

CW3E Atmospheric River Outlook: 13 March 2025

Atmospheric River Forecast to Bring Precipitation to Oregon and Northern California

AR Summary:

- An atmospheric river (AR) that made landfall late Tue 11 Mar will continue to bring rain and mountain snow to Central and Southern California today.
- Another AR is forecast to make landfall over the Oregon and Northern California coasts early on Sat 15 Mar and continue through Sun 16 Mar.
- This AR will bring two pulses of IVT. The second, stronger pulse of IVT will be driven by a shortwave trough and surface low-pressure system.
- The GEFS is forecasting AR 1-3 conditions (based on the Ralph et al. 2019 AR Scale) over the Southern Oregon and Northern California coasts for 15-17 Mar.

Precipitation Forecasts:

- The NWS Weather Prediction Center (WPC) is forecasting at least 3-7 inches of precipitation over the Oregon Cascades, Oregon and Northern California Coast Ranges and Klamath Mountains during this event.
- Freezing levels are forecast to rise across the Oregon Cascades and Klamath Mountains while remaining low over the Washington Cascades. This will lead to the highest elevations of the Oregon Cascades and Klamath still receiving some snow, but the majority of precipitation is likely to fall as rain.
- The NWS is currently forecasting 12-24 inches of snowfall over the Oregon and Washington Cascades and 6-12 inches over the Klamath Mountains with the initial pulse of IVT on 15-16 Mar.

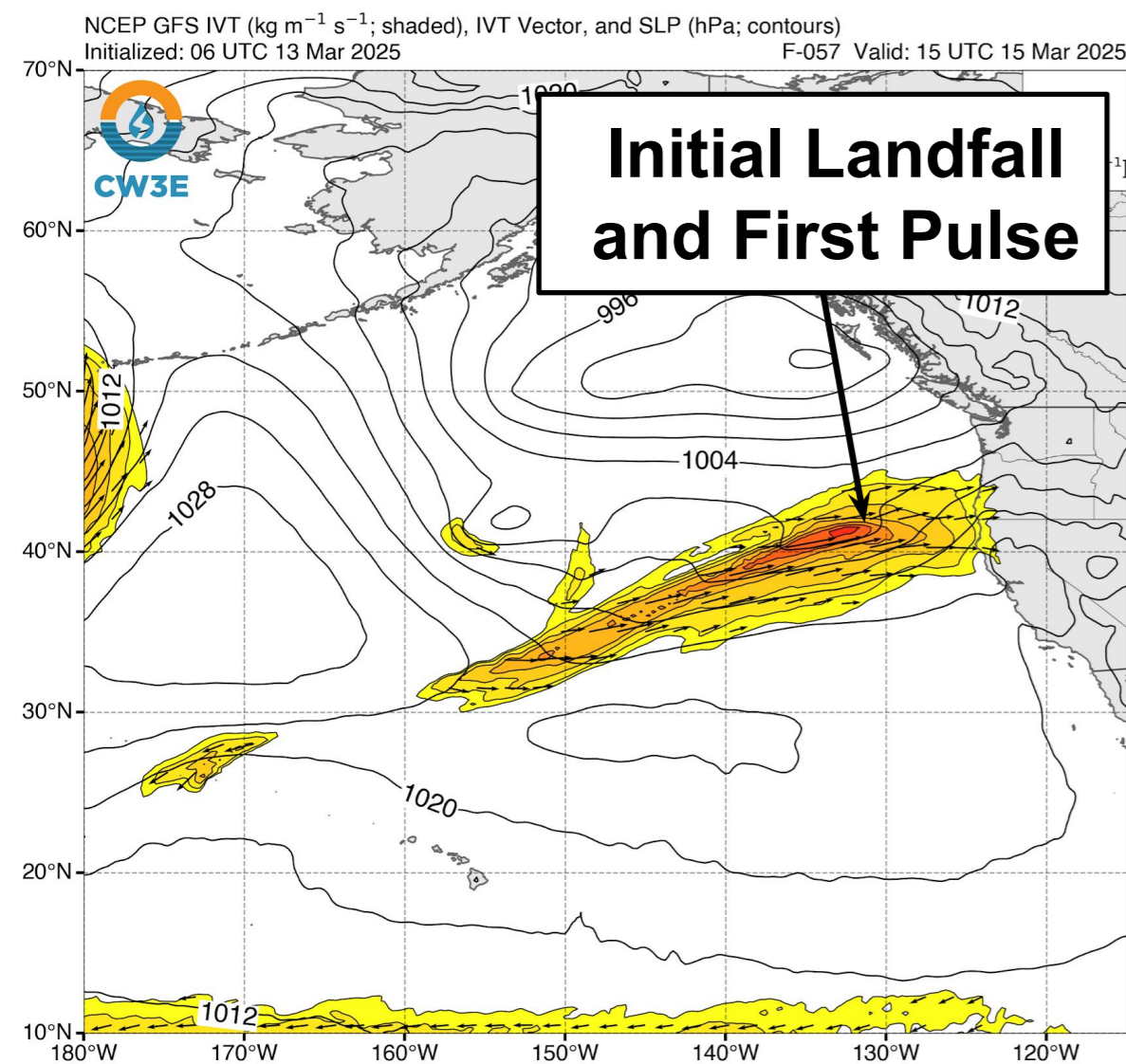
Flooding and Streamflow:

- The NWS WPC has issued a marginal risk Excessive Rainfall Outlook (ERO) (level 1 of 4, 5% chance of flooding) over Western Oregon, the California Coast Ranges, Klamath Mountains and Northern Sierra Nevada .
- The Northwest River Forecast Center currently forecasts five stations in Oregon to rise above minor flood stage and 12 stations across Washington and Oregon to rise above action/bankfull stage during 16-18 Mar with the incoming AR.

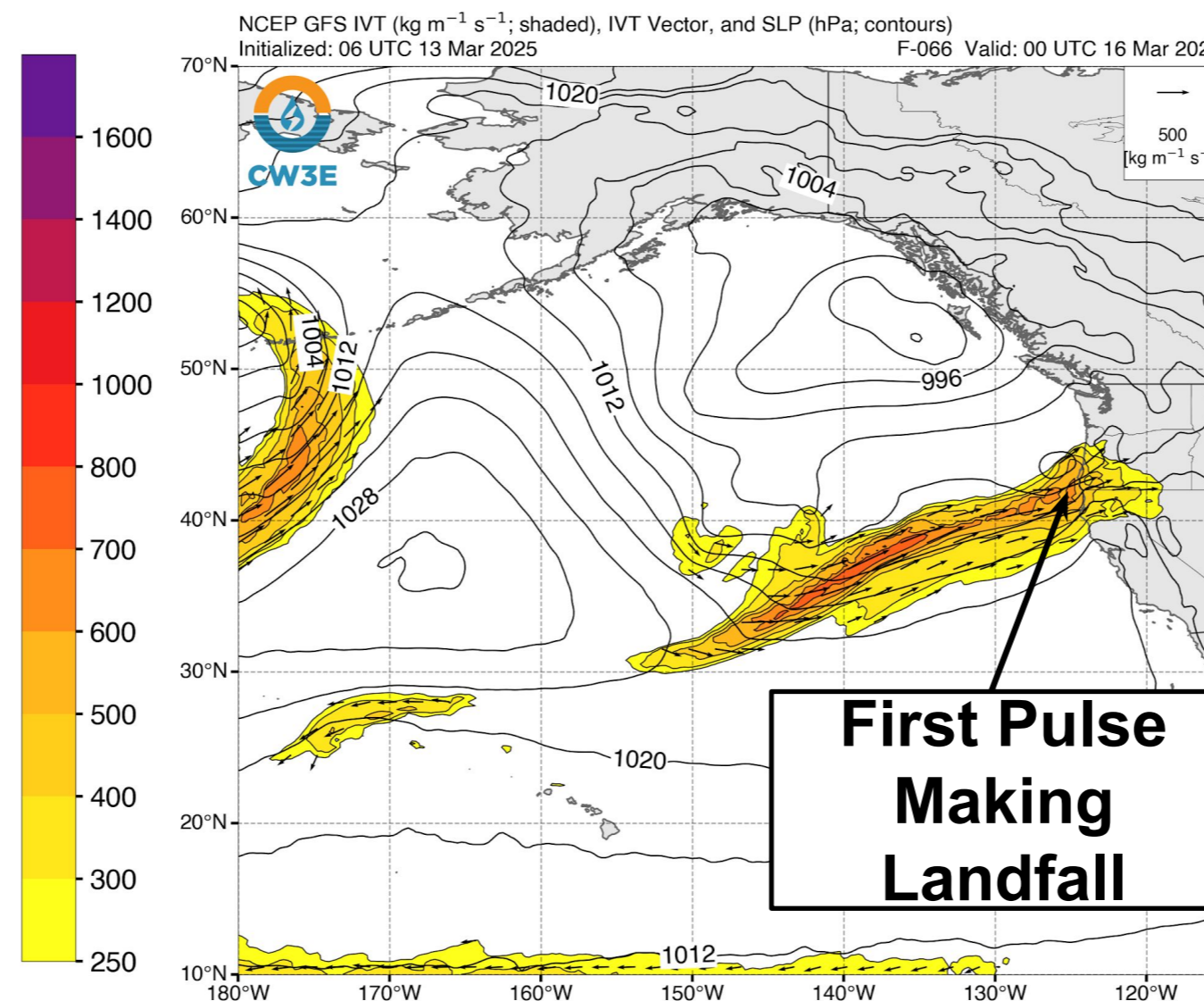
AR Outlook: 13 March 2025

GFS IVT & SLP Forecasts

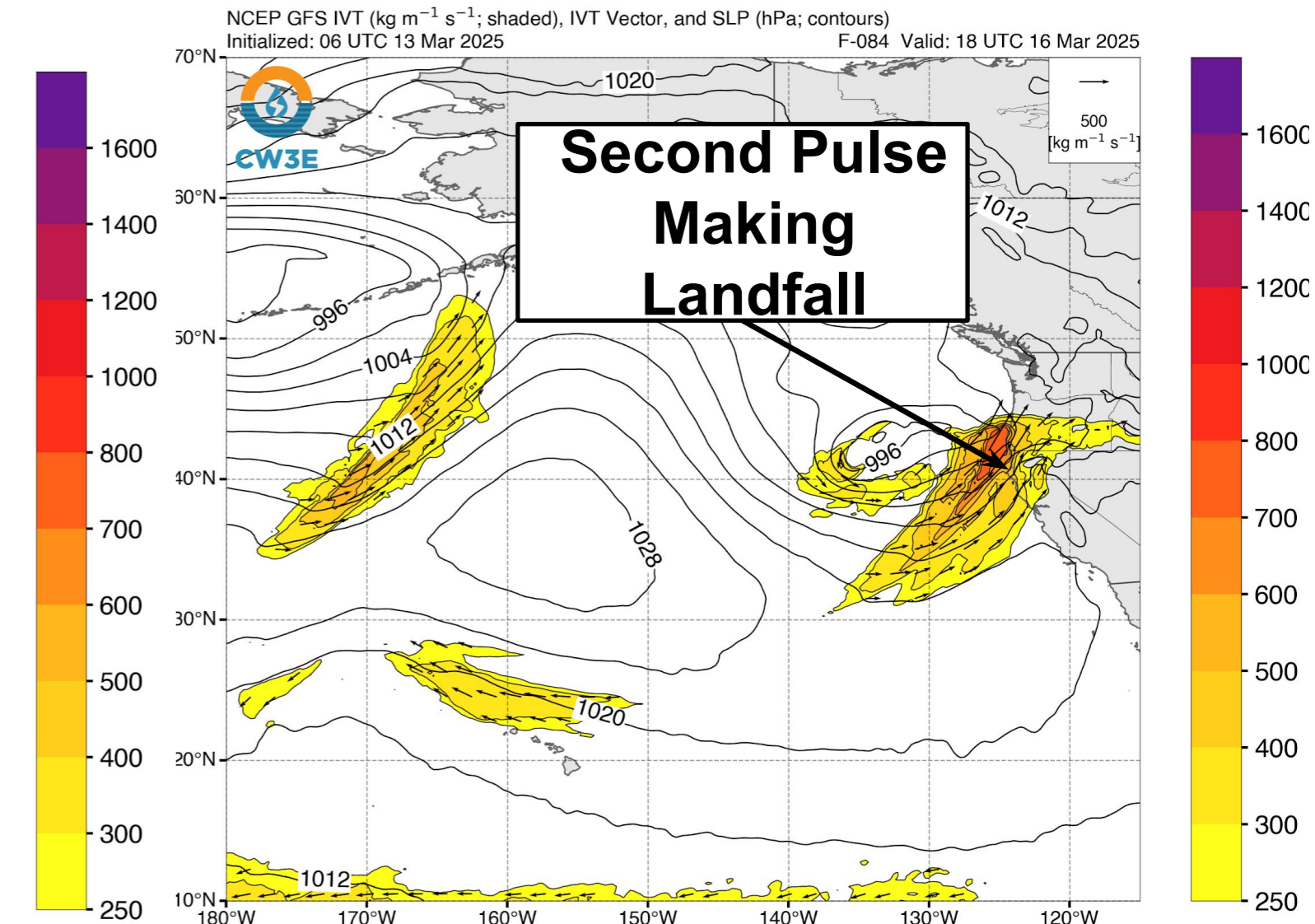
Valid: 8 AM PDT 15 Mar (F-057)



Valid: 5 PM PDT 15 Mar (F-066)



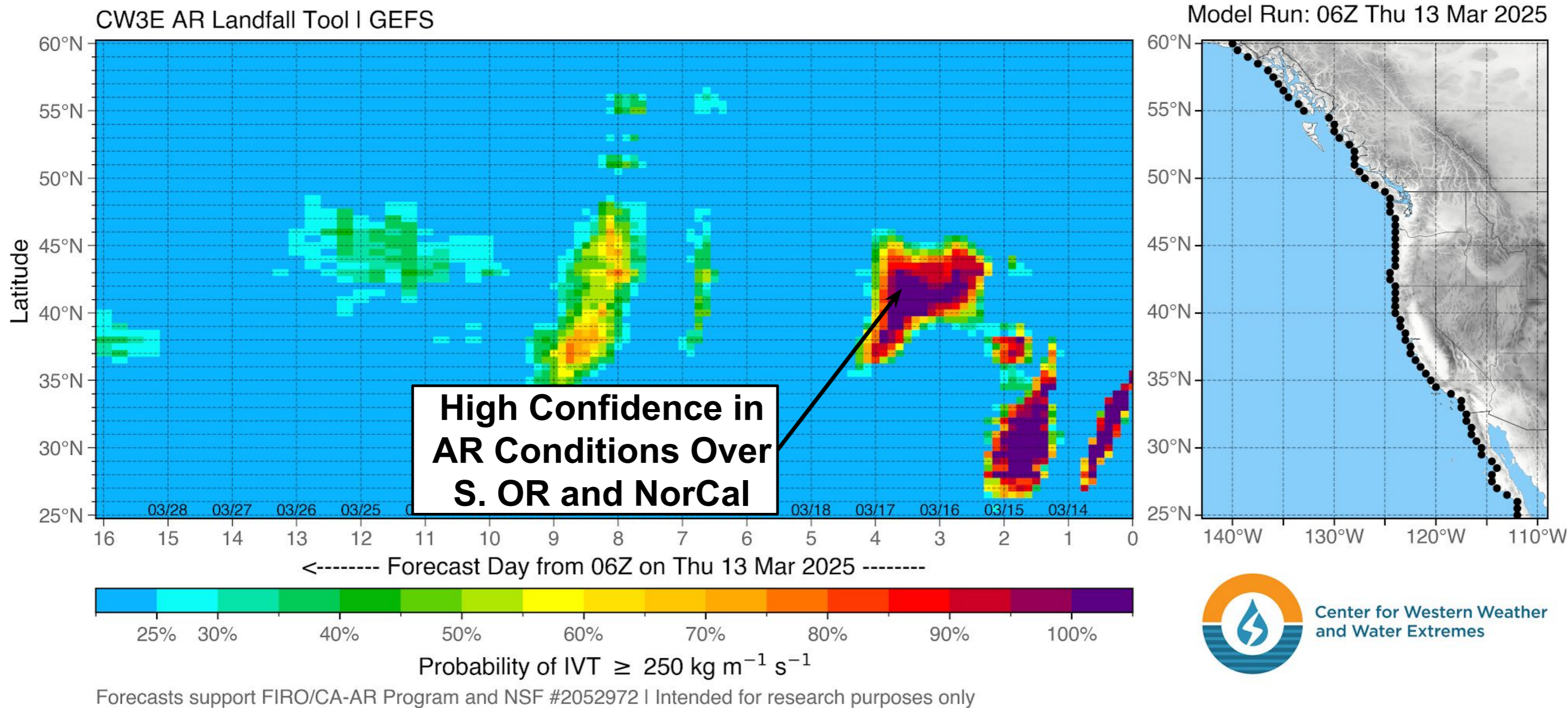
Valid: 11 AM PDT 16 Mar (F-084)



- The next atmospheric river (AR) is forecast to propagate toward the USWC during the next 48 hours, reaching the coast early Sat 15 Mar.
- The initial pulse will move over the region through Sat 15 Mar driving the initial precipitation.
- A shortwave trough will deepen in the NE Pacific behind the AR. As the trough approaches the USWC, a surface low-pressure system is forecast to form beneath the trough.
- The shortwave and surface low are likely to help strengthen IVT at the back end of the AR, leading to a stronger second pulse of IVT over the Southern Oregon and Northern California coasts.

AR Outlook: 13 March 2025

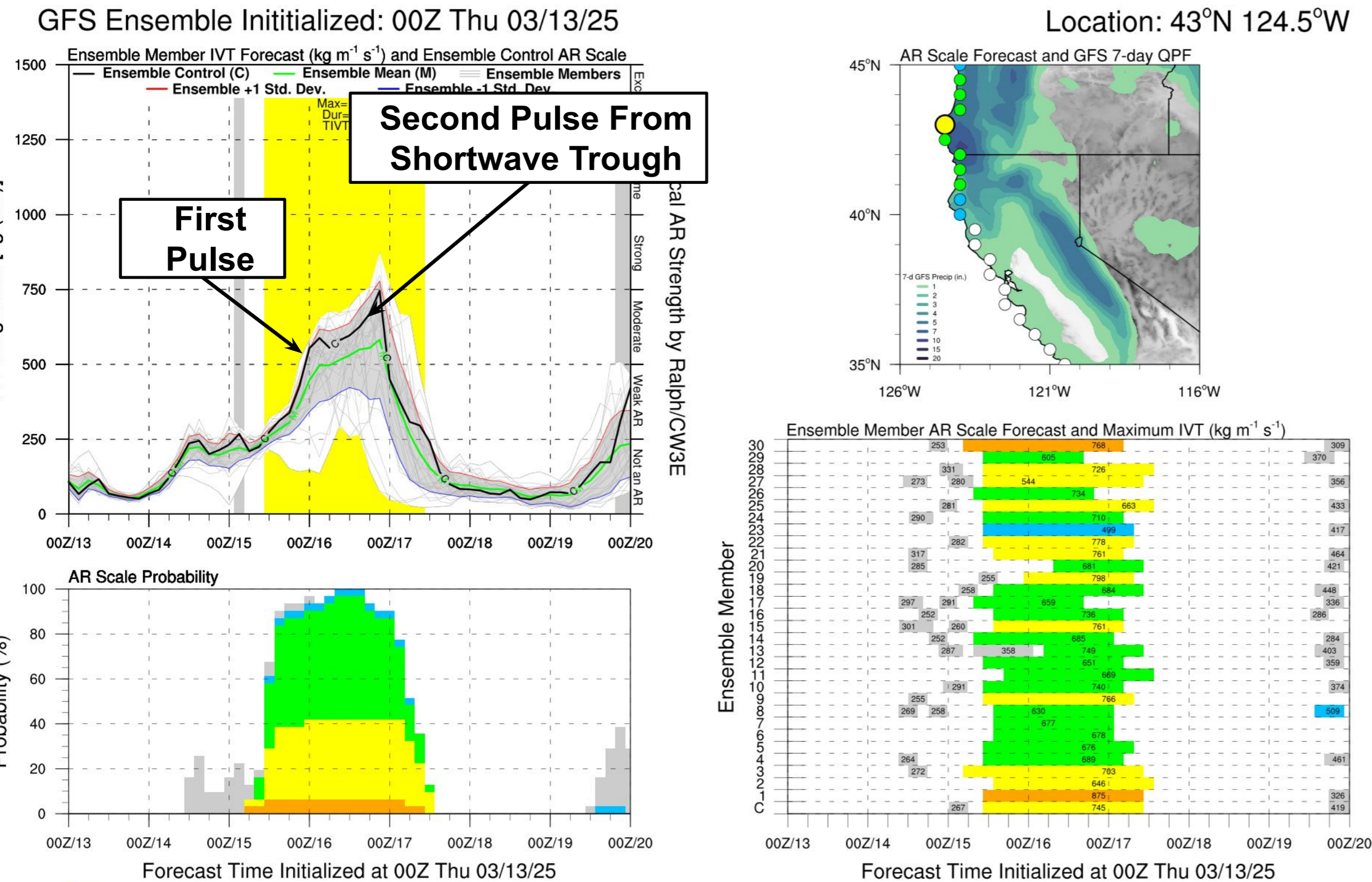
CW3E AR Landfall Tool: GEFS



- CW3E’s AR Landfall Tool based on the GEFS shows high confidence ($>95\%$ confidence) in AR conditions ($IVT \geq 250 \text{ kg m}^{-1} \text{ s}^{-1}$) beginning over coastal Oregon and Northern California on Sat 15 Mar and continuing through Sun 16 Mar.
- The second pulse of IVT associated with the shortwave trough is likely to bring short duration AR conditions to the Bay Area at the end of the event.

AR Outlook: 13 March 2025

GEFS AR Scale and IVT Forecasts



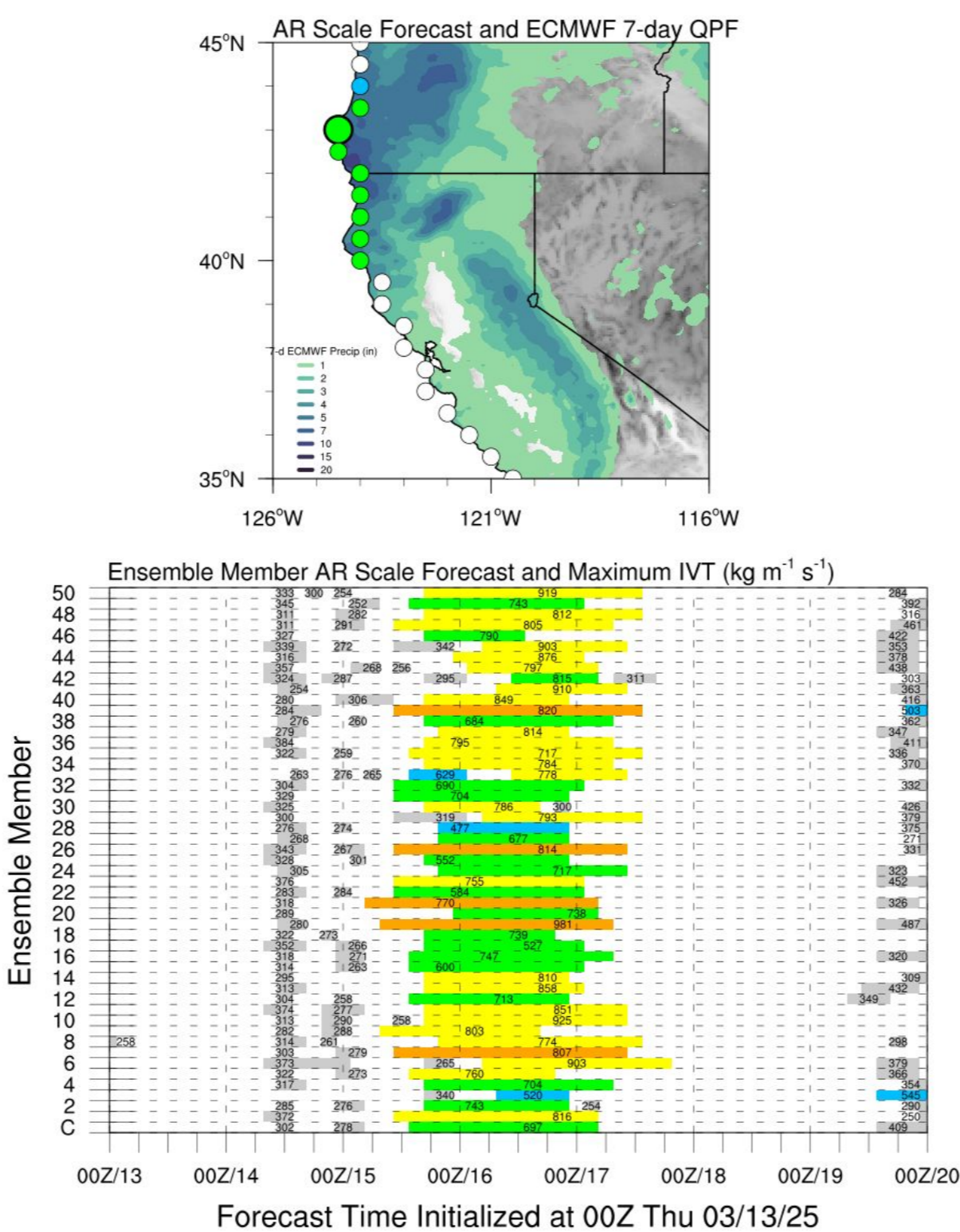
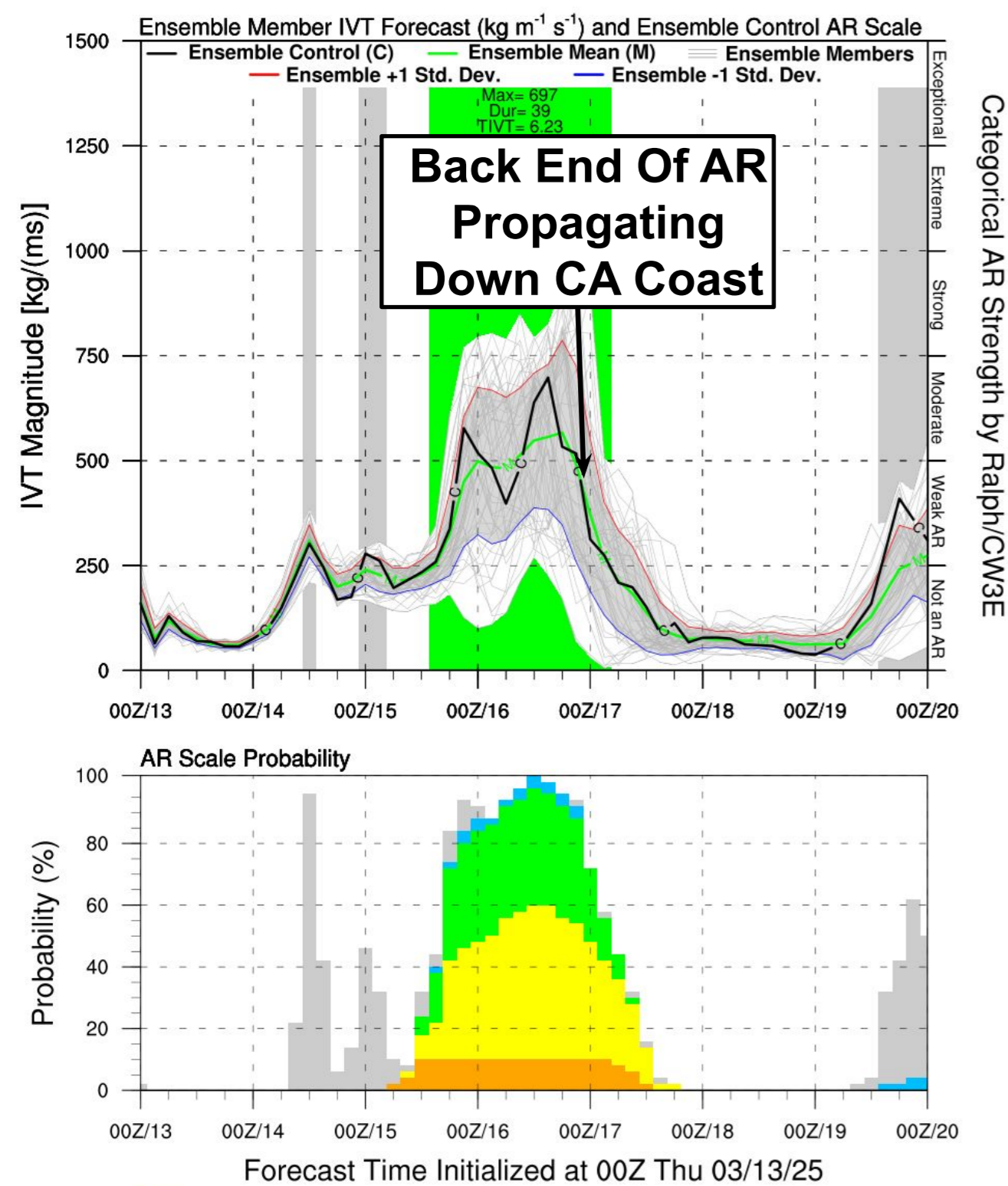
- The 00Z GEFS control member is forecasting **AR1-AR3 conditions** (based on the Ralph et al. 2019 AR Scale) over coastal Oregon and Northern California for this event.
- 13/31 GEFS members are forecasting at least AR3 conditions for a coastal point at 43°N, 124.5°W (Coastal Coos County, OR).
- There is uncertainty amongst the GEFS members with the timing of onset/dissipation of AR conditions and maximum IVT

AR Outlook: 13 March 2025

EPS AR Scale and IVT Forecasts

ECMWF Ensemble Initialized: 00Z Thu 03/13/25

Location: 43°N 124.5°W

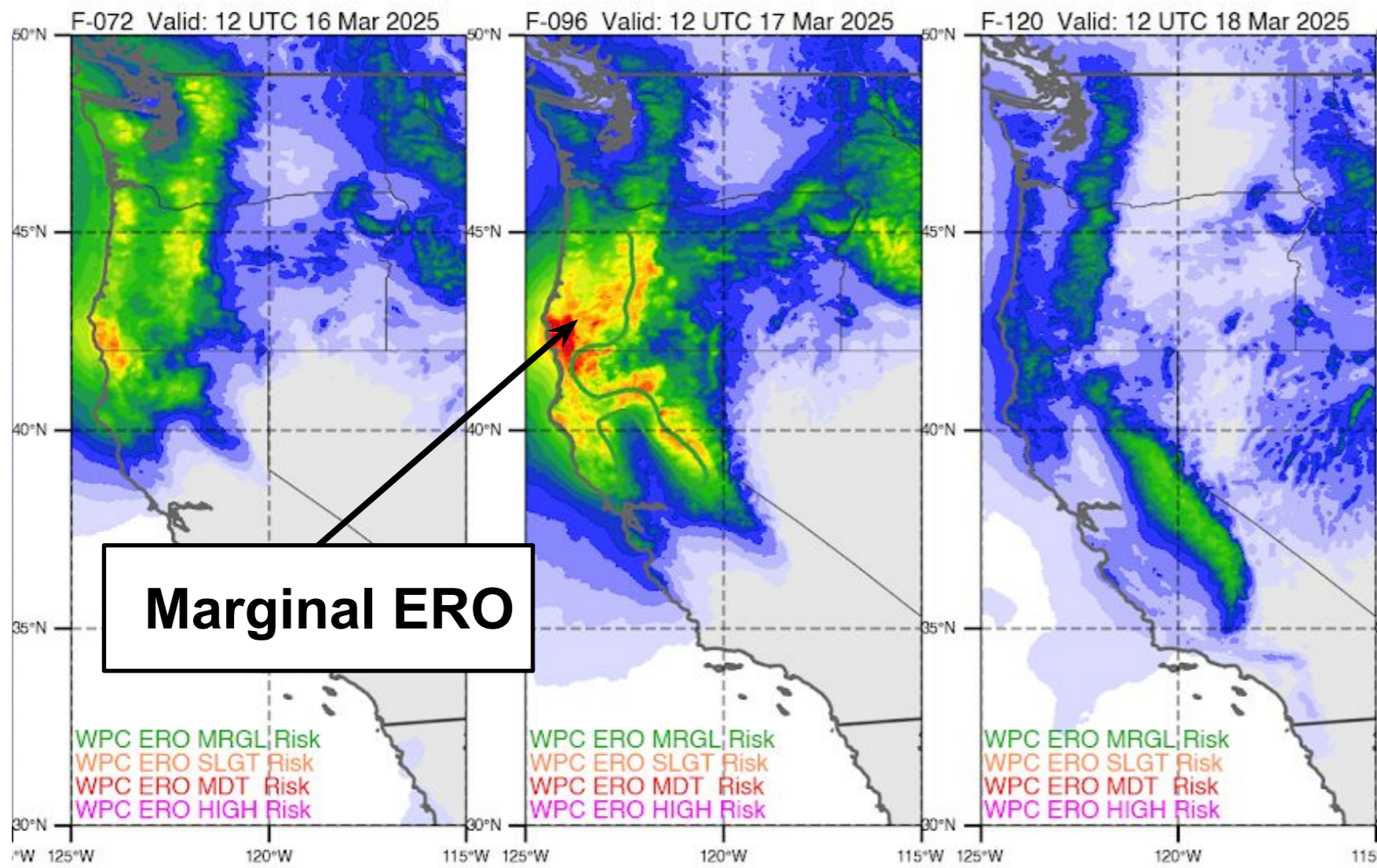


- The 00Z EPS control member is forecasting **AR1-AR2 conditions** over coastal Oregon and Northern California for this event.
- 30/51 EPS members are forecasting at least AR3 conditions for a coastal point at 43°N, 124.5°W (Coastal Coos County, OR).
- EPS members also show uncertainty in the timing of onset and duration of AR conditions as well as the timing and magnitude of maximum IVT.

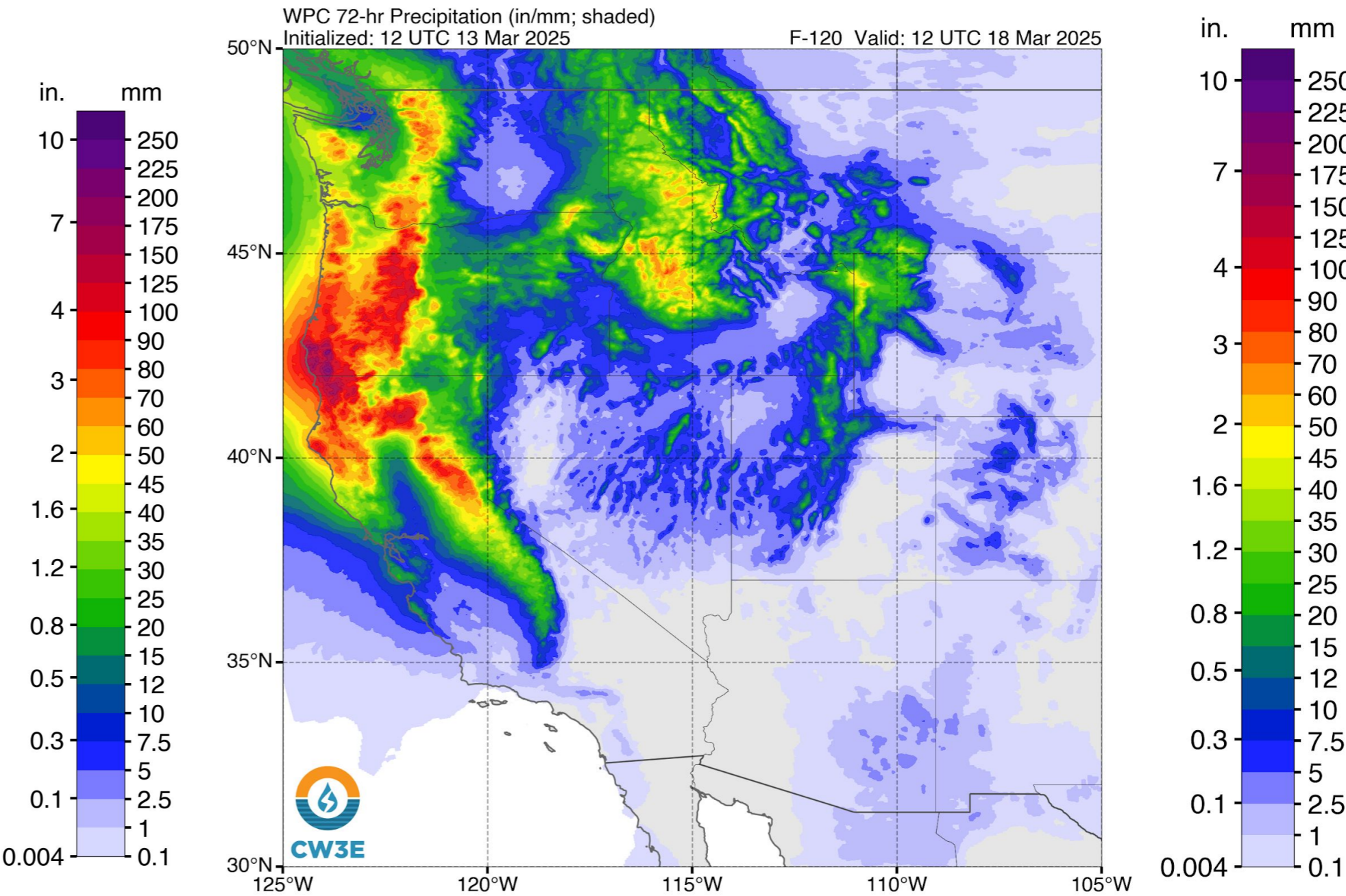
WPC Precipitation Forecasts

WPC 24-h Forecasts for Days 3-5

Valid: 5 AM PT 15-18 Feb



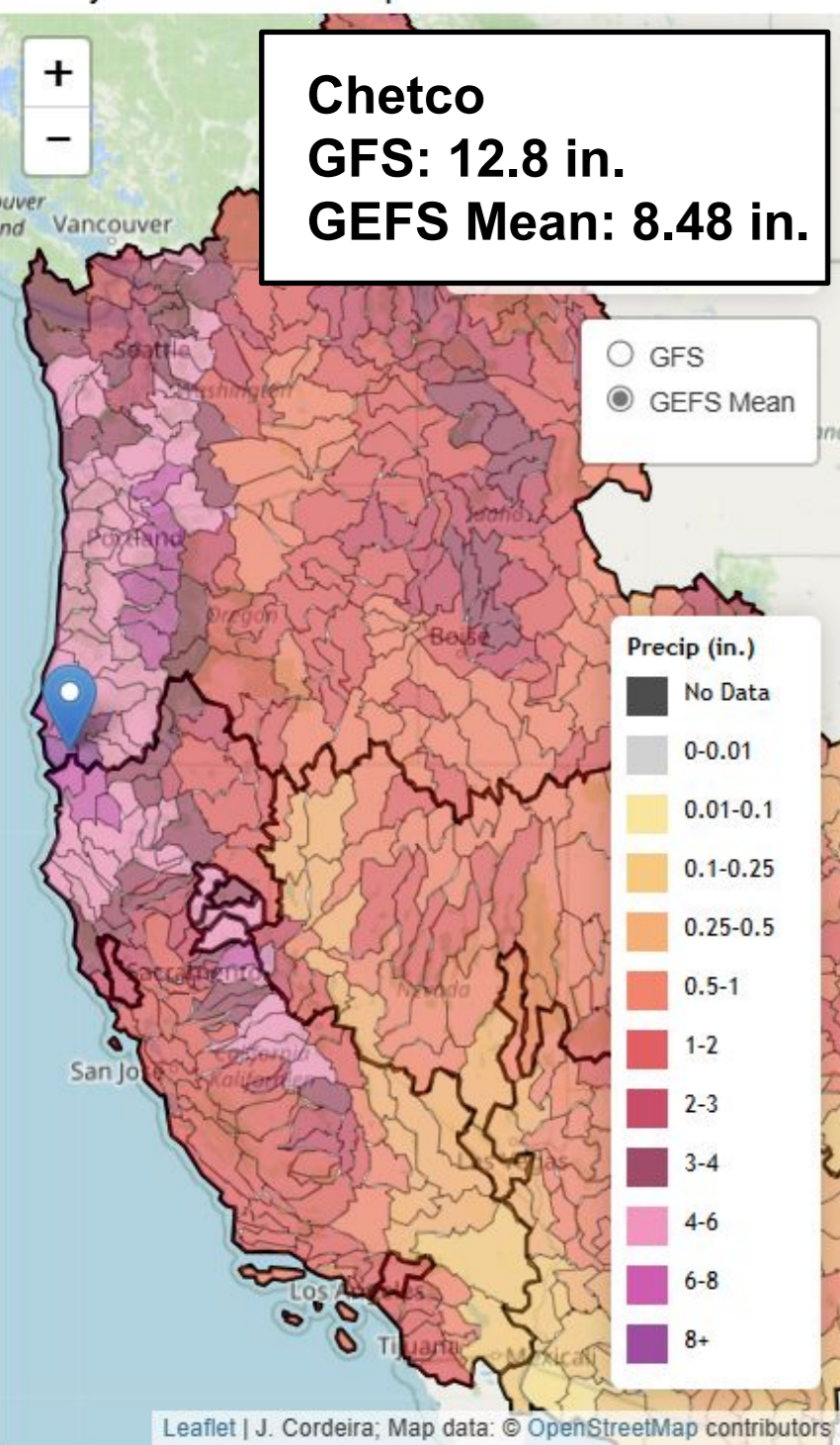
WPC 72-h QPF
Valid: 5 AM PT 18 Mar



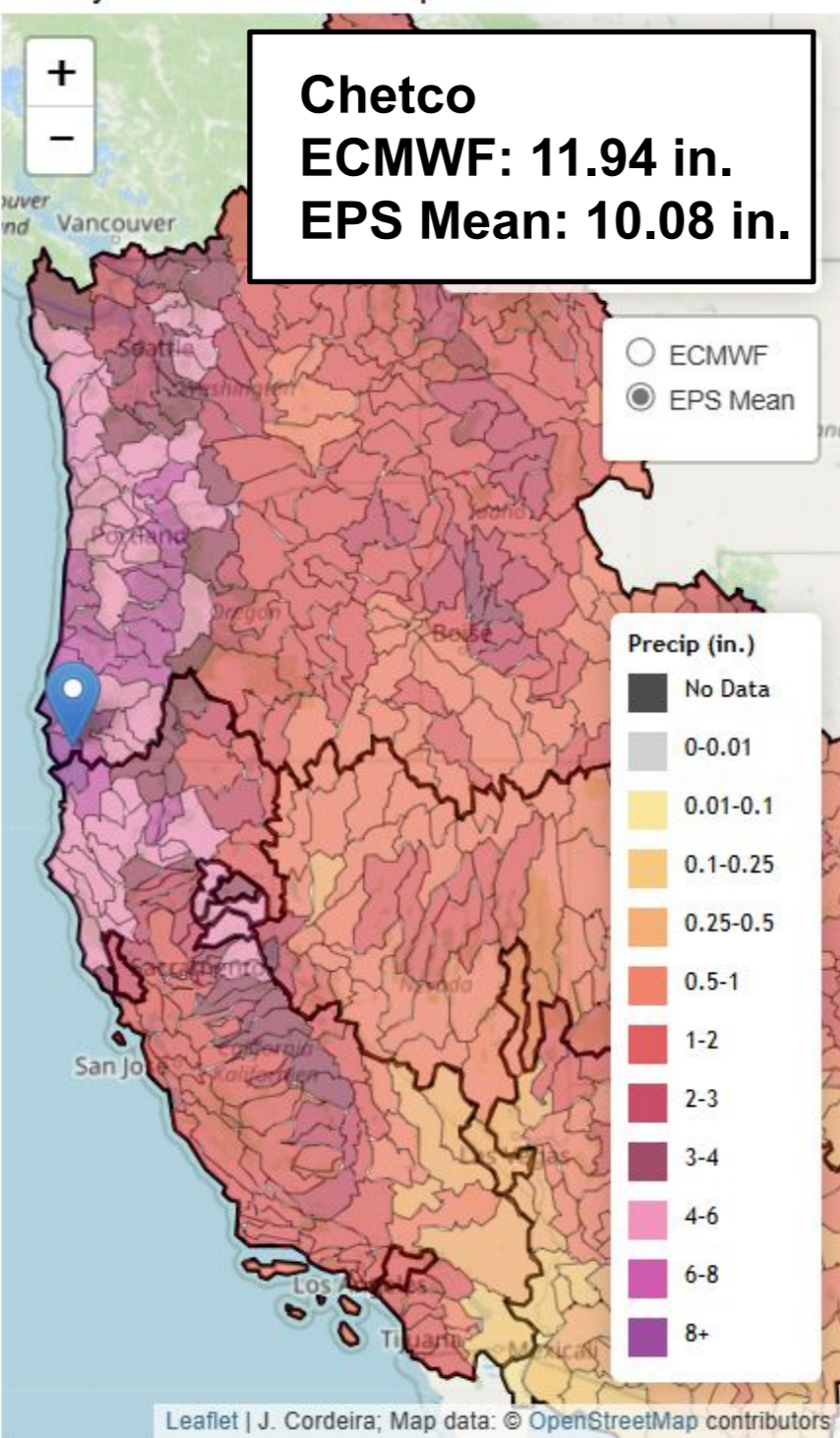
- The highest 3-day precipitation totals are expected over the Oregon Cascades, Oregon and Northern California Coast Ranges and Klamath Mountains where at least 3-7 inches are forecast.
- A marginal risk Excessive Rainfall Outlook (ERO) (level 1 of 4, 5% chance of flooding) has been issued over Western Oregon and California Coast Ranges, Klamath Mountains and Northern Sierra Nevada on day 4 (24-h period ending 5 AM PT Mon 17 Mar).

Watershed Precipitation Forecasts - Chetco

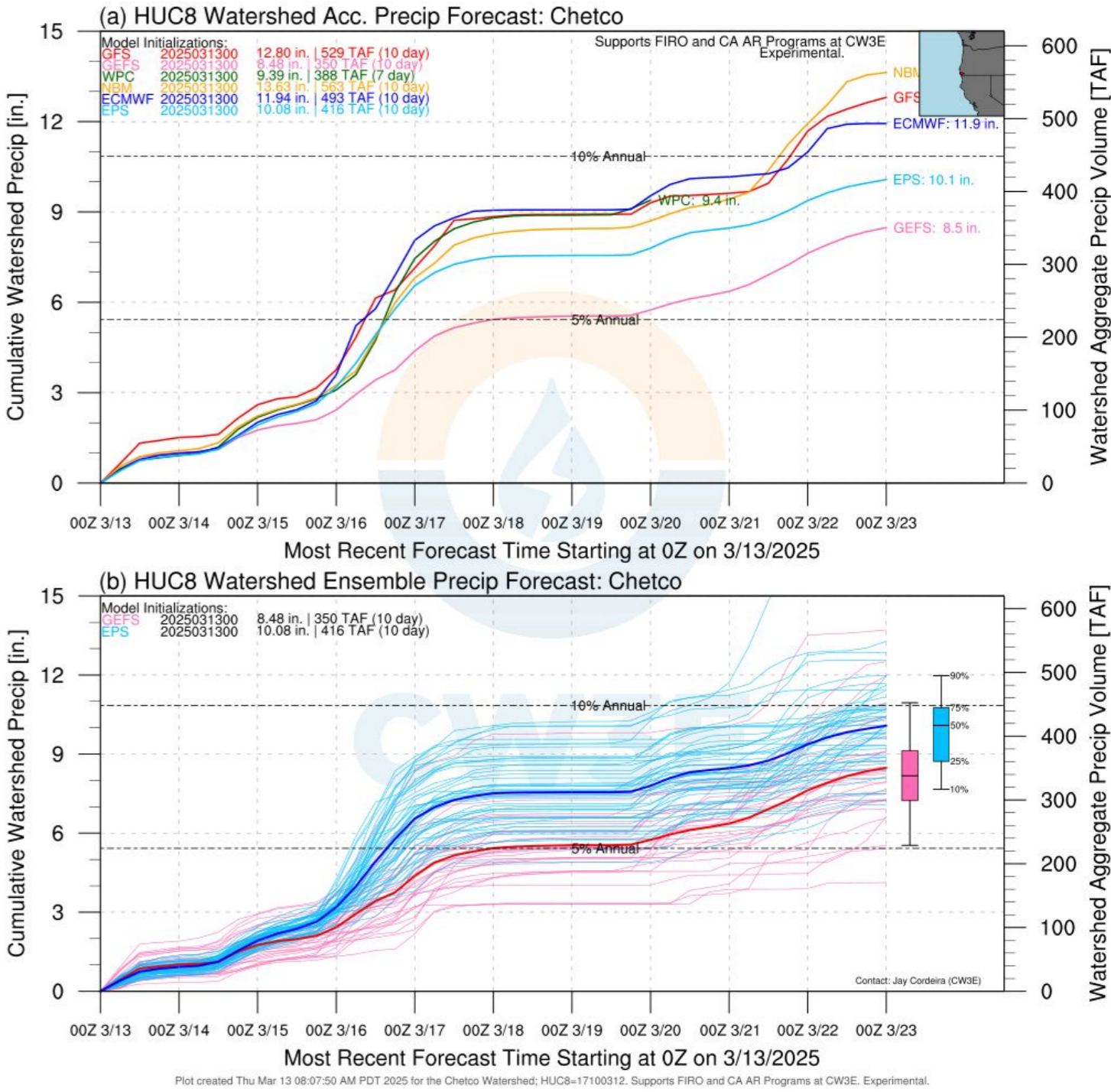
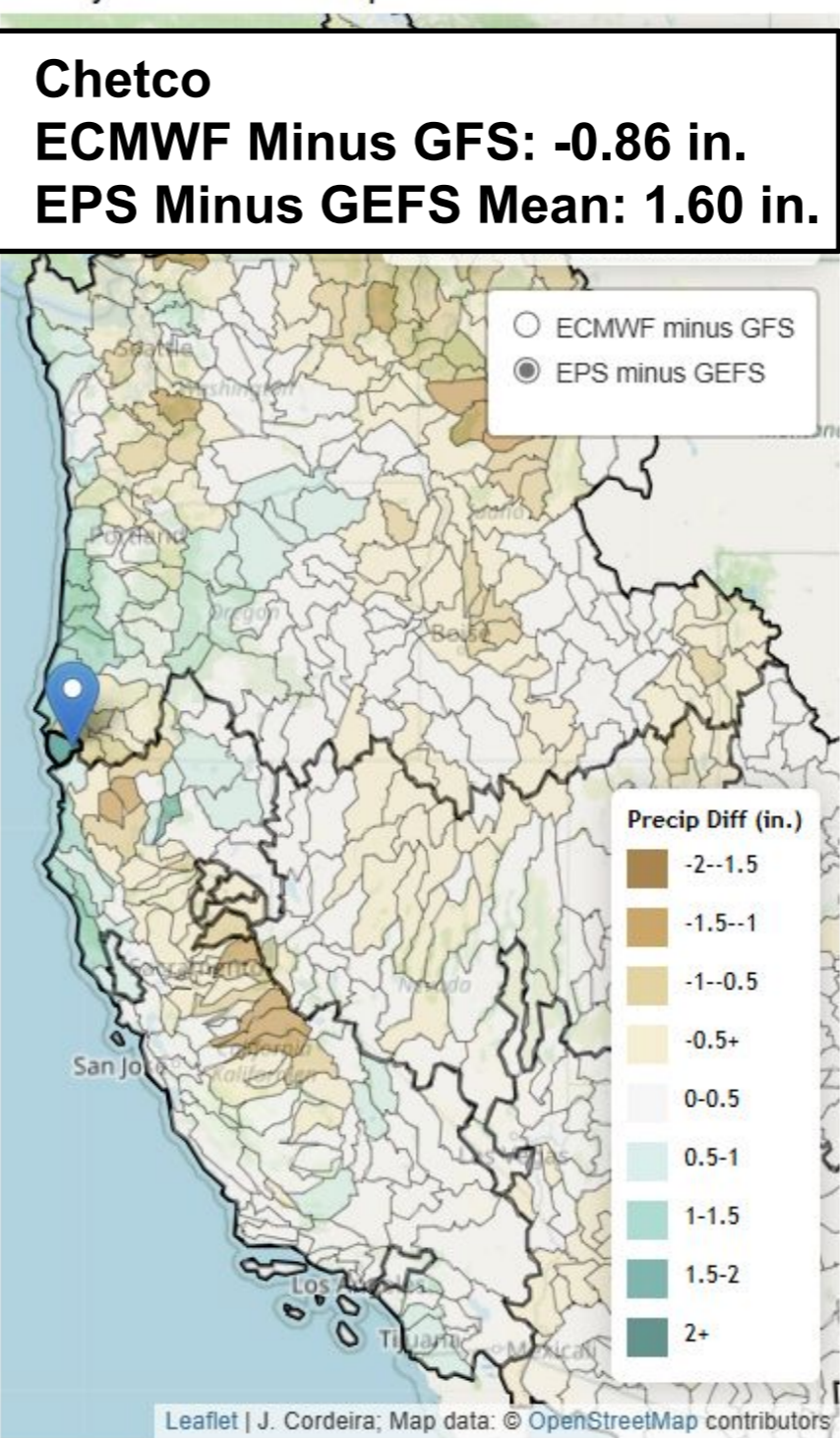
10-day GFS/GEFS Precipitation Forecasts



10-day ECMWF/EFS Precipitation Forecast



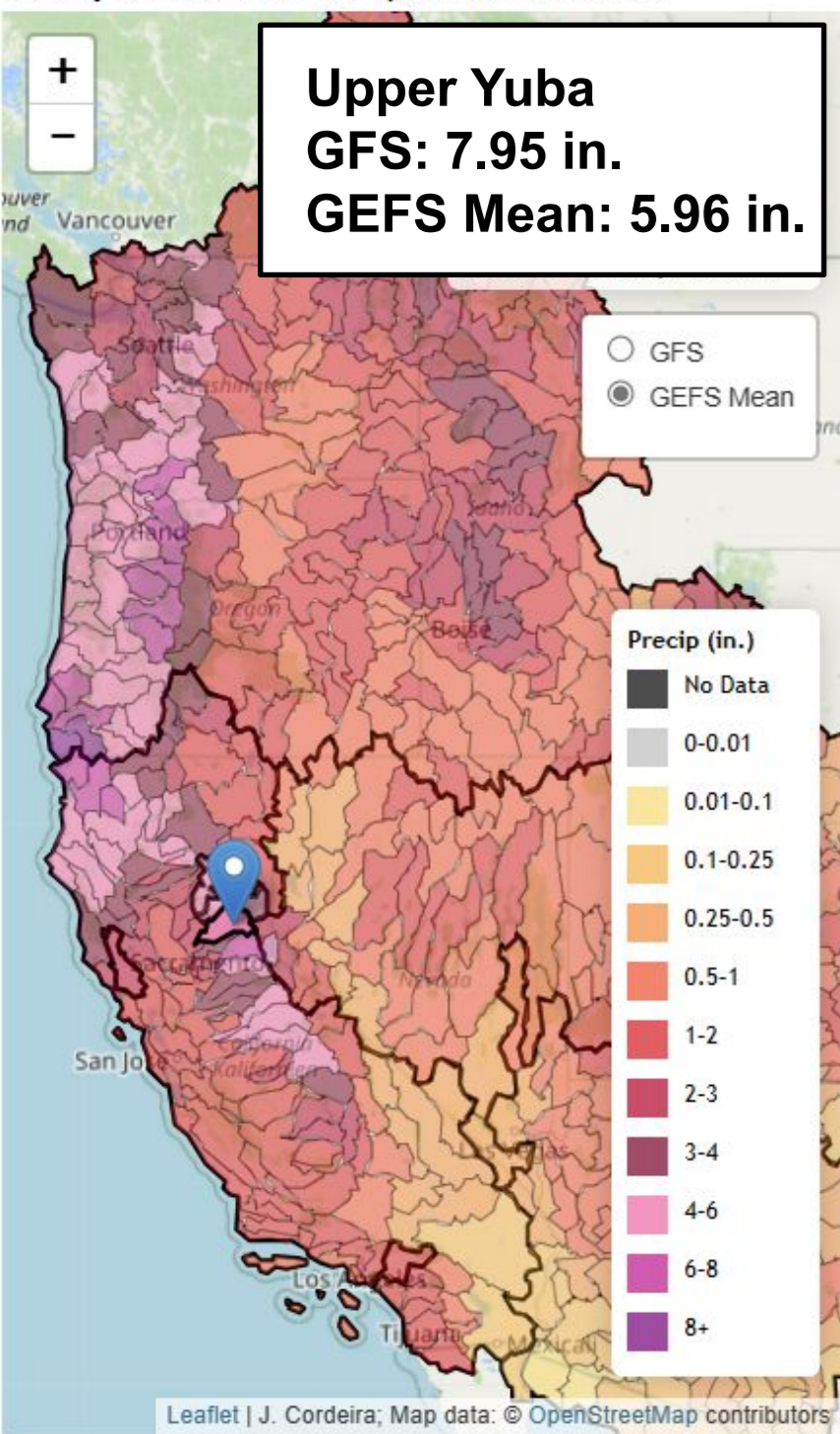
10-day Difference Precipitation Forecast



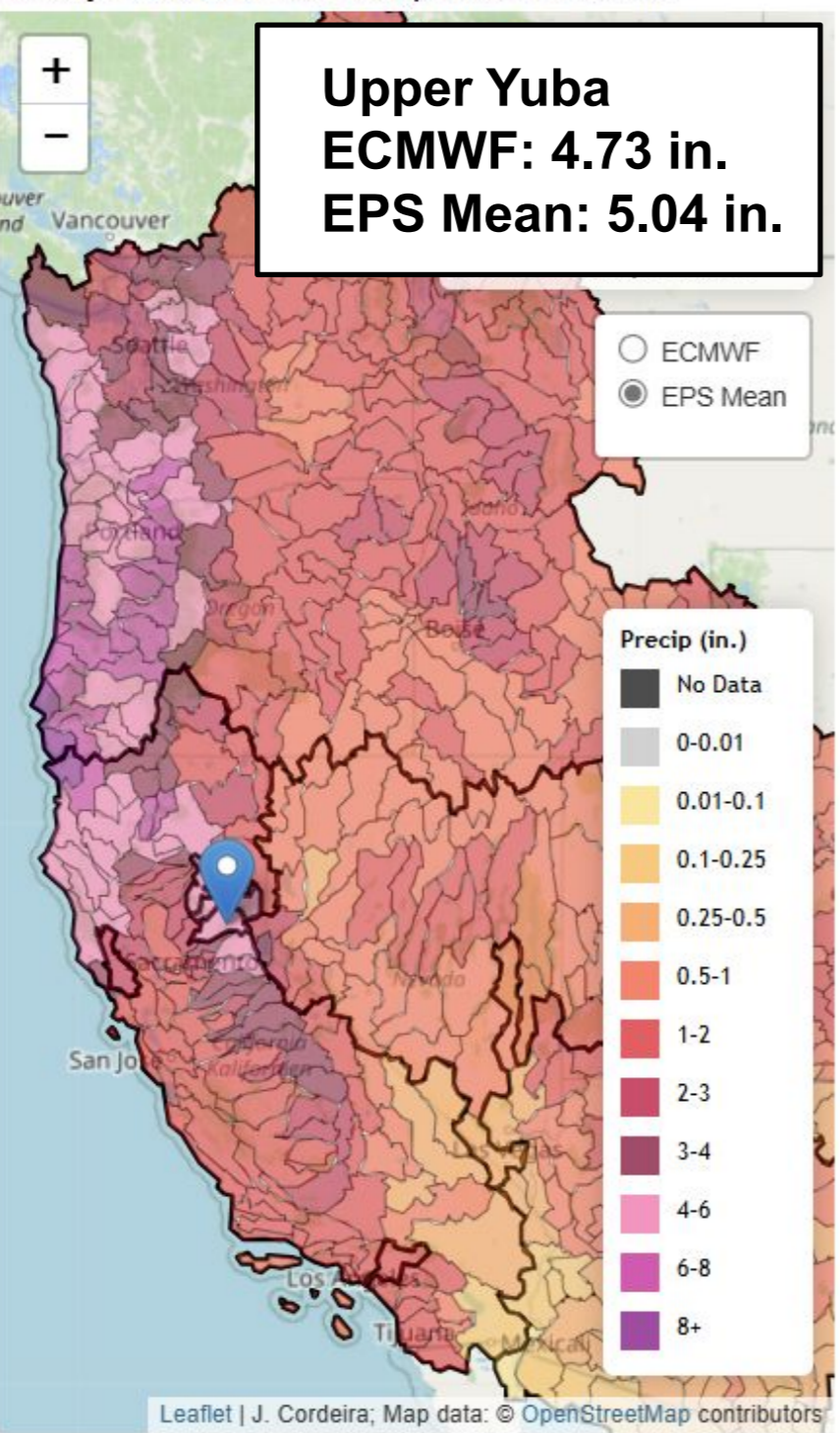
- All ensemble means and models are forecasting at least 8 inches of precipitation in the Chetco watershed (**5% of normal annual precipitation**) over the next 10 days (*upper right*).
- >90% of GEFS and 100% of EPS members are forecasting 10-day precipitation totals to exceed **5% of normal annual precipitation** over this watershed.
- ~75% of EPS members forecasting 9+ inches of precipitation while only ~25% of GEFS members are forecasting totals that high over the next 10 days.

Watershed Precipitation Forecasts - Upper Yuba

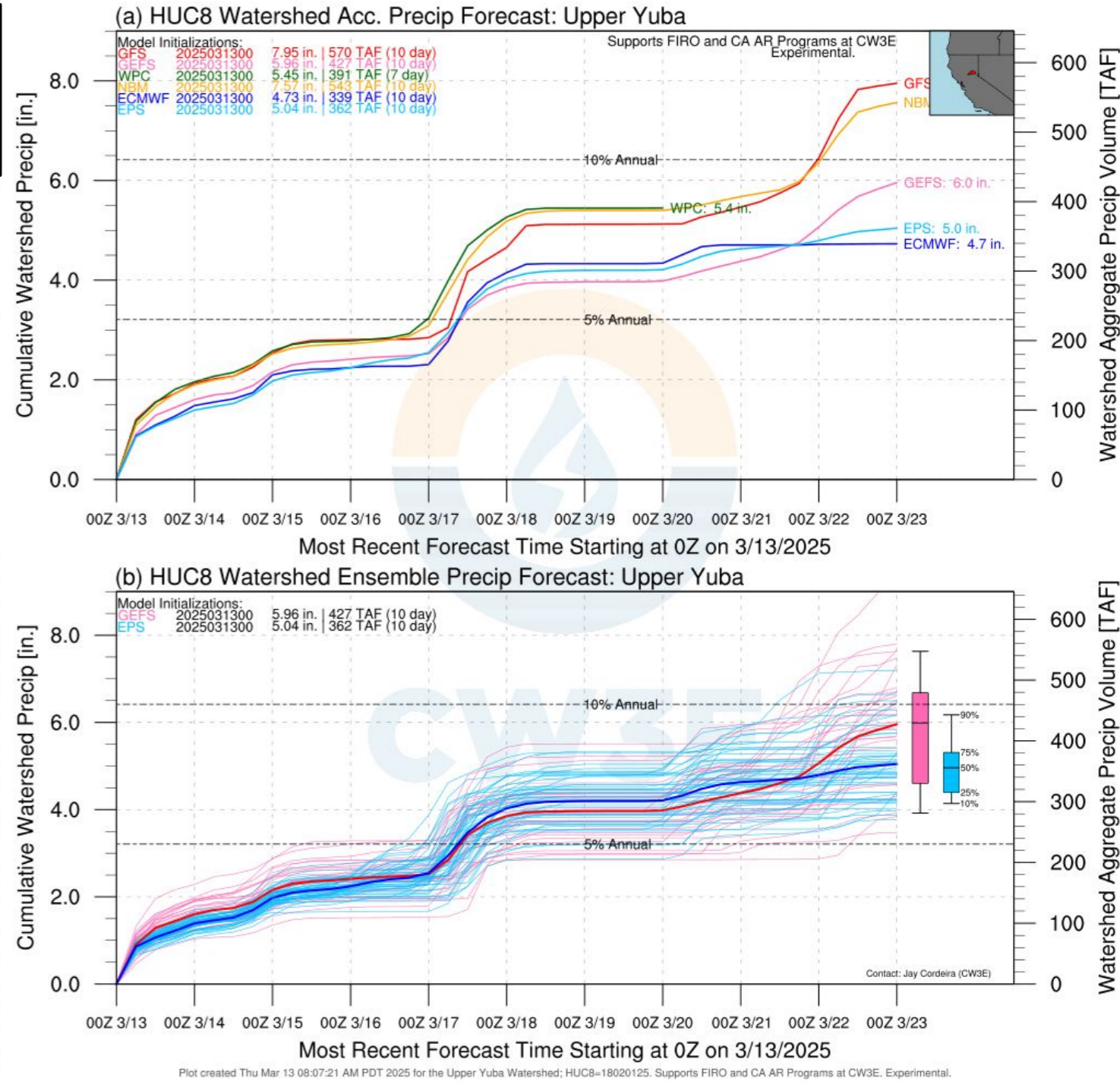
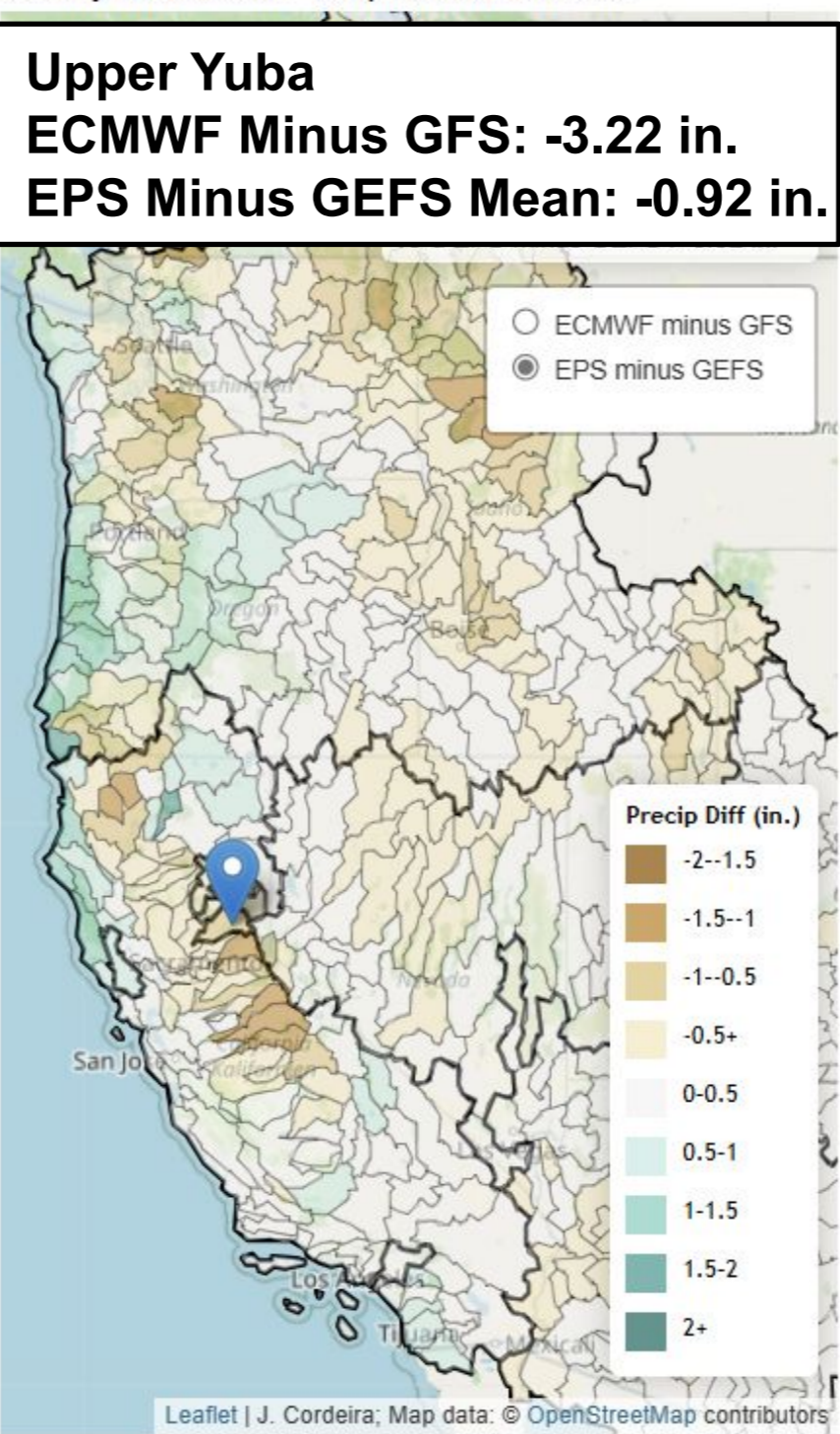
10-day GFS/GEFS Precipitation Forecasts



10-day ECMWF/EFS Precipitation Forecast

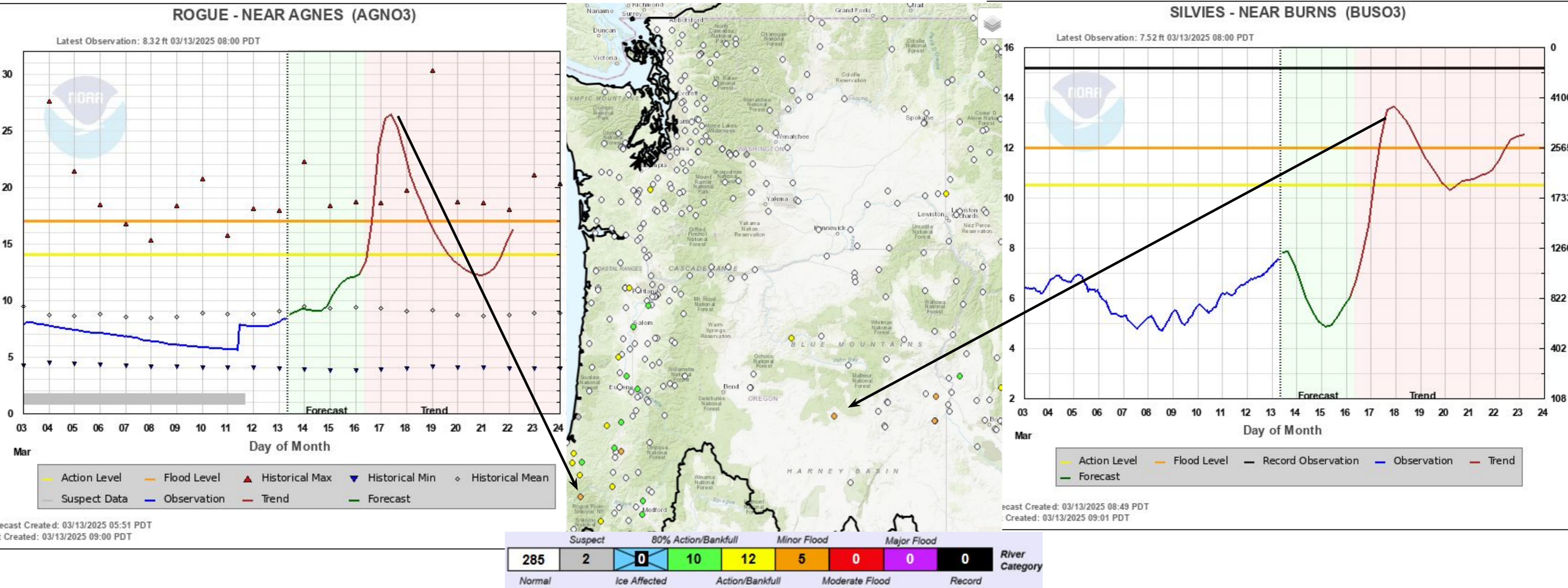


10-day Difference Precipitation Forecast



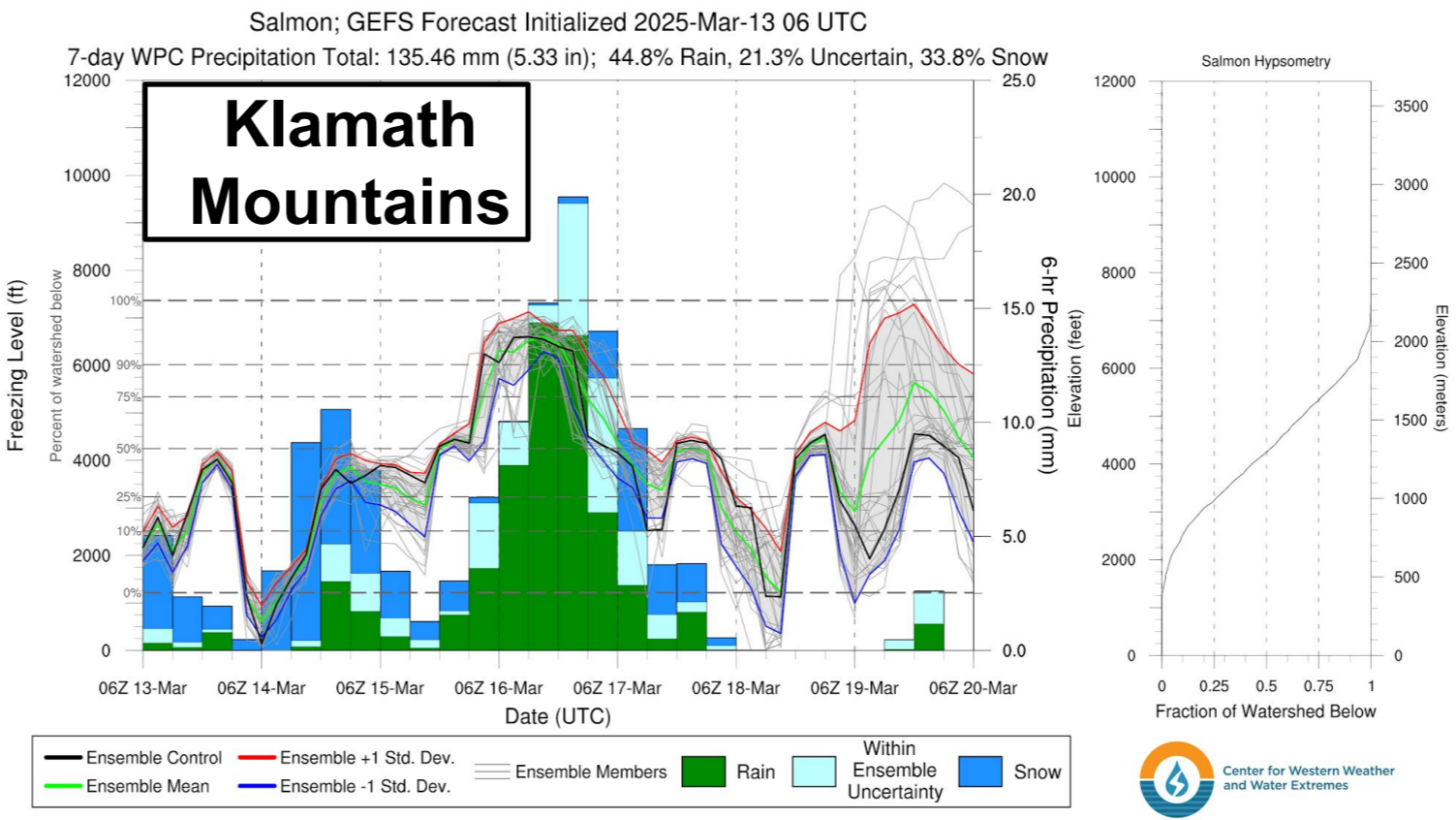
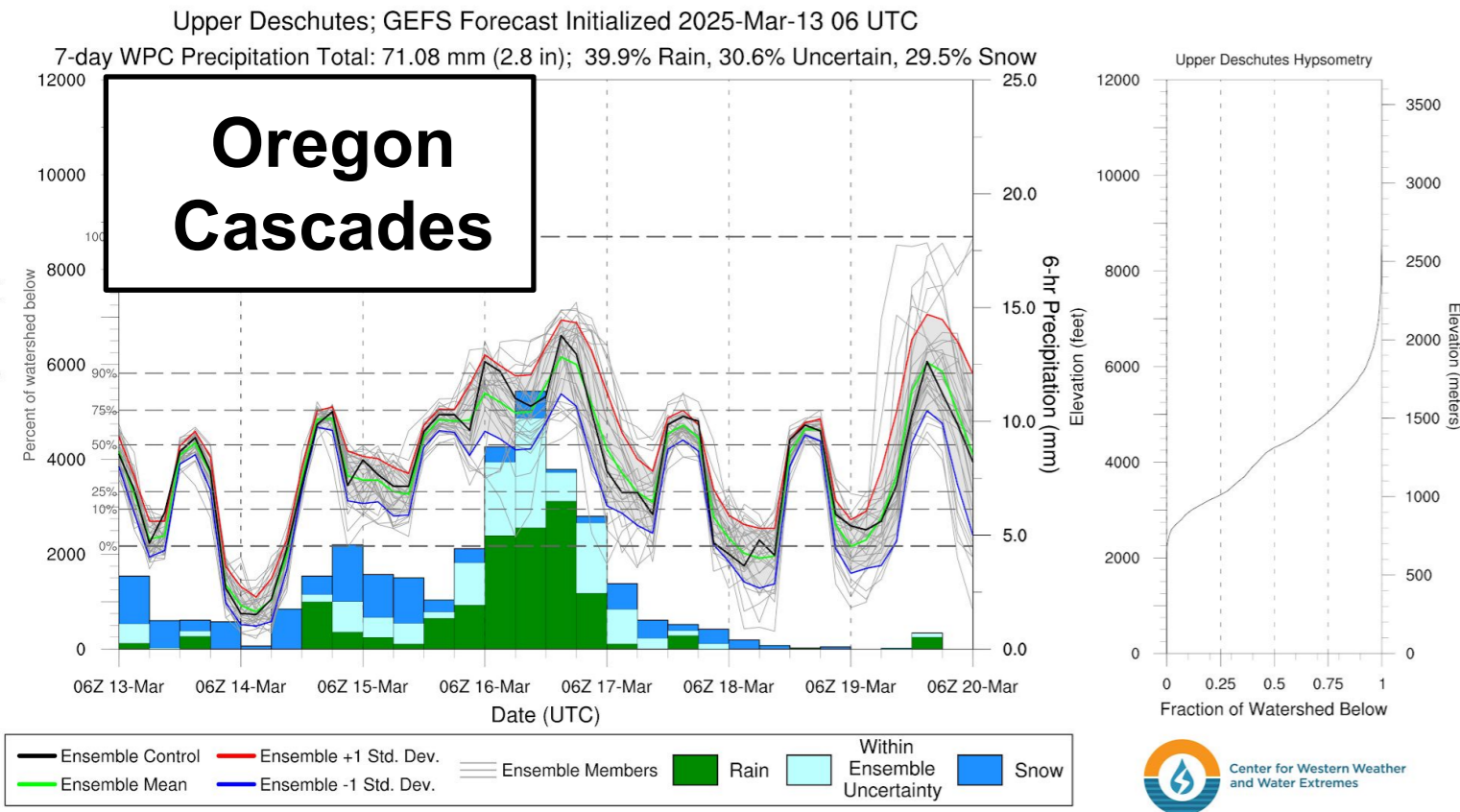
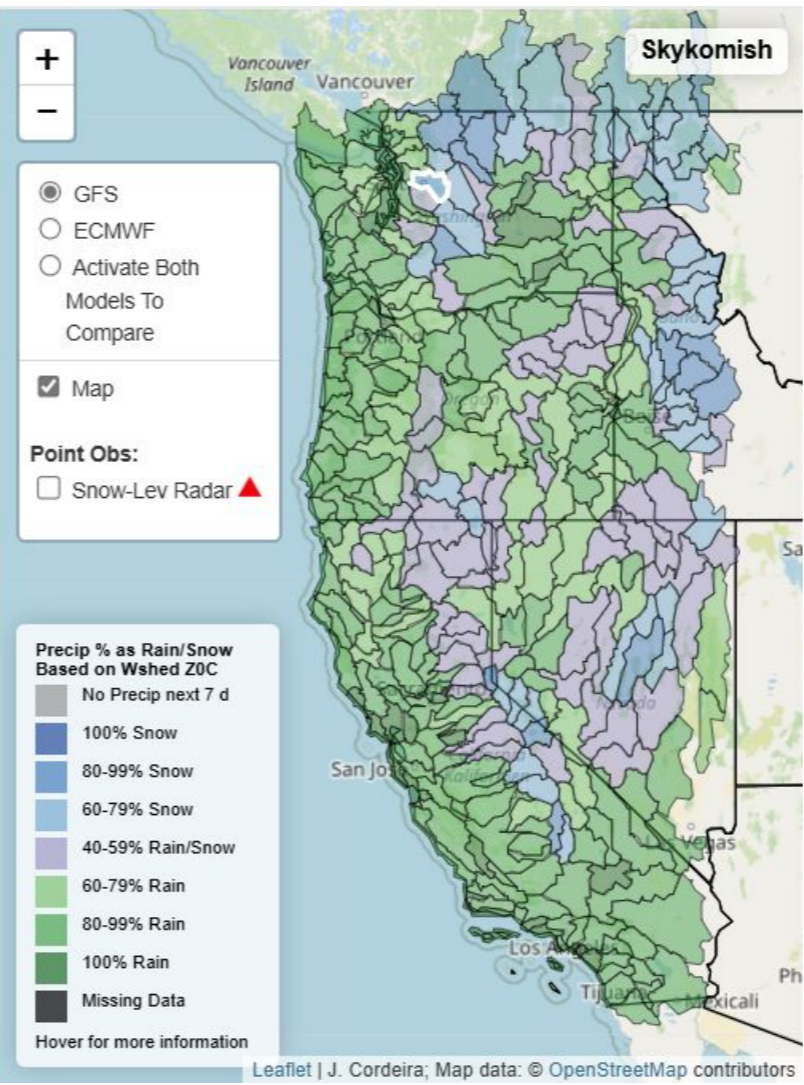
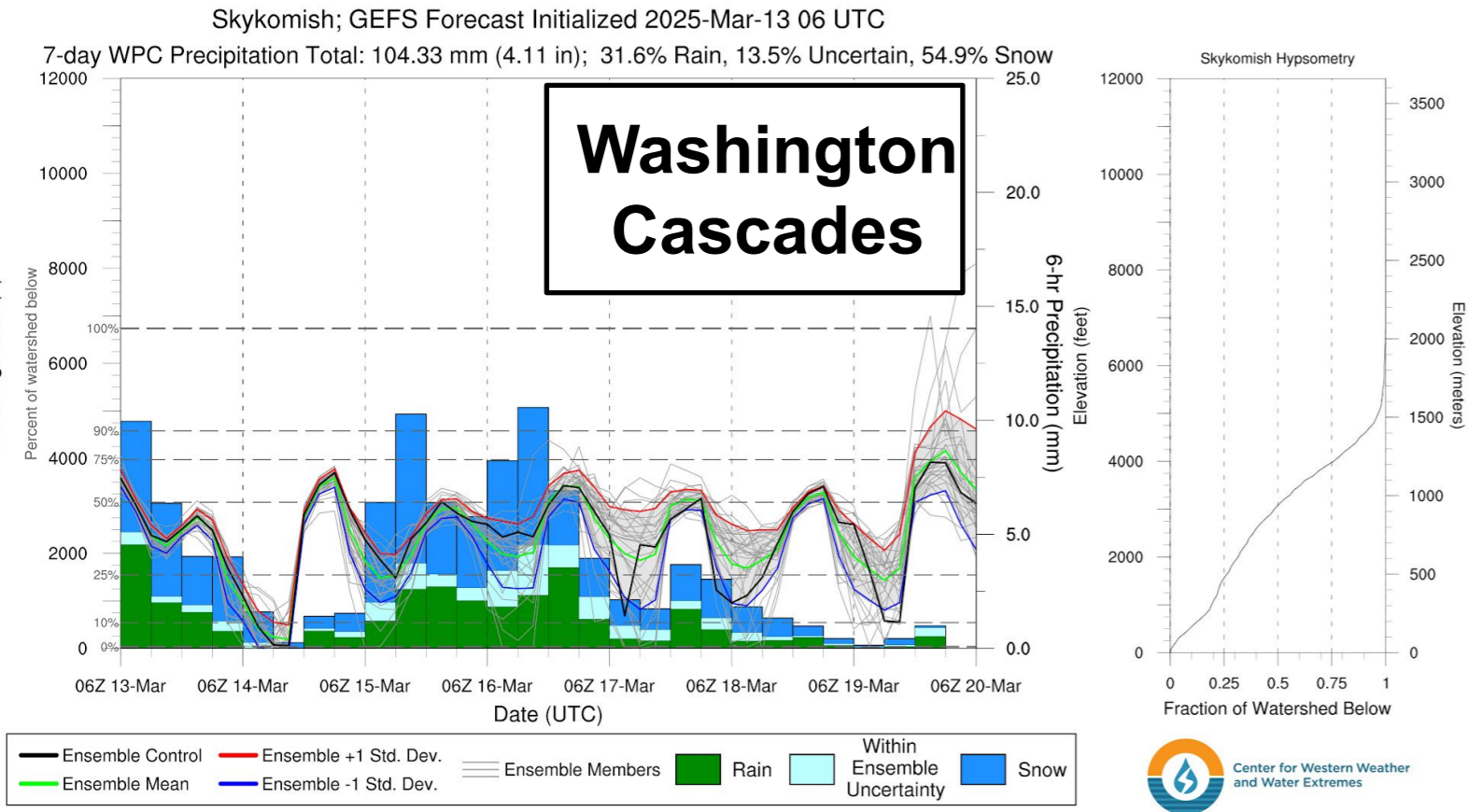
- All ensemble means and models are forecasting at least 4 inches of precipitation in the Upper Yuba watershed (**5% of normal annual precipitation**) over the next 10 days (*upper right*).
- 100% of GEFS and EPS members are forecasting 10-day precipitation totals to exceed **5% of normal annual precipitation** over this watershed.
- Several GEFS and EPS members are forecasting 10-day precipitation totals that exceed **10% of normal annual precipitation** as precipitation later in the period adds on to the AR precipitation.

Hydrologic Forecasts: Pacific Northwest



- The NWS Northwest River Forecast Center (NWRFC) is forecasting five stations in Oregon to rise above minor flood stage (e.g., Rogue River Near Agnes, left, and Silvies River Near Burns, right) and 12 stations across Washington and Oregon to rise above action/bankfull stage during 16-18 Mar with the incoming AR.

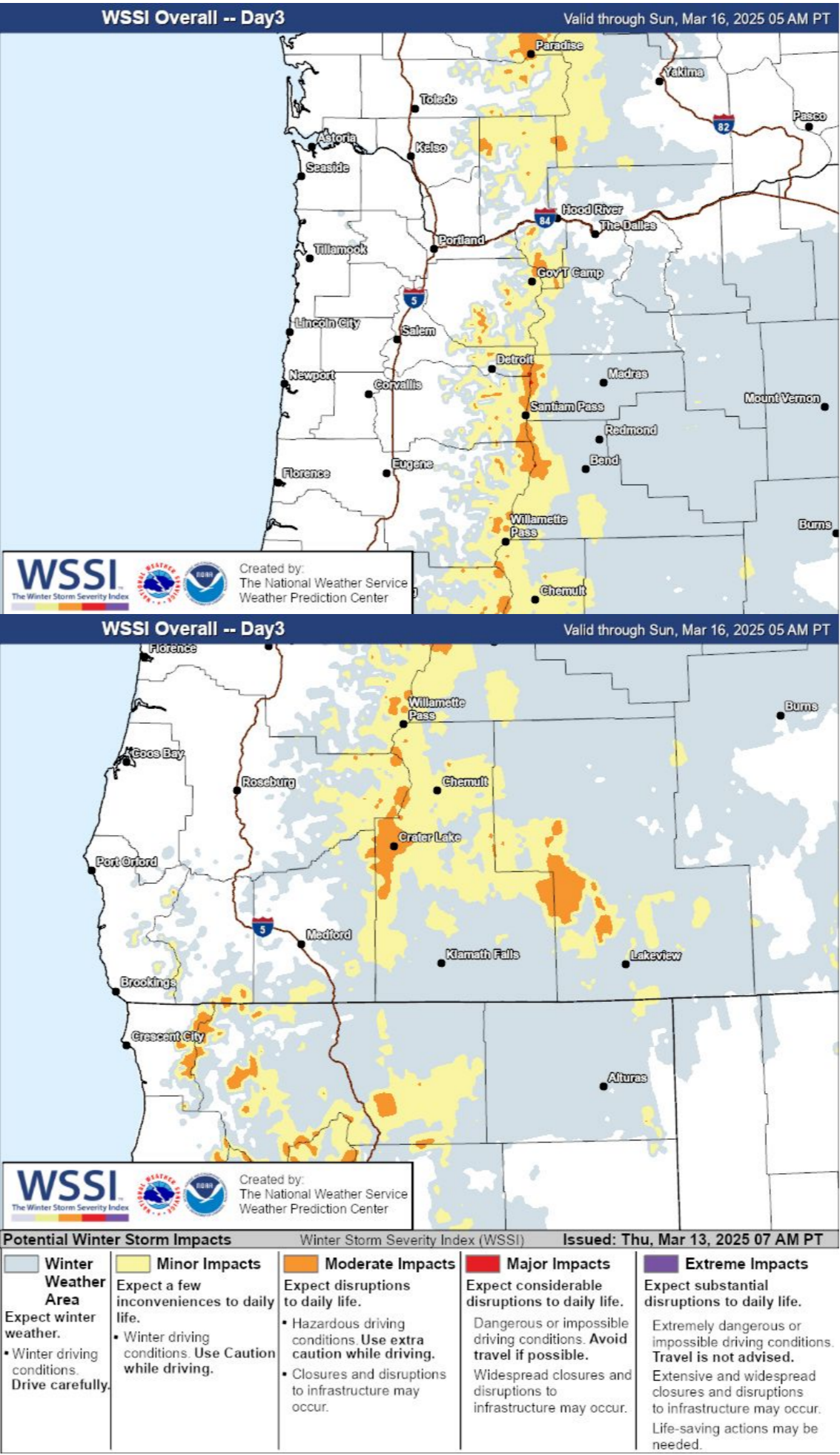
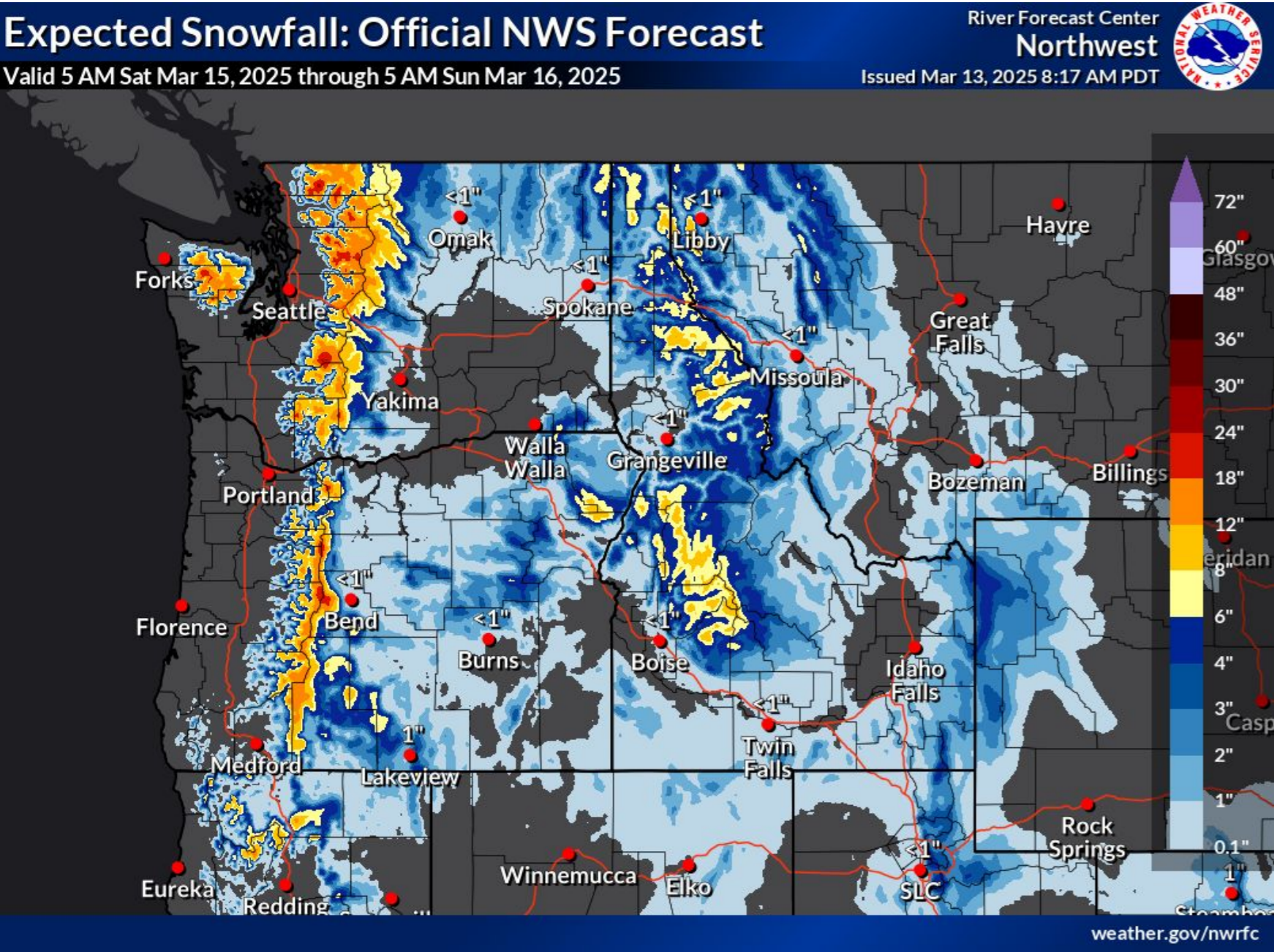
Watershed Freezing Level Forecast Comparison



- Freezing levels are forecast to rise over both the Oregon Cascades and Klamath Mountains while remaining low over the Washington Cascades as the AR makes landfall on Sat 15 Mar.
- The lower freezing levels over the Washington Cascades are likely to lead to most of the precipitation falling as snow over much of the region.
- There is far more uncertainty in precipitation type over the Oregon Cascades and Klamath Mountains. The highest elevations are likely to still see snow but more precipitation is expected to fall as rain in these regions.

AR Outlook: 13 March 2025

NWS Snowfall Forecast and Winter Storm Severity Index



- The NWS is forecasting 12-24 inches of snow over the Cascades and Olympic Mountains and 6-12 inches over the Klamath Mountains for 5 AM PT 15-16 Mar.
- Minor to moderate impacts are forecast across the Cascades and over the Klamath Mountains for 5 AM PT 15-16 Mar.