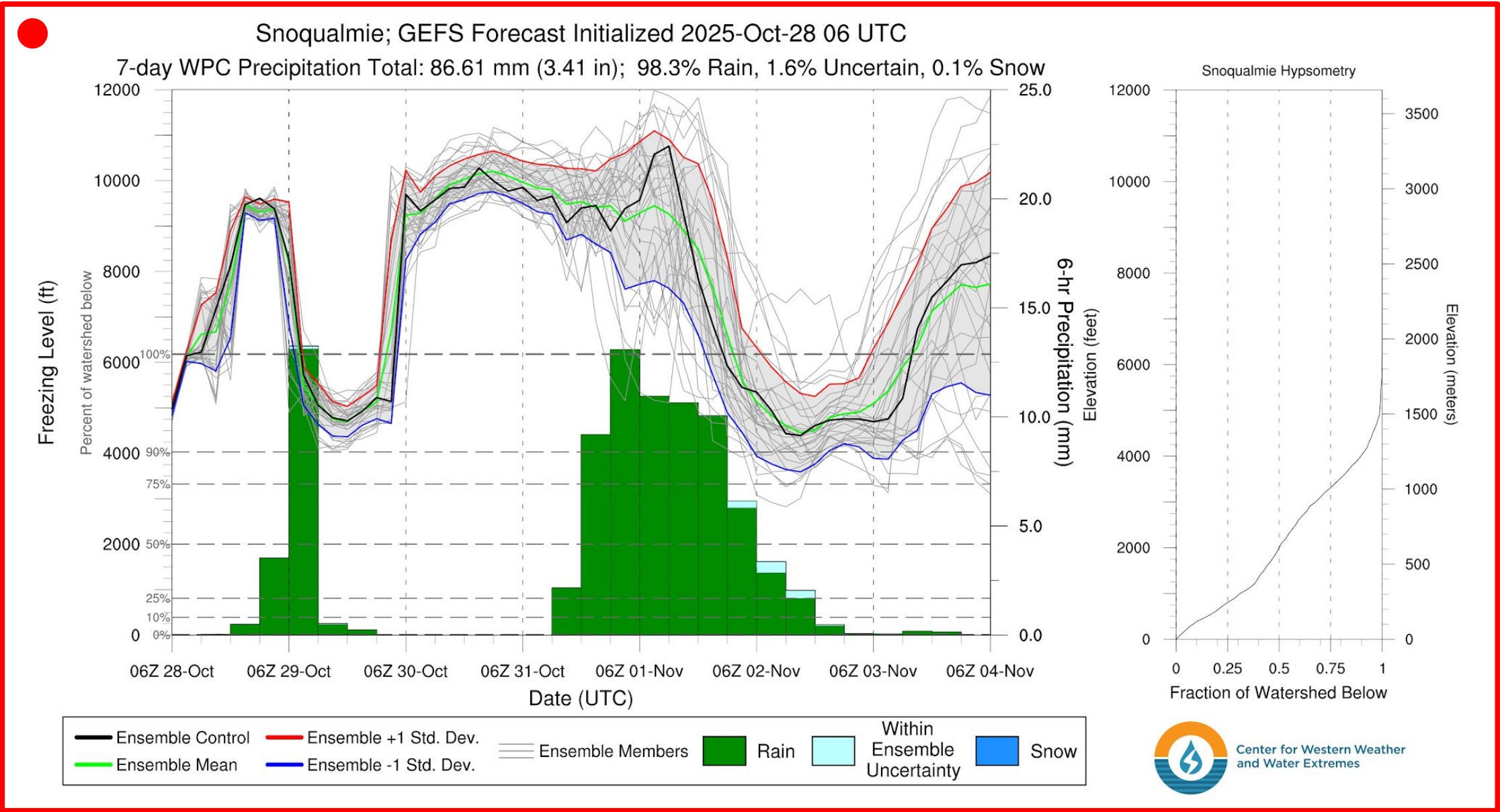
Watershed Precipitation Forecasts: South Santiam



- Compared to the GEFS, the EPS members is generally forecasting higher precipitation totals with the second AR over the Oregon Cascades. EPS 10-day mean precipitation (3.15 in.) is 1.08 inches higher than the GEFS (2.07 in.) over the South Santiam Watershed.
- 17 EPS members and only 3 GEFS members are forecasting precipitation accumulations from the first and second ARs to exceed 2 in. by 5 PM PT 2 Nov.

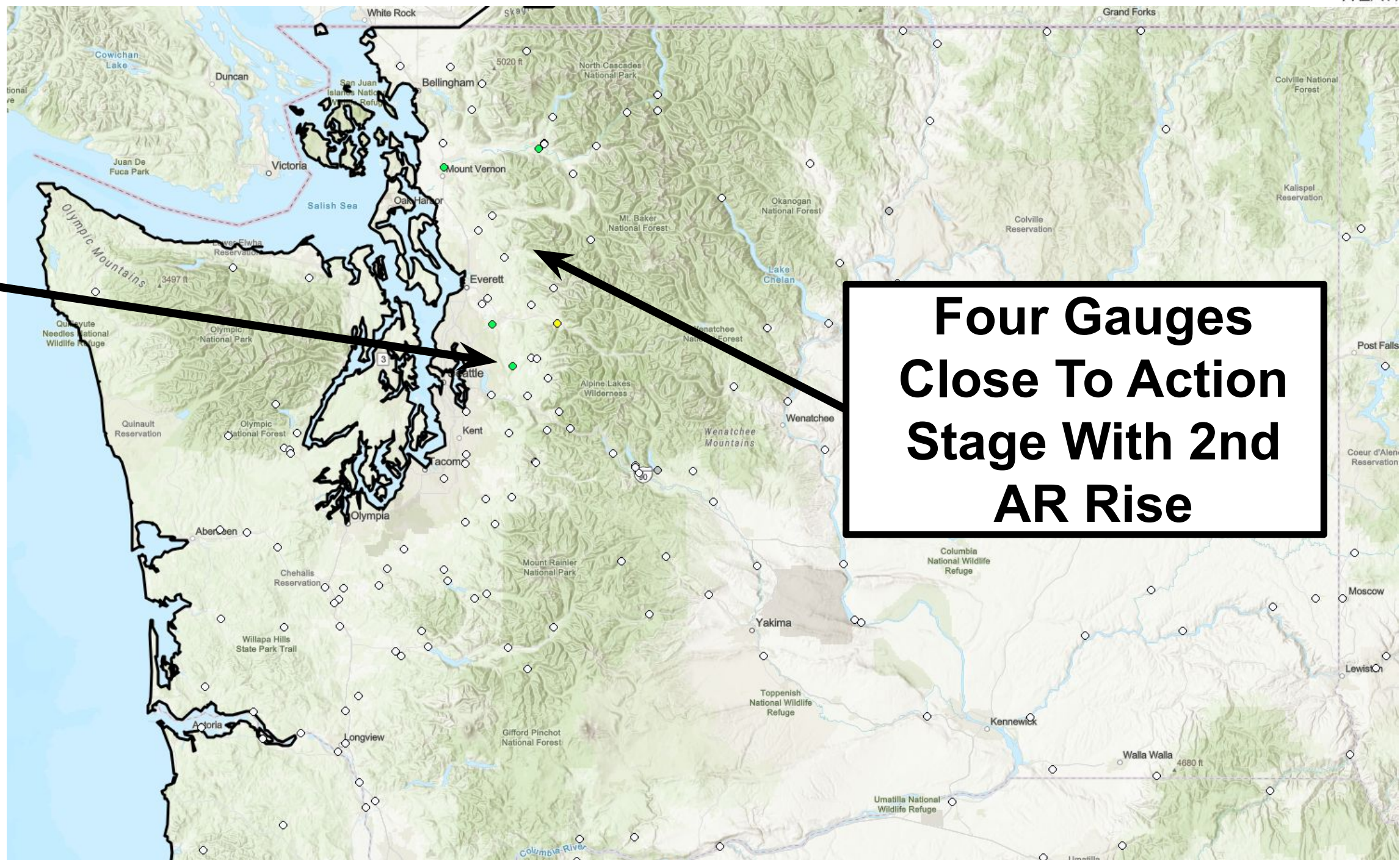
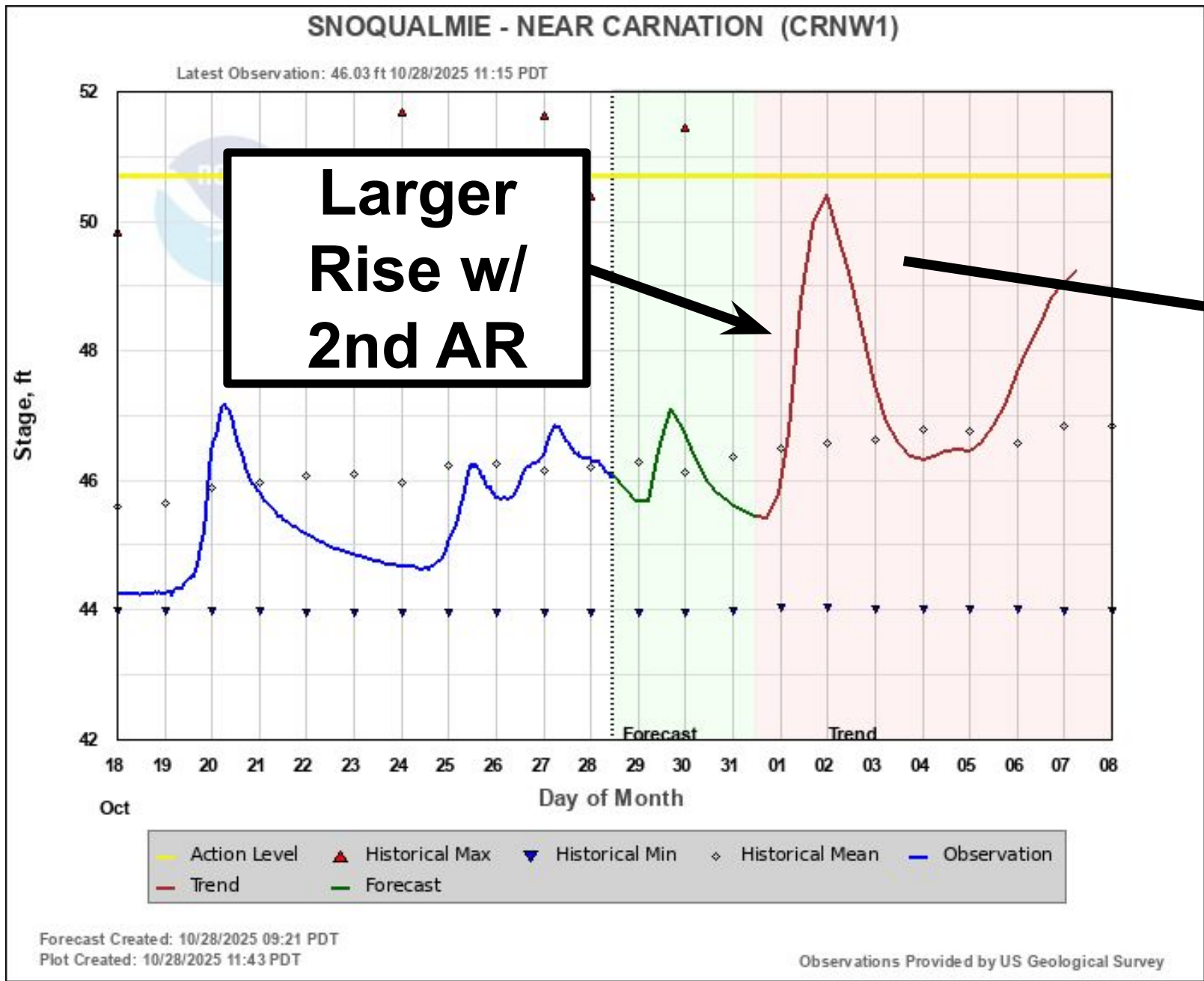
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Watershed Freezing Level Forecast: Snoqualmie



- Freezing levels across the Pacific Northwest are forecast to remain elevated throughout much of the duration of both events. As a result, precipitation from these ARs are forecast to fall primarily in the form of rain, except in the highest elevations of the Washington Cascades.
- Freezing levels during the second AR are forecast to start out above 9,000 feet in the Snoqualmie watershed on Fri 31 Oct, then drop below 6,000 feet late Sat 1 Nov as the core of the AR passes through the region.

NWRFC Streamflow Forecasts



- Northwest River Forecast Center (NWRFC) is forecasting streamflow rises in Washington with the precipitation forecast with the first and second ARs. While
- Larger streamflow rises are forecast with the second AR, but flooding is not anticipated. Five stream gauge locations in Western Washington are forecast to rise close to the Action Stage.