

Quick Look at Major Atmospheric River Event in California

Updated: 30 January 2025

An extended period of landfalling atmospheric river (AR) activity will bring heavy precipitation to Northern and Central California starting tomorrow and continuing into next week.

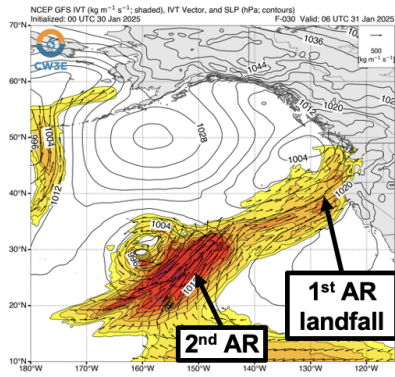
Forecast Highlights:

- The initial AR landfall will bring weak-to-moderate AR conditions (IVT 250–750 kg m⁻¹ s⁻¹) to western Oregon and Northern California late today into Fri 31 Jan.
- As the first AR moves southward, a stronger AR associated with a robust tropical moisture export is forecast to approach the US West Coast and stall over Northern California.
- There is still uncertainty in the evolution of the second AR beyond Sun 2 Jan. The 00Z deterministic GFS is forecasting the AR to gradually drift southward, then stall and re-strengthen over Central California between Tue 4 Feb and Thu 6 Feb. The 00Z deterministic ECMWF is forecasting the AR to remain over Northern California longer, then dissipate as it moves southward on Tue 4 Feb.
- Ensemble guidance continues to show >50% probability of an AR 4 (based on the Ralph et al. 2019 AR Scale) in Marin County, with AR 3 conditions likely elsewhere between Santa Cruz and Mendocino Counties.
- Model differences in the evolution of the second AR are driving differences in forecast precipitation over the next 10 days. The ECMWF is forecasting higher precipitation amounts in much of Northern California, whereas the GFS is forecasting higher precipitation amounts over most of the Sierra Nevada.
- The NWS Weather Prediction Center (WPC) is forecasting at least 7–15 inches of precipitation in the Northern California Coast Ranges and Northern/Central Sierra Nevada over the next 7 days. Total precipitation from these ARs could exceed 25% of normal annual precipitation in some locations.
- Heavy rainfall over multiple days could lead to significant hydrologic impacts in Northern California. The WPC has issued **slight risk (≥ 15%; level 2 of 4)** excessive rainfall outlooks (EROs) for portions of the Northern California Coast Ranges, Bay Area, Sacramento Valley, and Northern/Central Sierra Nevada between Sat 1 Feb and Tue 4 Feb.
- While freezing levels will remain quite high in California, significant snowfall accumulations (>12 inches) and moderate-to-major winter storm impacts are expected in the highest elevations of the Sierra Nevada through Sun morning (2 Feb).
- Farther north, the initial AR and a weak low-pressure system are forecast to produce at least 12–36 inches of snow and moderate-to-major winter storm impacts over the Olympic Mountains and Cascades.

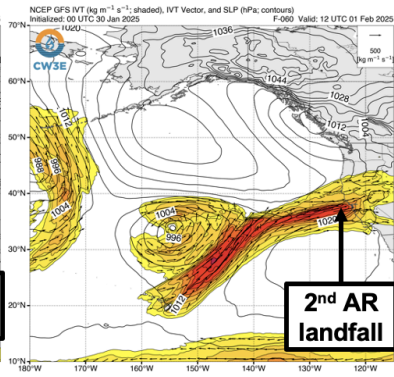
Stay alert to official NWS forecasts, watches, and warnings at [weather.gov](https://www.weather.gov) and follow guidance from local emergency management officials

GFS IVT & SLP Forecasts

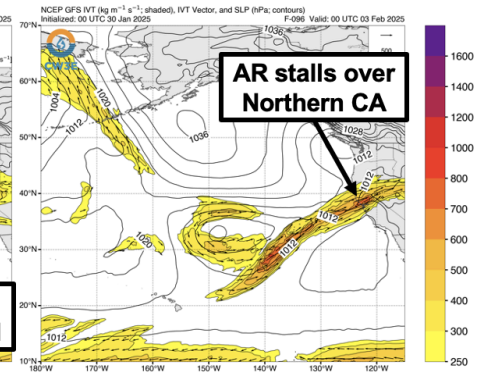
Valid 10 PM PT 30 Jan (F-030)



Valid 4 AM PT 1 Feb (F-060)

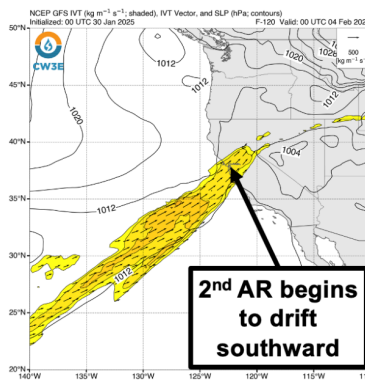


Valid 4 PM PT 2 Feb (F-096)

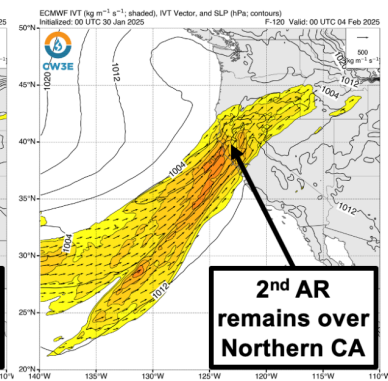


GFS vs. ECMWF IVT Forecasts: Valid 4 PM PT 3 Feb (F-120)

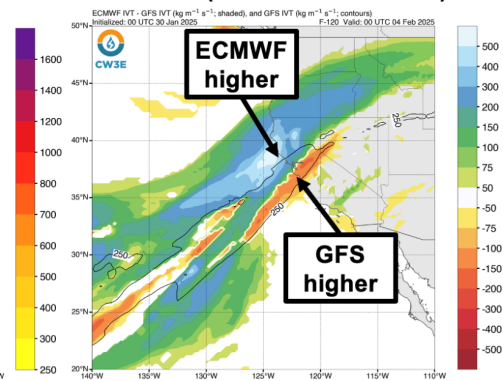
GFS



ECMWF

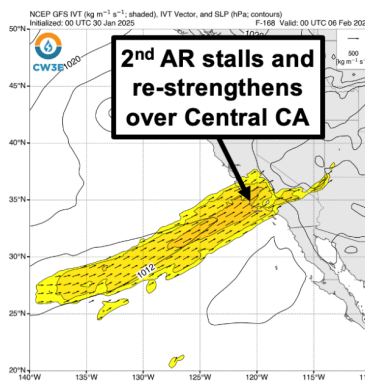


Difference (ECMWF Minus GFS)

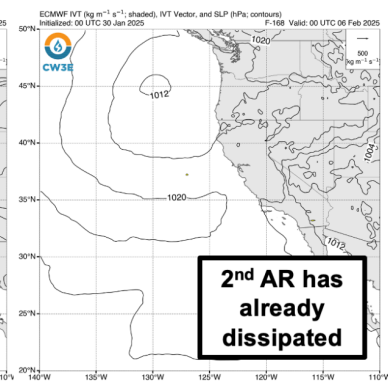


GFS vs. ECMWF IVT Forecasts: Valid 4 PM PT 5 Feb (F-168)

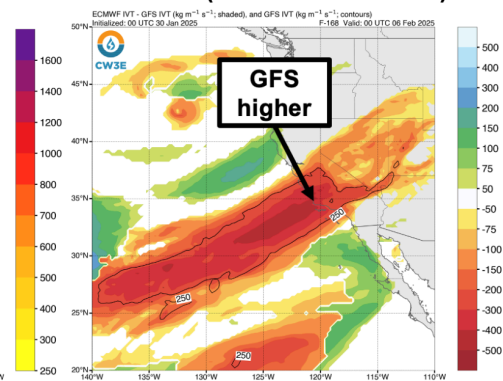
GFS



ECMWF

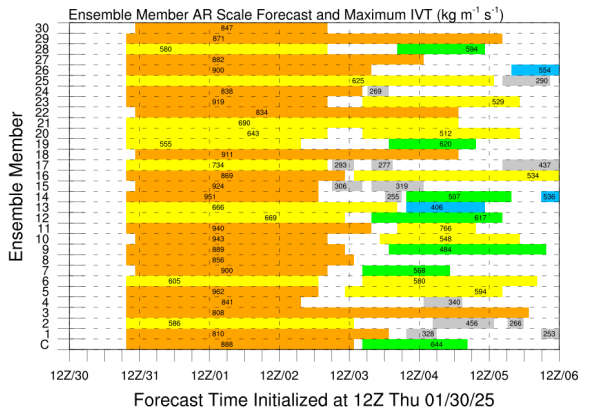
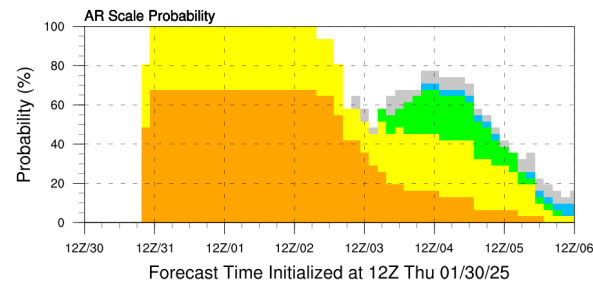
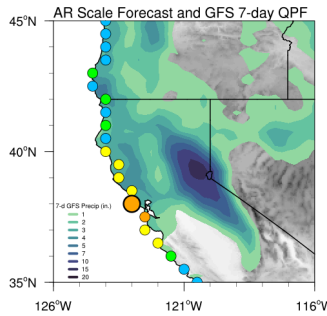
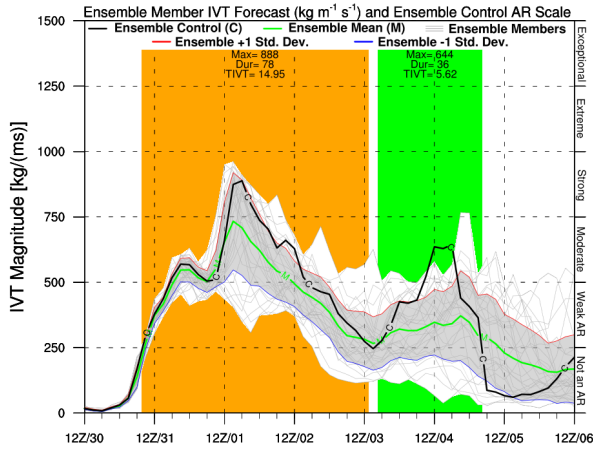


Difference (ECMWF Minus GFS)



GFS Ensemble Initialized: 12Z Thu 01/30/25

Location: 38°N 123°W



AR 1 AR 2 AR 3 AR 4 AR 5

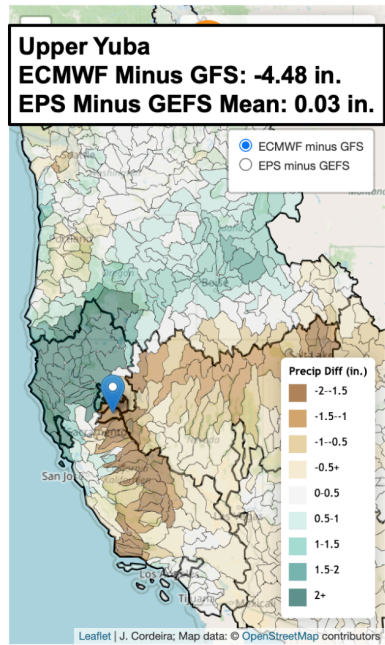
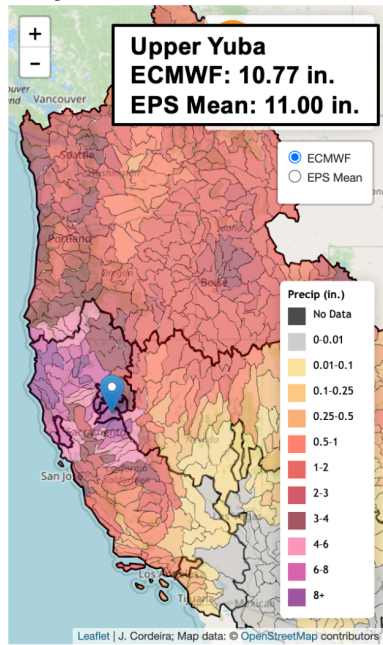
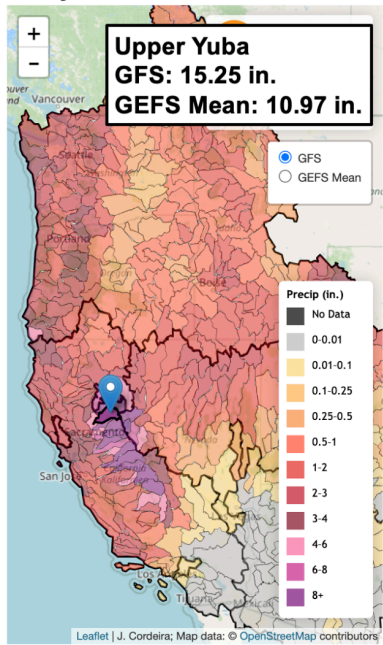
Image created: 17 UTC 01/30/2025

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

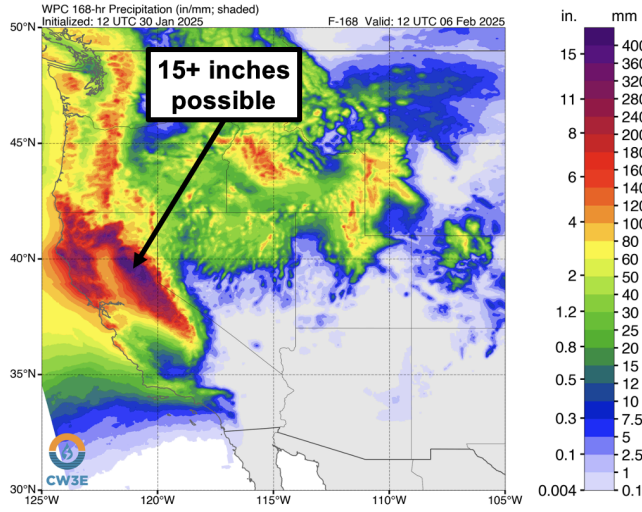
10-day GFS/GEFS Watershed QPF

10-day ECMWF/EPS Watershed QPF

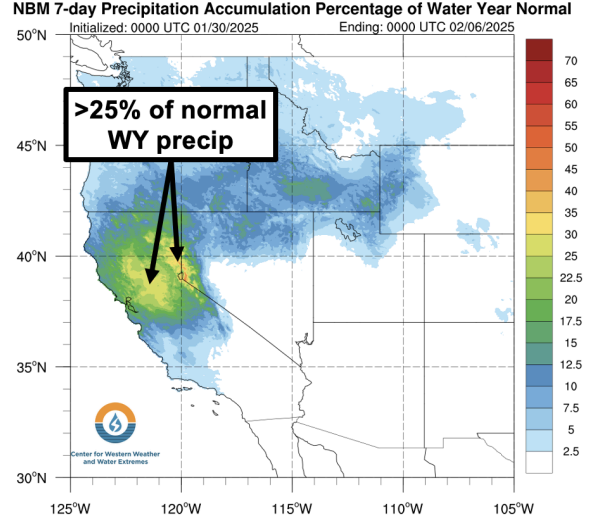
Difference



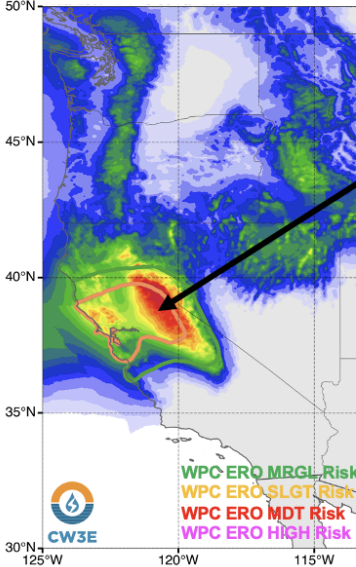
WPC 7-day QPF
Valid 4 AM PST 6 Feb



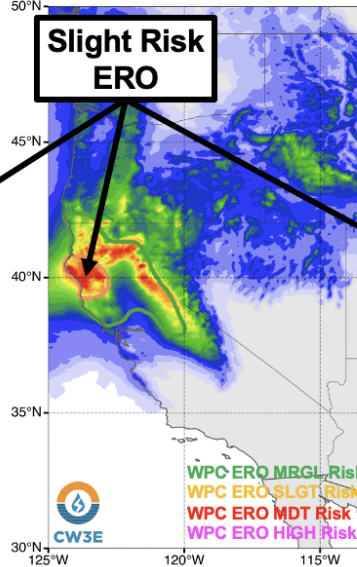
NBM 7-day Percent of Normal WY Precip
Valid 4 PM PST 5 Feb



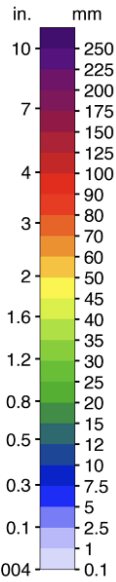
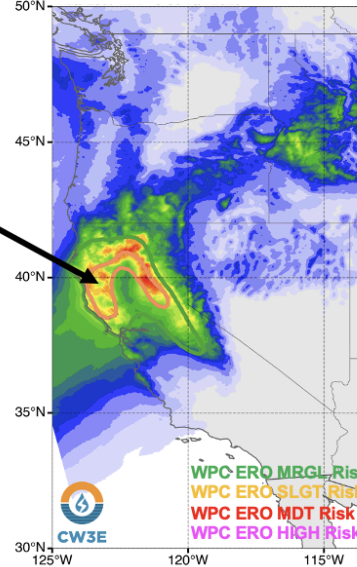
WPC Day 3 24-h QPF
Valid 4 AM PST 2 Feb



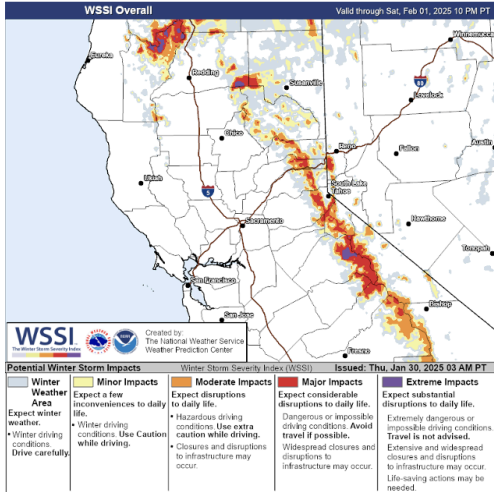
WPC Day 4 24-h QPF
Valid 4 AM PST 3 Feb



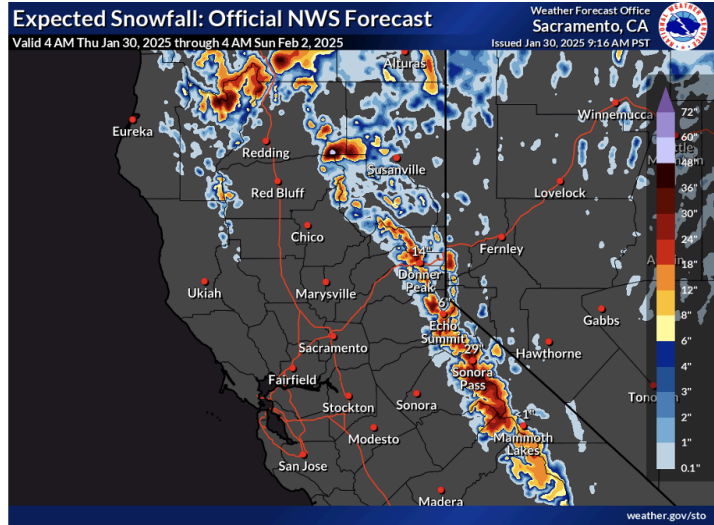
WPC Day 5 24-h QPF
Valid 4 AM PST 4 Feb



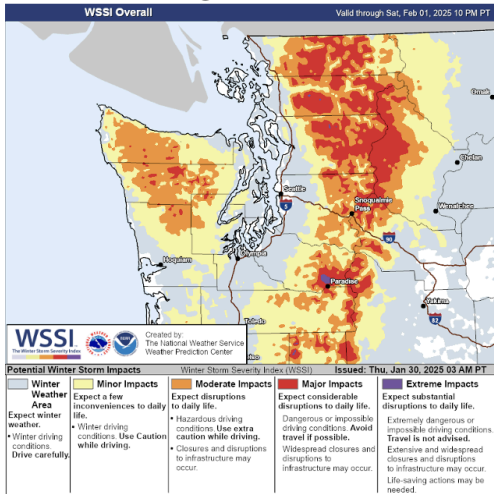
WPC Winter Storm Severity Index
Valid through 10 PM PST 1 Feb



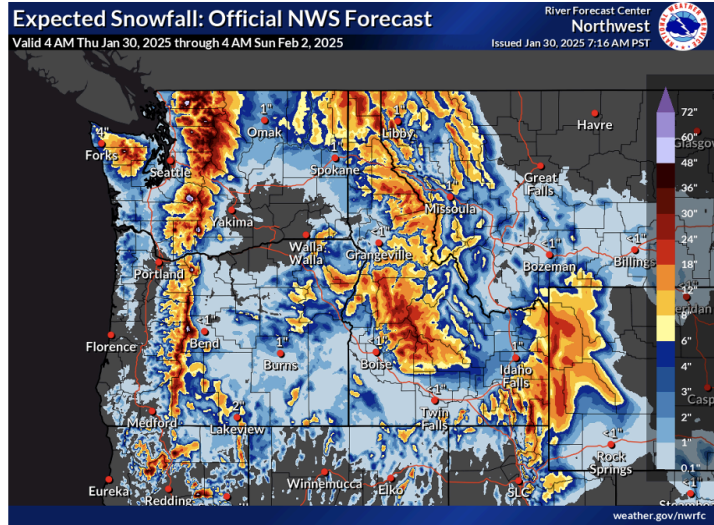
Total Snowfall: Valid through 4 AM PST 2 Feb



WPC Winter Storm Severity Index
Valid through 10 PM PST 1 Feb



Total Snowfall: Valid through 4 AM PST 2 Feb



Additional Considerations:

- Visit cnrfc.noaa.gov/ for specific river and stream forecasts and weather.gov/ for point specific watches, warnings, and forecasts.

In-depth AR forecasts products can be found here:

<https://cw3e.ucsd.edu/iwv-and-ivt-forecasts/>

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