CW3E Event Summary: 12 – 14 February 2025

Atmospheric River Brings Heavy Precipitation to California

The AR:

- The atmospheric river made landfall over California on Wed 12 Feb following an initial pulse of moisture. The storm propagated down the California coast through Thu 13 Feb before dissipating early Fri 14 Feb.
- The southwesterly direction of moisture transport within the core of the AR was optimal for precipitation enhancement over the California Coast Ranges, Transverse Ranges and Sierra Nevada.

Precipitation and Hydrology:

- The storm produced 2-6 inches of precipitation over much of coastal California and in the vicinity of the Sierra Nevada as well as 2–6 feet of snow throughout the Sierra Nevada, with the highest amounts above 7,000 feet and south of Lake Tahoe.
- The precipitation helped improve drought conditions in Central and Southern California and increased snowpack levels in the Central and Southern Sierra Nevada.
- The heavy precipitation led to stream and reservoir rises across the state of California.

Impacts:

- Numerous landslides and debris flow LSRs were reported across CA as a result of the rainfall during this event, with debris flows forcing evacuations near burn scars over the recent Eaton and Palisades fires in Los Angeles.
- Flood and flash flood reports were also observed across the state in coastal Northern, Central, and Southern California, with additional reports in the Central Valley.

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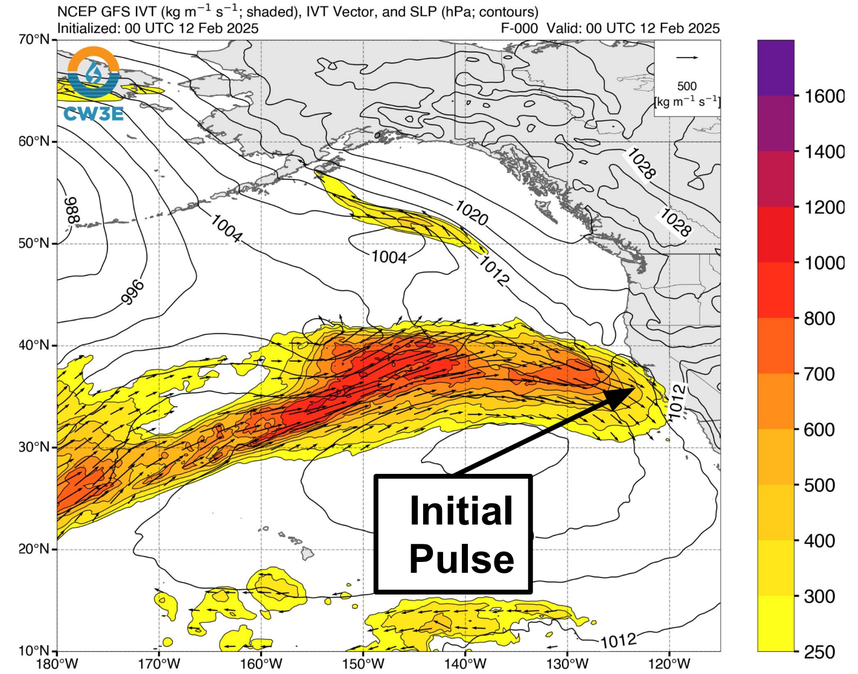
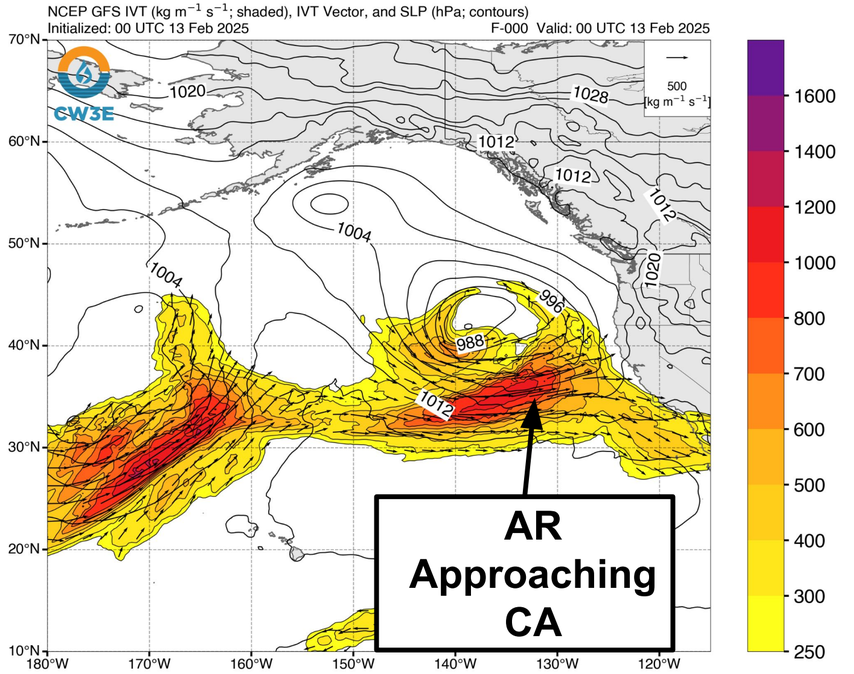
GFS IVT Analysis

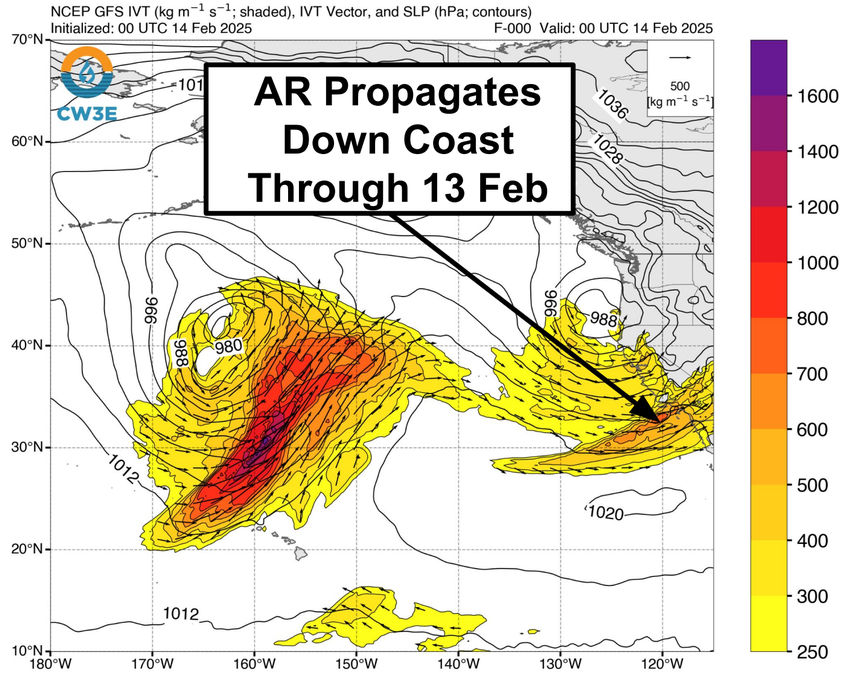
Valid: 4 PM PST 11 Feb 2025



Valid: 4 PM PST 12 Feb 2025



Valid: 4 PM PST 13 Feb 2025



- The initial pulse of moisture ahead of the AR reached the California coast late on Tue 11 Feb, resulting in a brief period of AR conditions and the initial precipitation with this event.
- As the pulse moved southeastward, the AR and associated low pressure system propagated east toward the USWC, making landfall over California late Wed 12 Feb.
- The core of the AR initially landfall over the San Francisco Bay Area and moved down the coast through Thu 13 Feb before dissipating early Fri 14 Feb.

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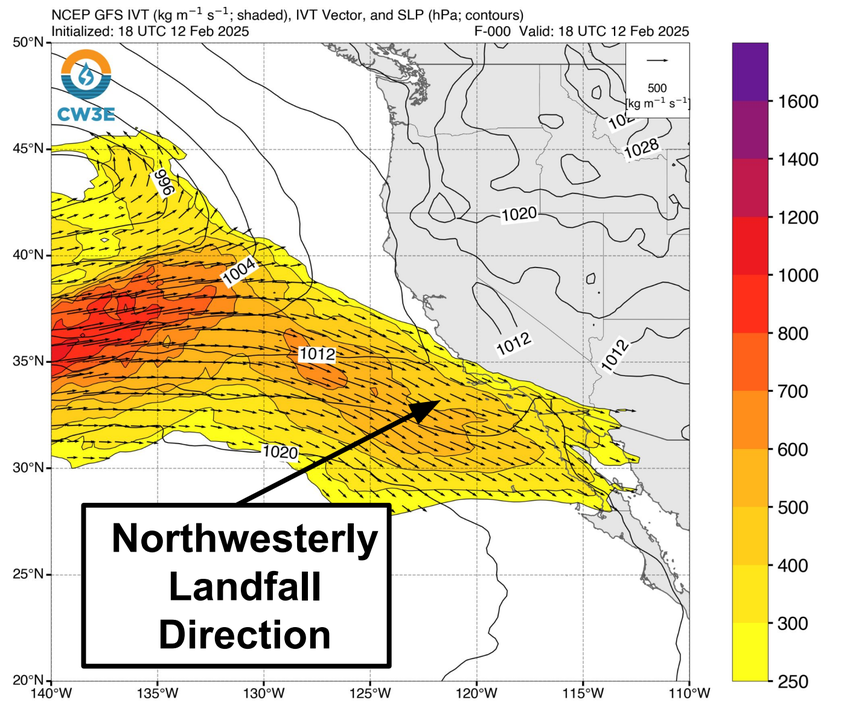
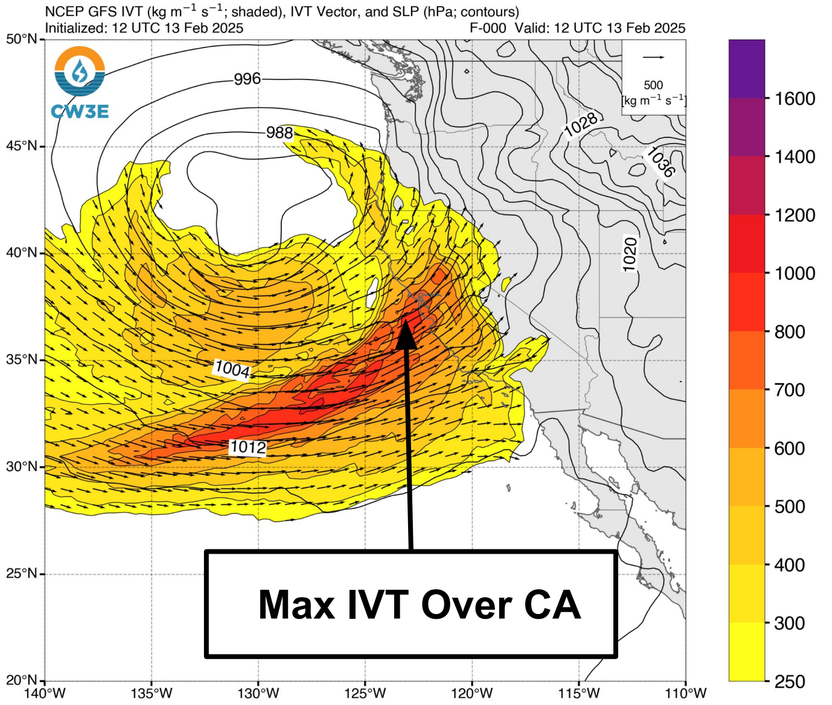
GFS IVT and IWV Analysis

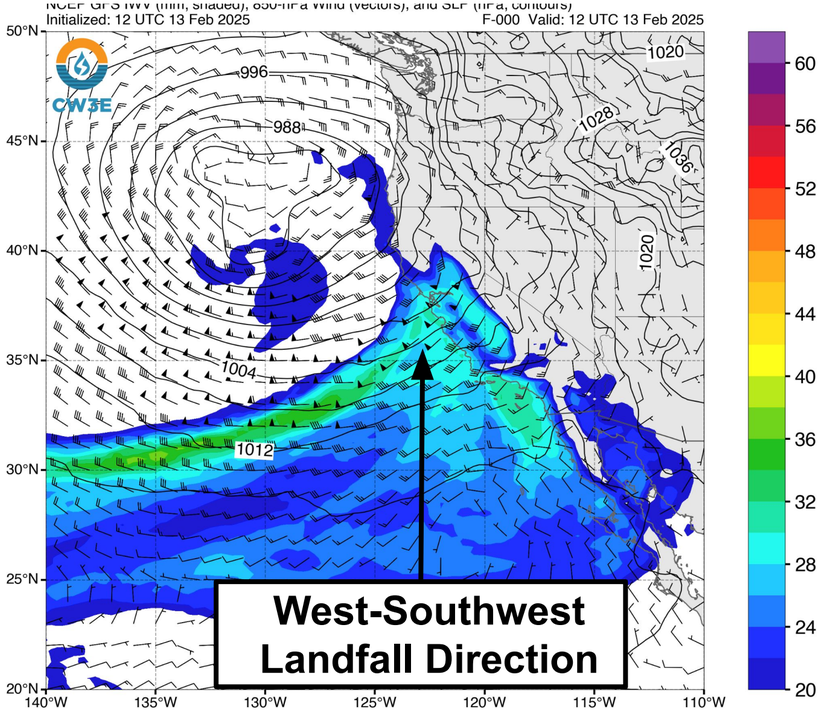
Valid: 11 AM PST 12 Feb 2025



Valid: 4 AM PST 13 Feb 2025



Valid: 4 AM PST 13 Feb 2025



- The landfall direction of the initial pulse of moisture and the AR played a role in the amount of precipitation each produced.
- The southwesterly direction of moisture transport is optimal for the orographic enhancement of precipitation along the California Coast Ranges, Transverse Ranges and Sierra Nevada, effectively increasing the amount of precipitation that this system was able to produce
- The northwesterly direction of moisture transport of the initial moisture pulse is not optimal for precipitation enhancement, which limited the precipitation impacts tied to this pulse.

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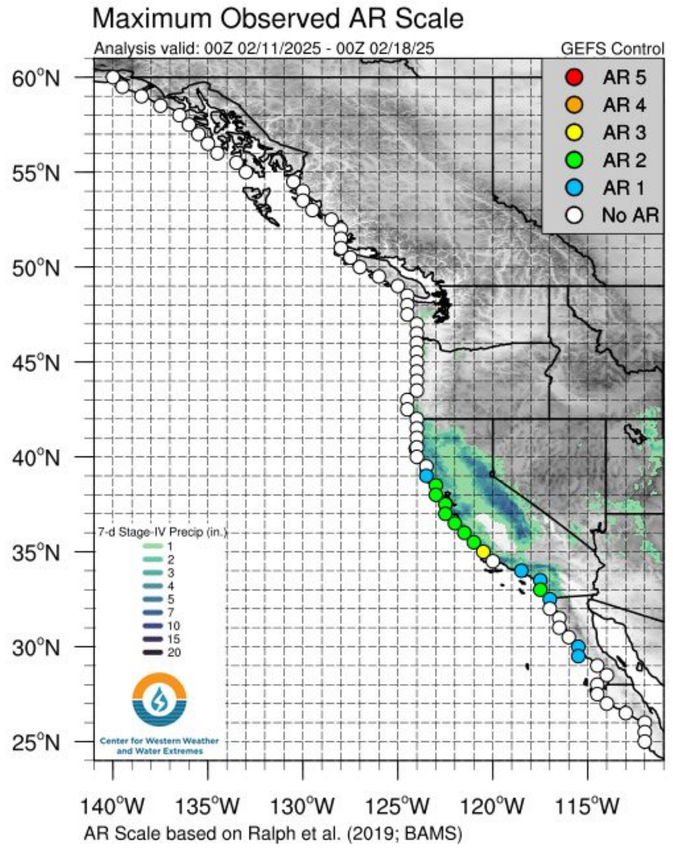
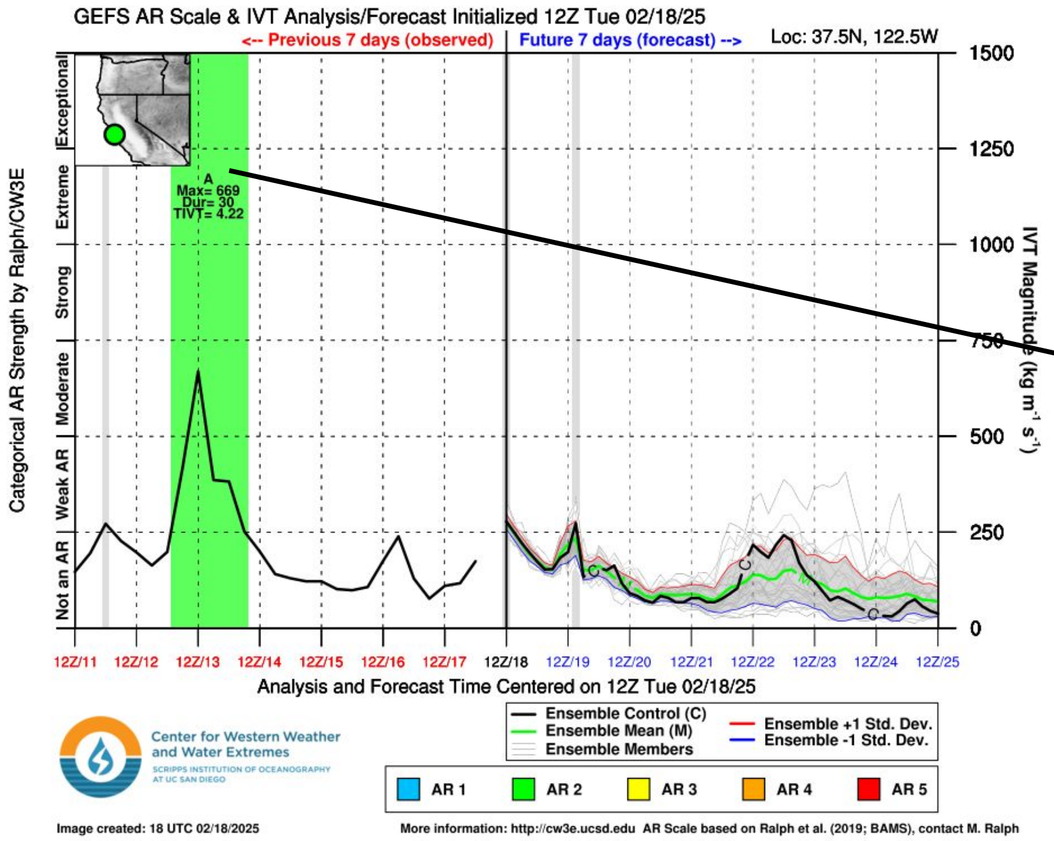
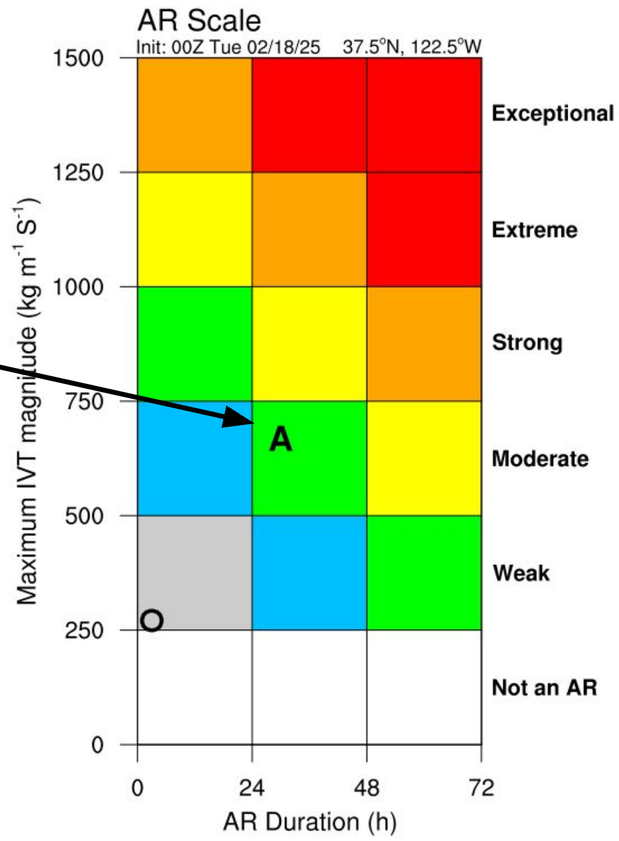
GEFS AR Scale Analysis (Northern CA)







- An AR 2 (based on the Ralph et al. 2019 AR Scale) was observed over Northern and Central California, with AR durations between 24 and 36 hours.
- The GEFS AR Scale analysis shows a maximum IVT of 669 kg m^{-1} s^{-1} and an AR duration of 30 hours at 37.5°N 122.5°W (near San Francisco, CA).

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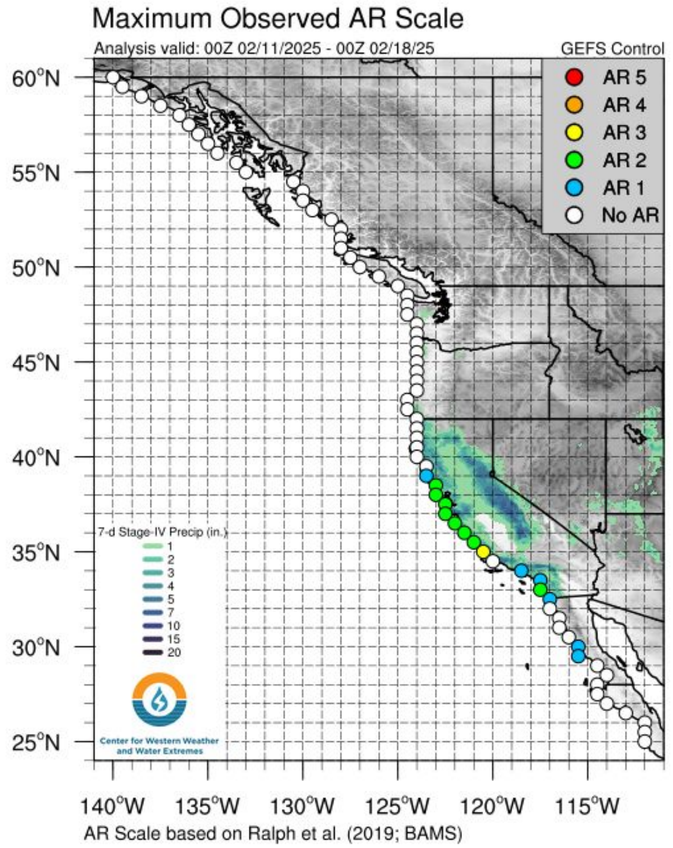
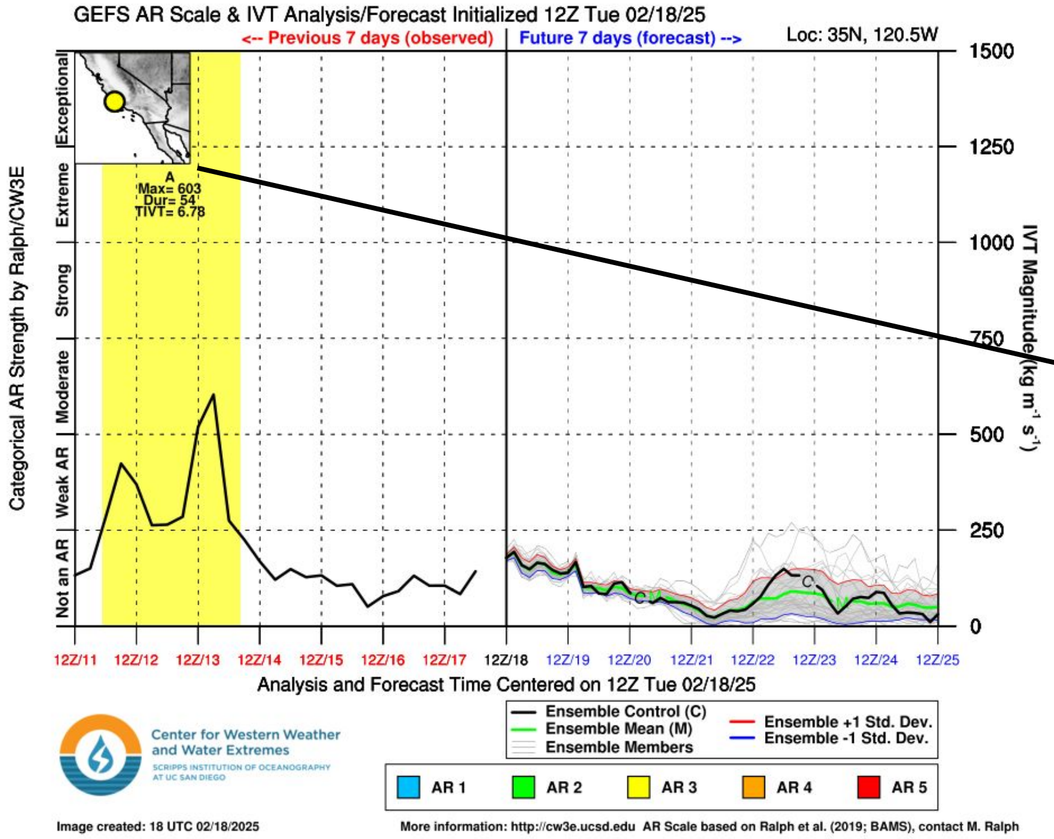
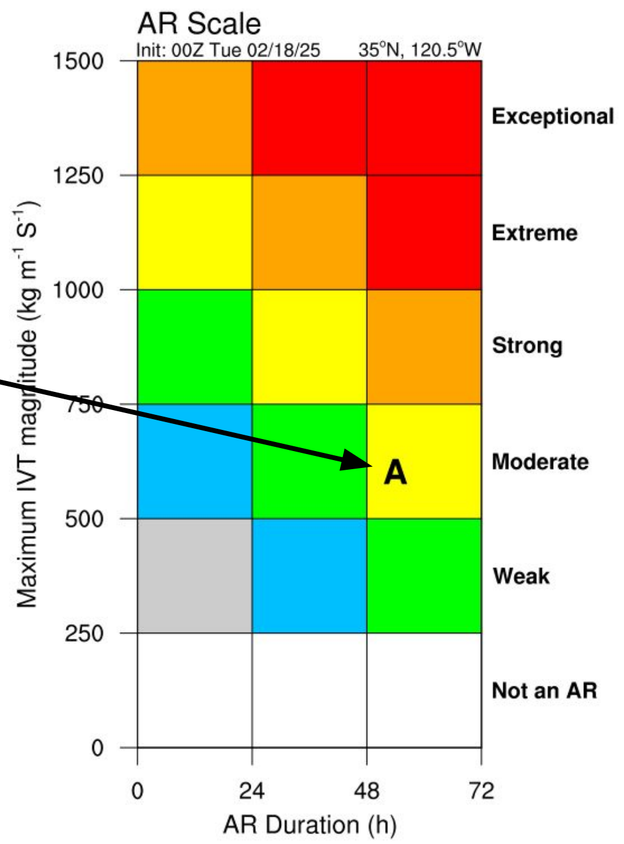
GEFS AR Scale Analysis (Southern CA)





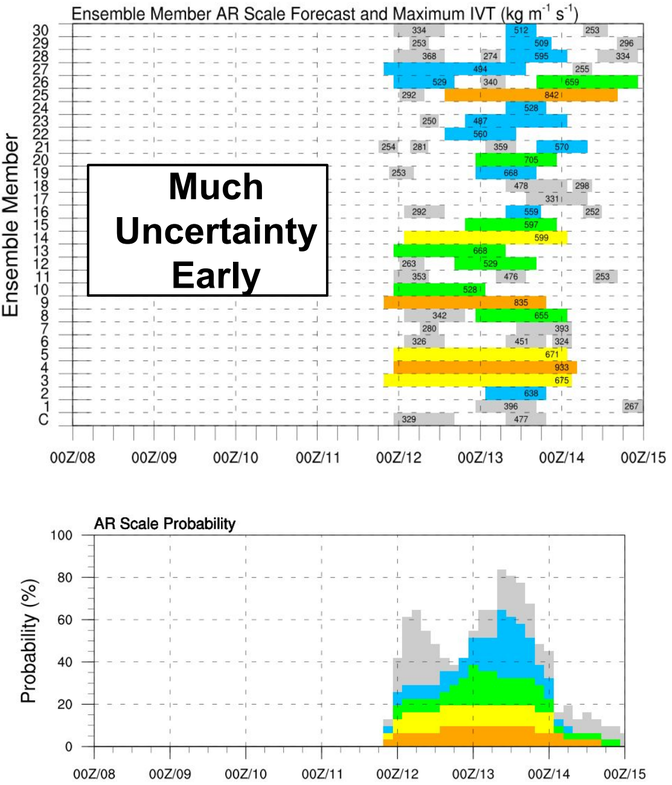


- The initial pulse of IVT along the California coast helped extend the AR conditions in some locations in Southern California.
- The GEFS AR Scale analysis shows a maximum IVT of 603 kg m^{-1} s^{-1} and an AR duration of 54 hours at 35°N 120.5°W (near San Luis Obispo, CA).

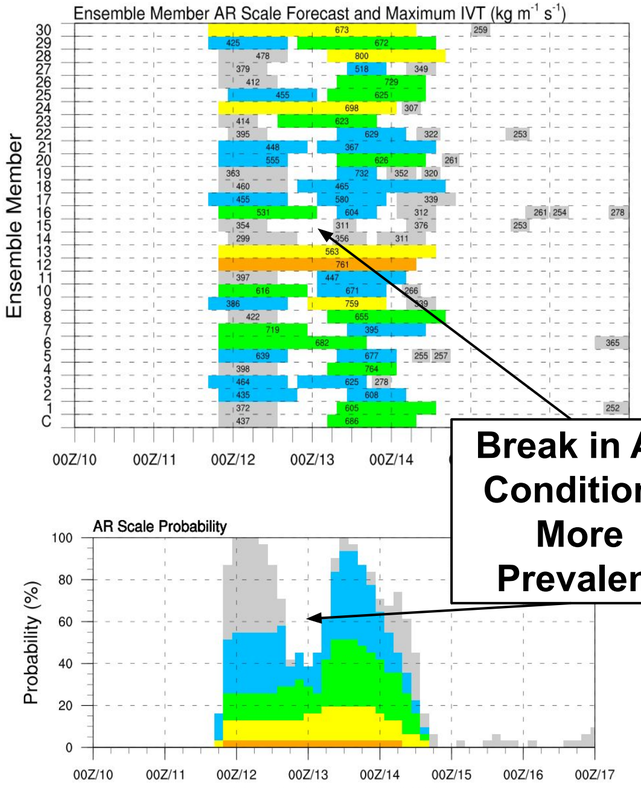
CW3E Event Summary: 12 – 14 February 2025

GEFS AR Scale dProg/dt: Coastal CA

Forecast Initialized 00Z 8 Feb

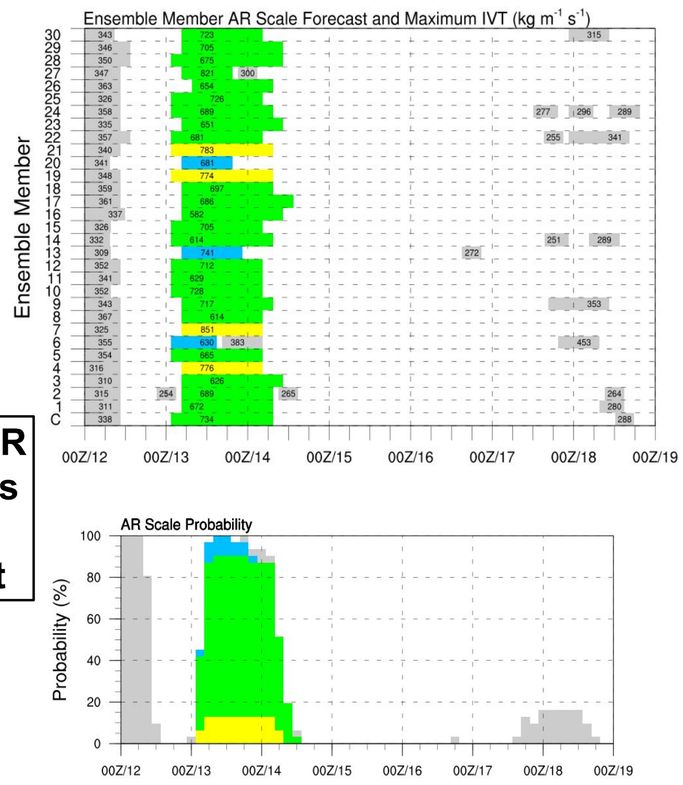


Forecast Initialized 00Z 10 Feb

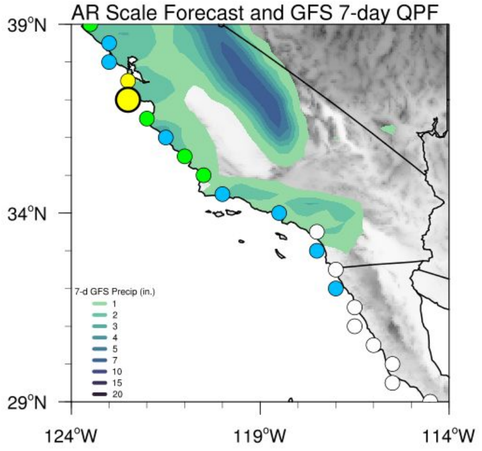


Break in AR Conditions More Prevalent

Forecast Initialized 00Z 12 Feb



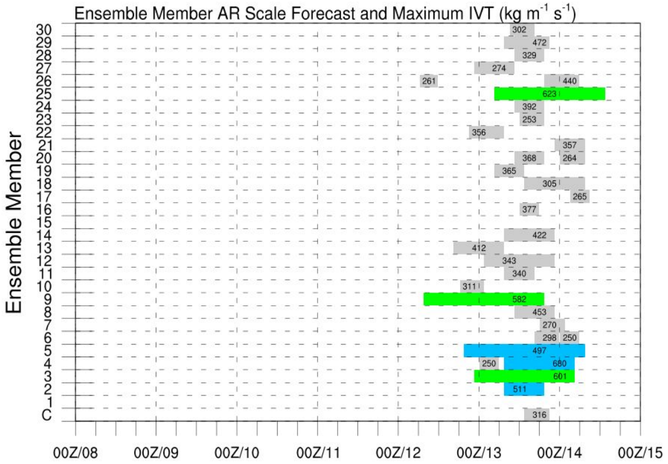
- Initial forecasts 4-6 days ahead of the event show a lot of uncertainty amongst GEFS ensemble members regarding the AR duration and timing.
- Over the next couple days, the break in AR conditions became more prevalent within the ensemble members, with the second AR being stronger.

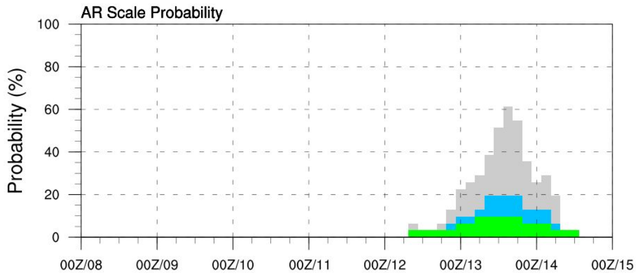


CW3E Event Summary: 12 – 14 February 2025

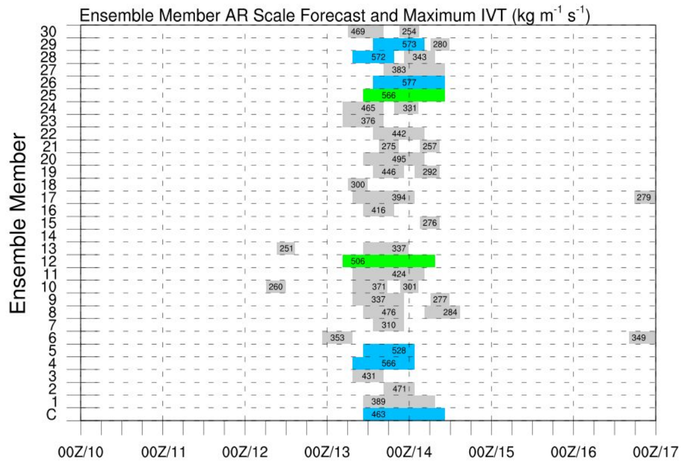
GEFS AR Scale dProg/dt: Sierra Nevada Foothills

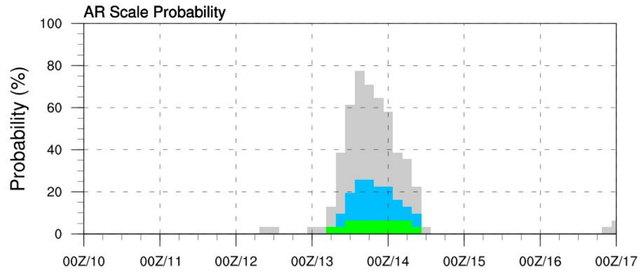
Forecast Initialized 00Z 8 Feb



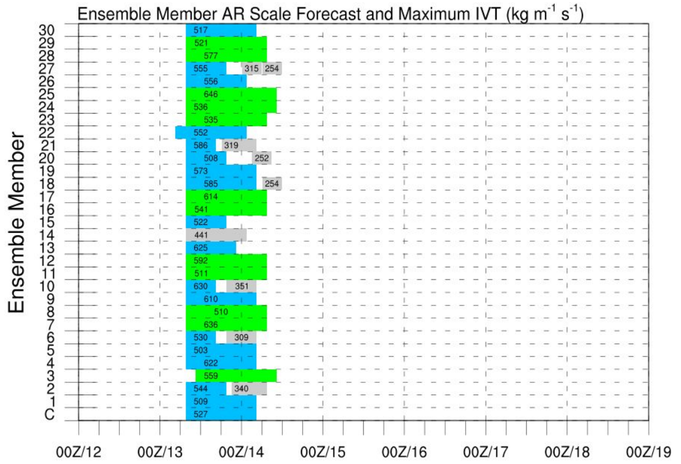


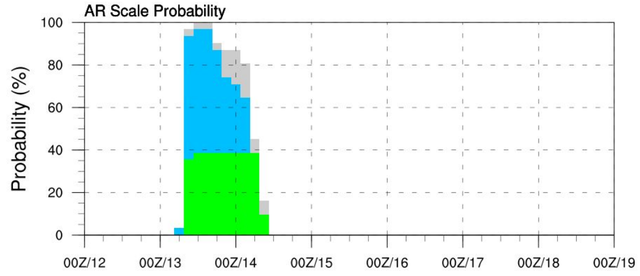
Forecast Initialized 00Z 10 Feb



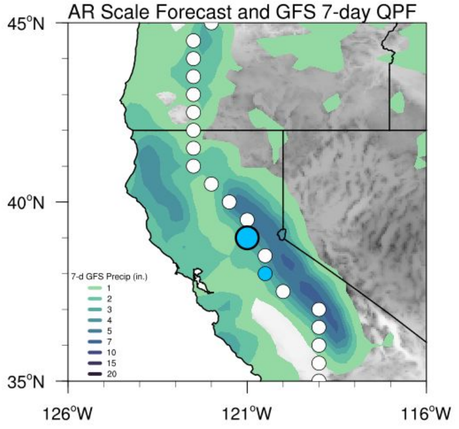


Forecast Initialized 00Z 12 Feb



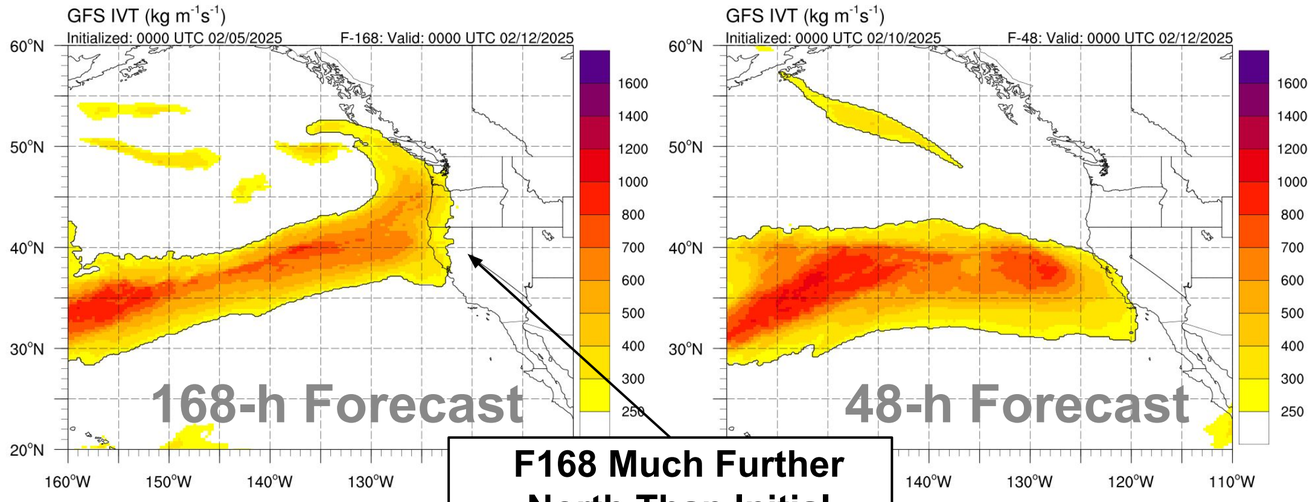


- The ensembles also locked in on greater inland penetration of this system over time.
- By 1-2 days out, the GEFS was more confident in at least AR1 conditions over the Sierra Nevada foothills. At this time, there was still uncertainty in a break in AR conditions, which impacted the AR Scale for some

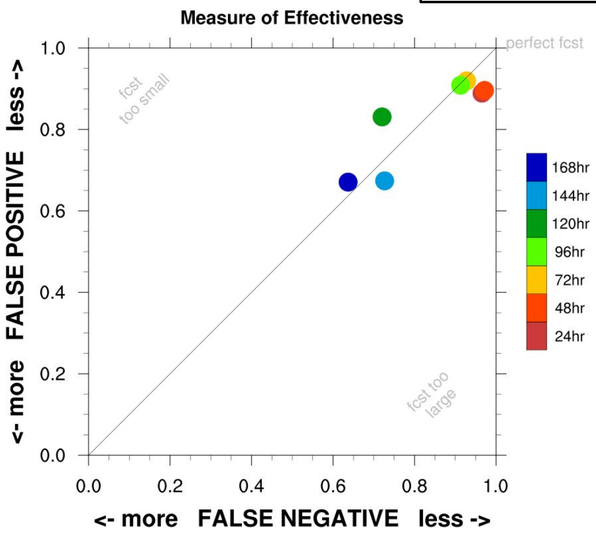


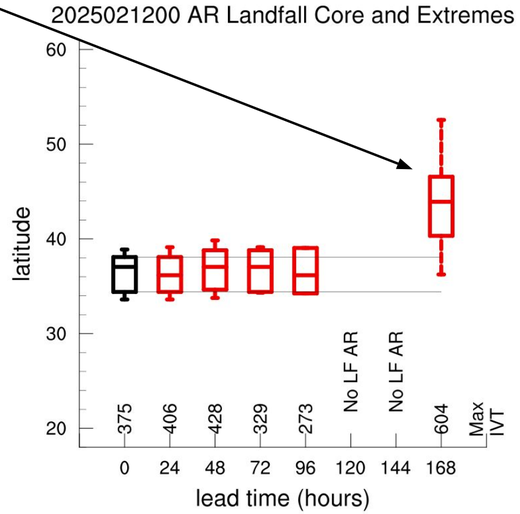
CW3E Event Summary: 12 – 14 February 2025

AR Landfall Verification: 00Z 12 Feb 2025



F168 Much Further North Than Initial Moisture Pulse

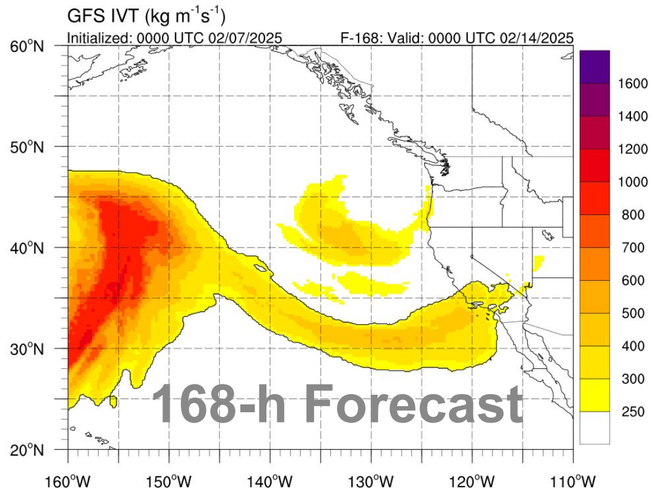


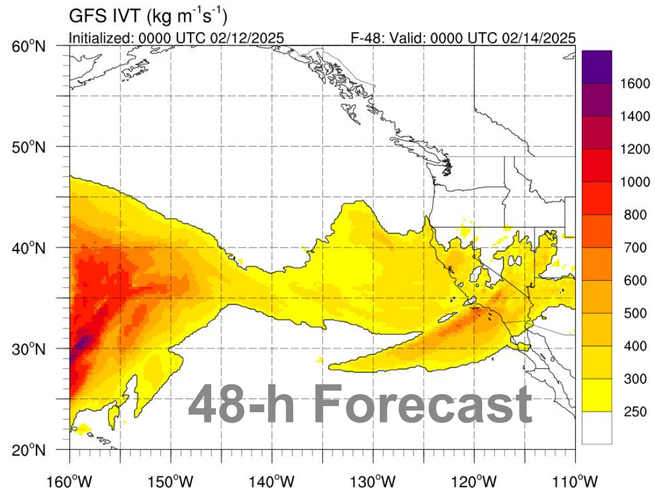


- The 24- to 96-hour forecasts had the landfall latitude of the initial moisture pulse positioned correctly on 00Z 12 Feb. However, the model had some difficulties honing in on the strength at landfall.
- The 120- and 144-hour forecasts failed to bring IVT to the coast with the initial pulse.
- The 168-hour forecast was much further north in association with an extratropical cyclone with much stronger IVT directed towards the Pacific Northwest.

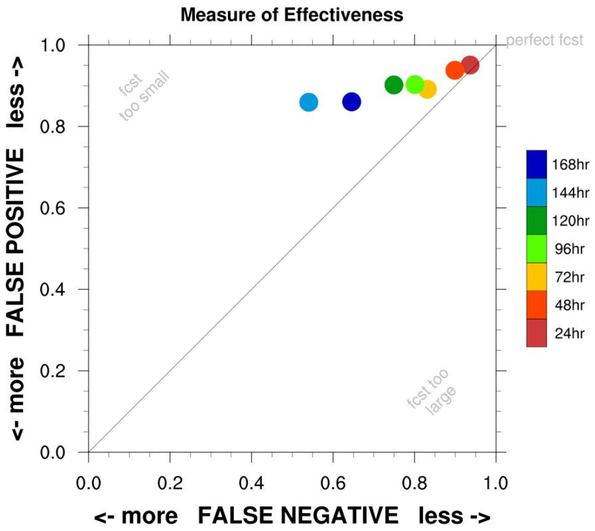
CW3E Event Summary: 12 – 14 February 2025

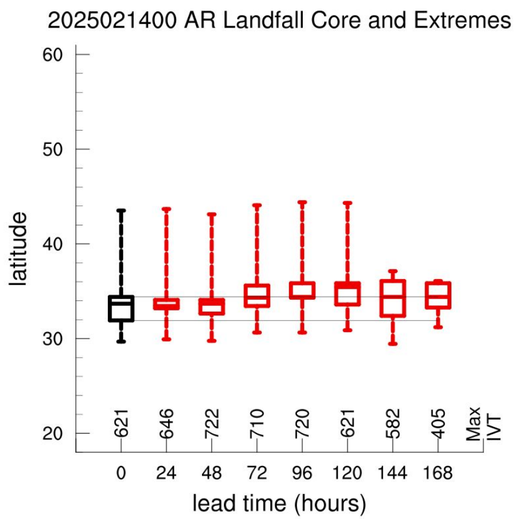
AR Landfall Verification: 00Z 14 Feb 2025

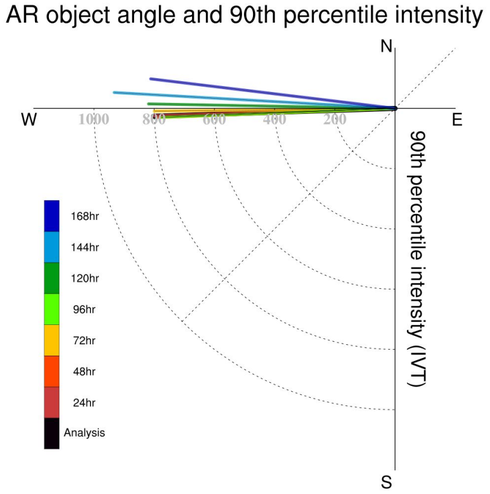




- IVT above 250 kg m^{-1} s^{-1} was widespread throughout coastal California on 00Z 14 Feb as seen by the whiskers (bottom middle plot).
- The 48, 72, and 96 hour forecasts were showing a stronger AR core too far north, while the 144 and 168 hour forecasts were also shifted northward but were weaker.







- As forecast lead time decreased, the Measure of Effectiveness moved towards being a perfect forecast (bottom left plot).

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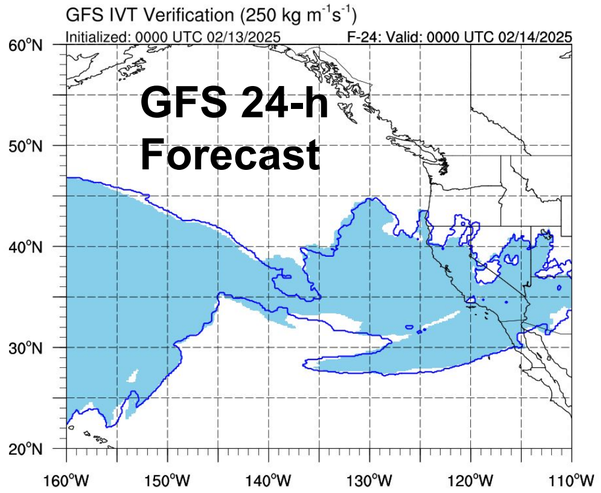
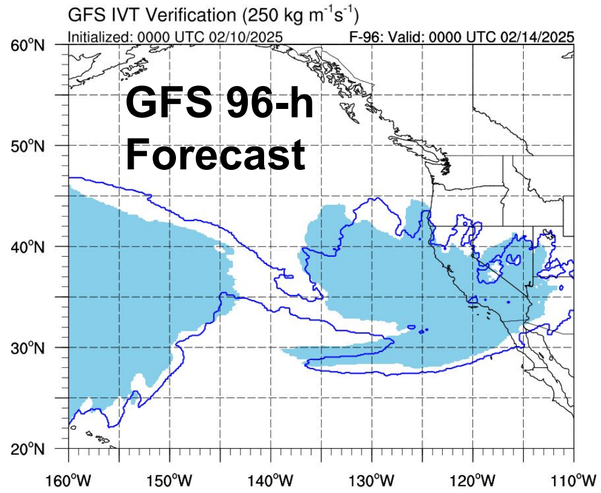
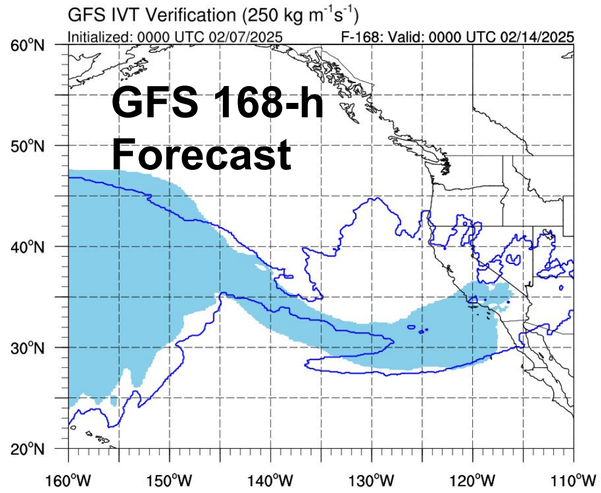
AR Landfall Verification: 00Z 14 Feb 2025

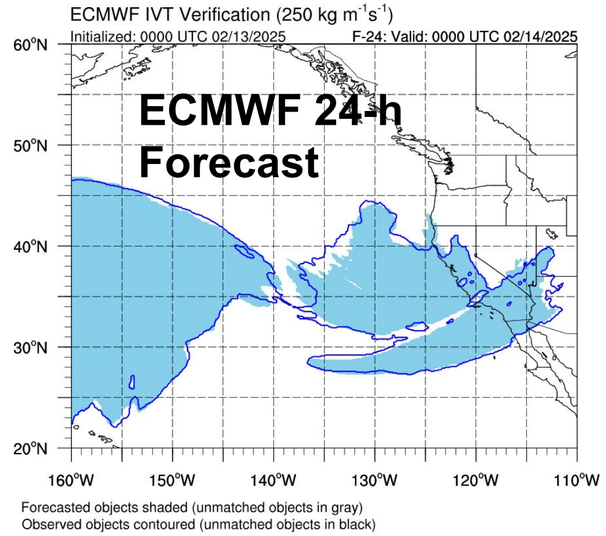
- At lead times >3 days, the GFS model showed a weaker and spatially smaller AR at landfall on 00Z 14 Feb.

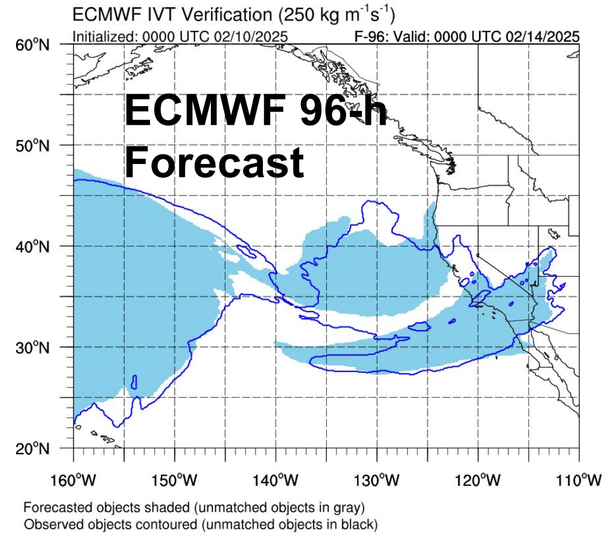
- The ECMWF model showed much better AR alignment for Southern California throughout the 7-day forecast as compared to GFS.

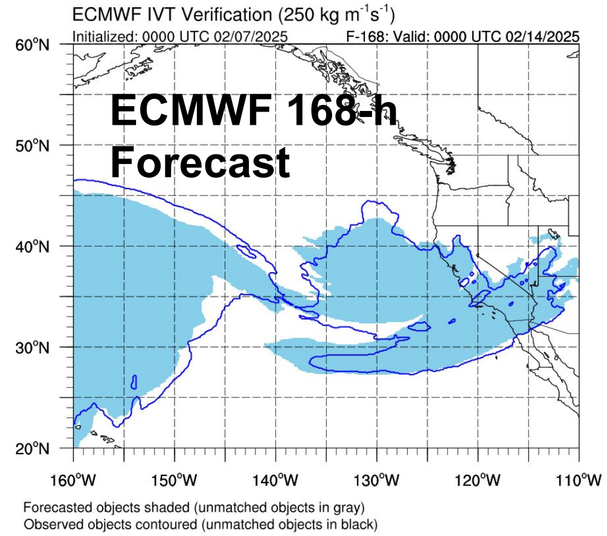












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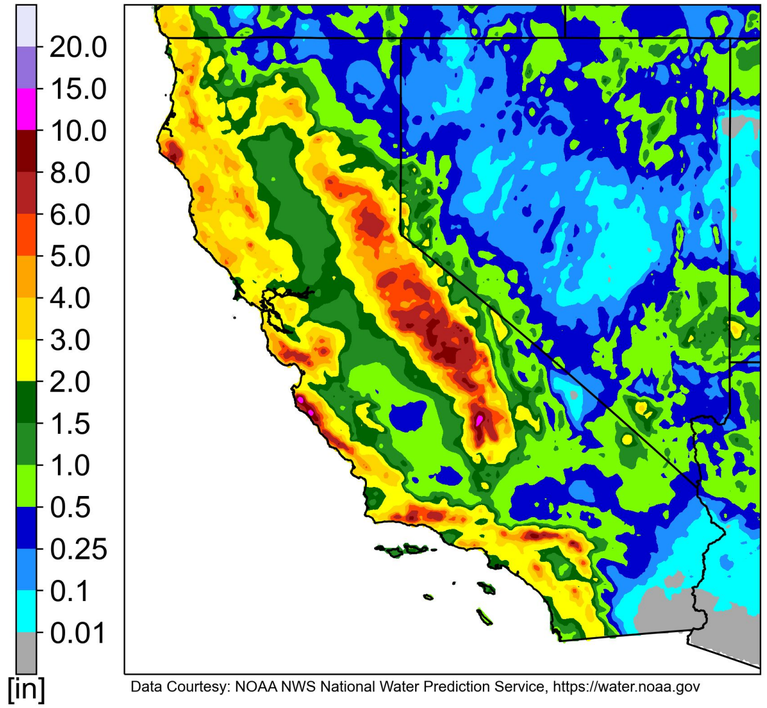
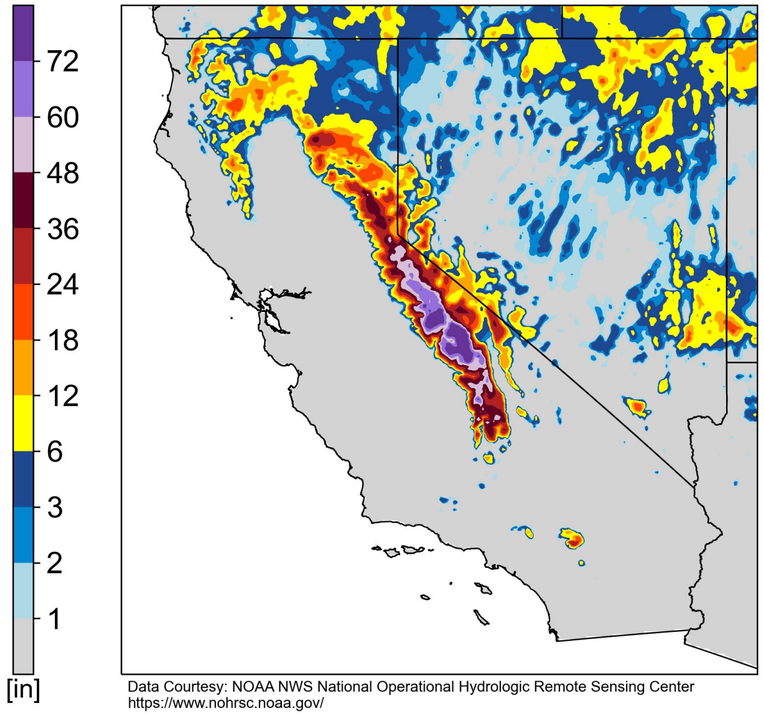
Observed Precipitation & Snowfall

NWS Stage IV 72-h QPE
Valid: 4 AM PST 15 Feb 2025



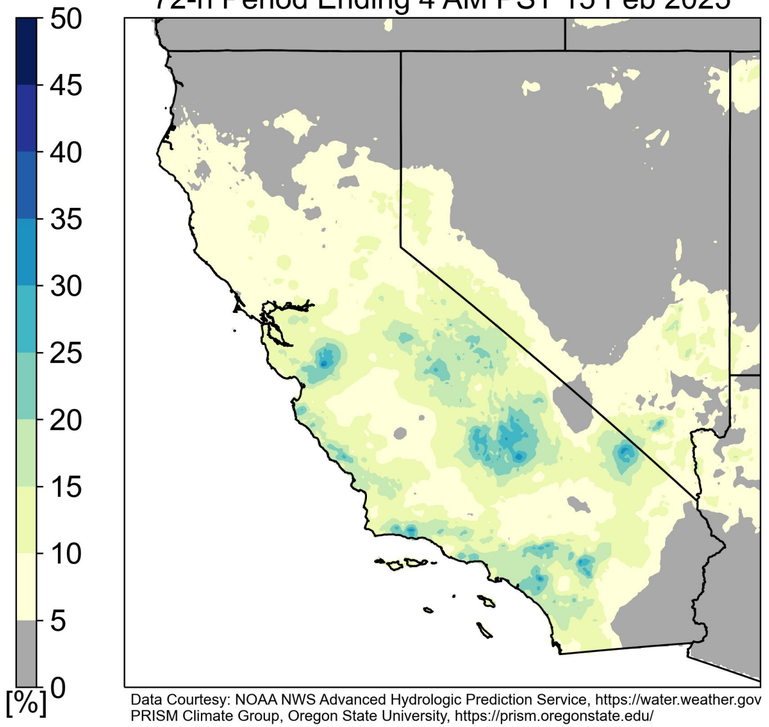
Data Courtesy: NOAA NWS National Water Prediction Service, https://water.noaa.gov

NWS 72-h Snowfall Analysis
Valid: 4 AM PST 15 Feb 2025



Data Courtesy: NOAA NWS National Operational Hydrologic Remote Sensing Center
https://www.nohrsc.noaa.gov/

Percent of Normal WY Precipitation
72-h Period Ending 4 AM PST 15 Feb 2025



Data Courtesy: NOAA NWS Advanced Hydrologic Prediction Service, https://water.weather.gov
PRISM Climate Group, Oregon State University, https://prism.oregonstate.edu/

- At least 2–6 inches of total precipitation fell over much of coastal California and in the vicinity of the Sierra Nevada. Higher amounts were observed in the Central and Southern Sierra Nevada, Central California Coast Ranges, and Transverse Ranges.
- This storm also produced an estimated 2–6 feet of snow throughout the Sierra Nevada, with the highest amounts above 7,000 feet and south of Lake Tahoe. As much as 83 inches of total snowfall were reported at the summit of Mammoth Mountain.
- Portions of Central and Southern California received >20% of normal annual precipitation from this event.
- Bishop, CA, experienced its 4th wettest February day on record (since 1943) on 13 Feb. The 2.23 inches that fell on this day represents 46% of this station's normal annual precipitation.

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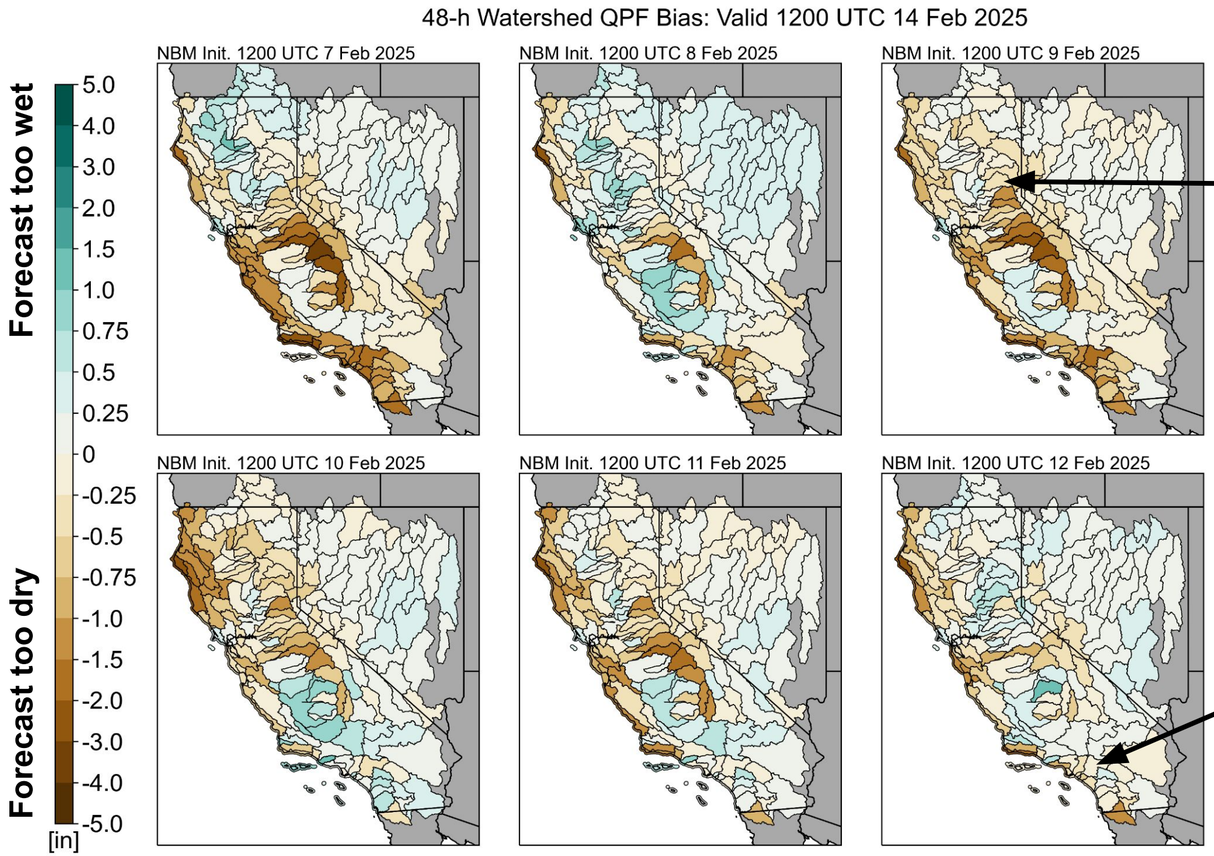
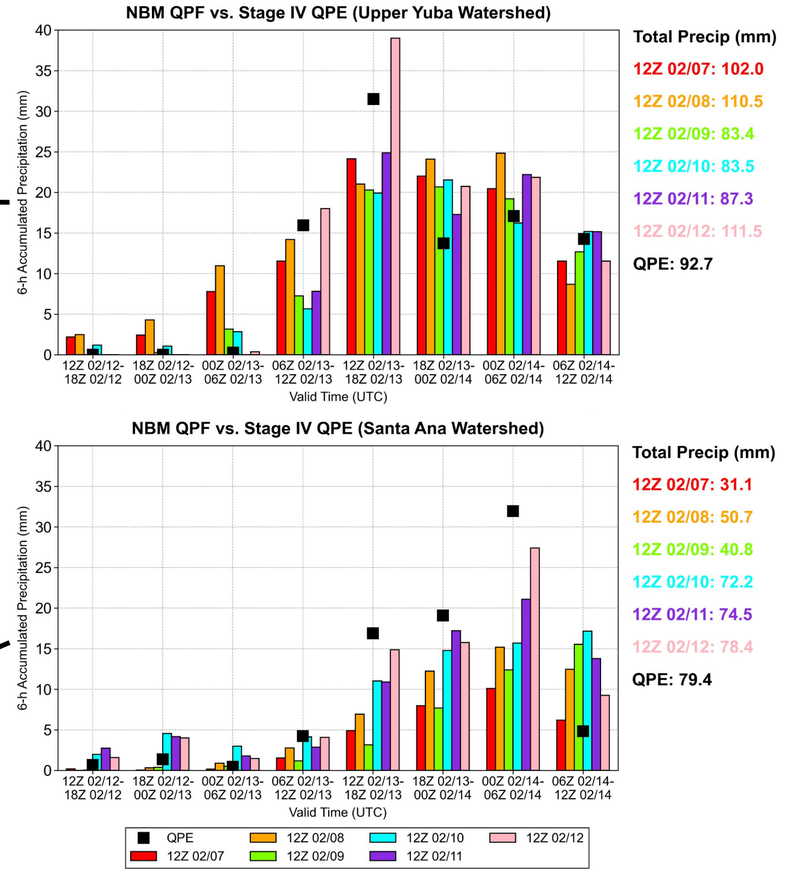
Watershed QPF Verification





- The National Blend of Models (NBM) underestimated precipitation amounts in coastal Central and Southern California at lead times of ~5–7 days and in the Central and Southern Sierra Nevada at lead times of 3–7 days.
- NBM precipitation forecasts for the 48-h period ending 4 AM PT Wed 14 Feb in the Upper Yuba watershed were consistently within ±1 inch of the observed precipitation at lead times out to 7 days.
- NBM precipitation forecasts in the Santa Ana watershed significantly underestimated observed precipitation at lead times of 5–7 days. Forecasts at shorter lead times still struggled to capture the peak in precipitation intensity on 14 Feb.

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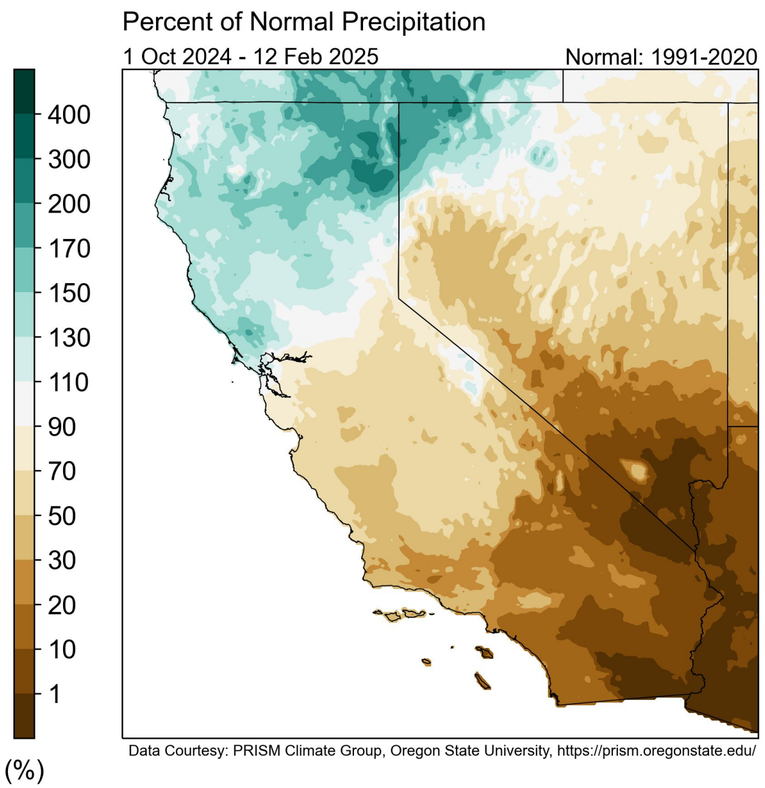
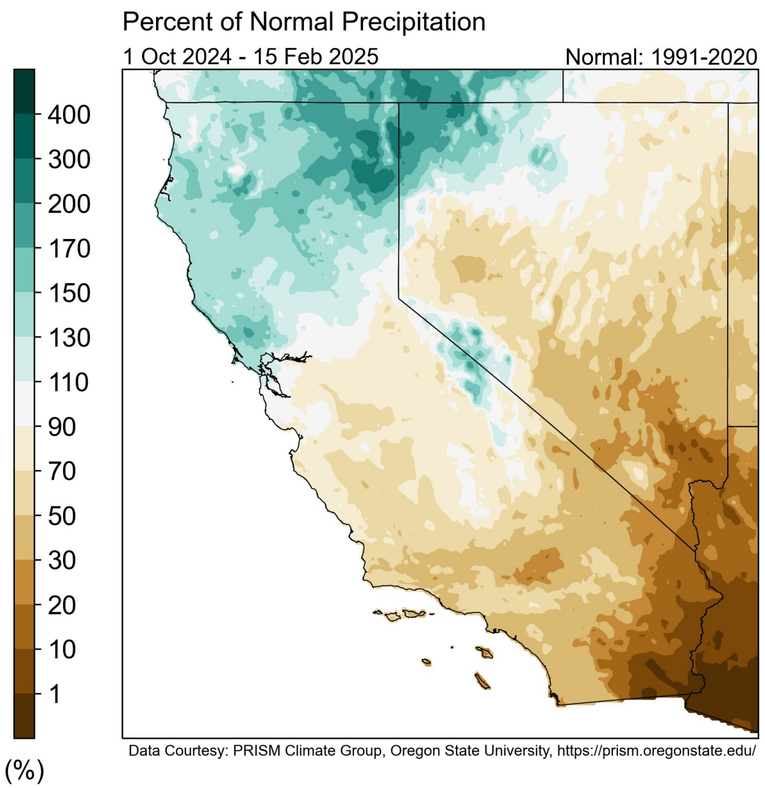
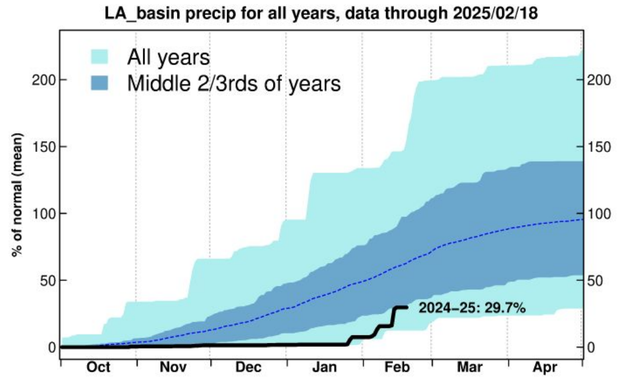
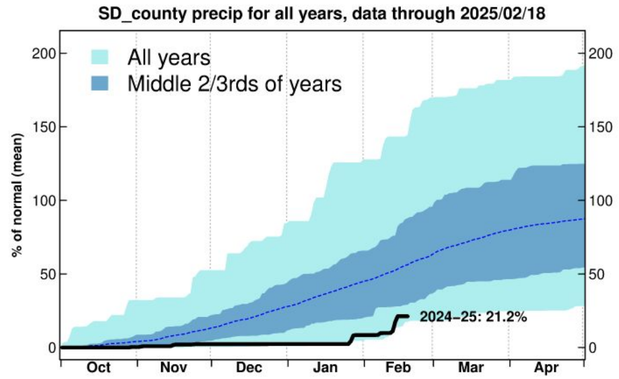
WY 2025 Precipitation







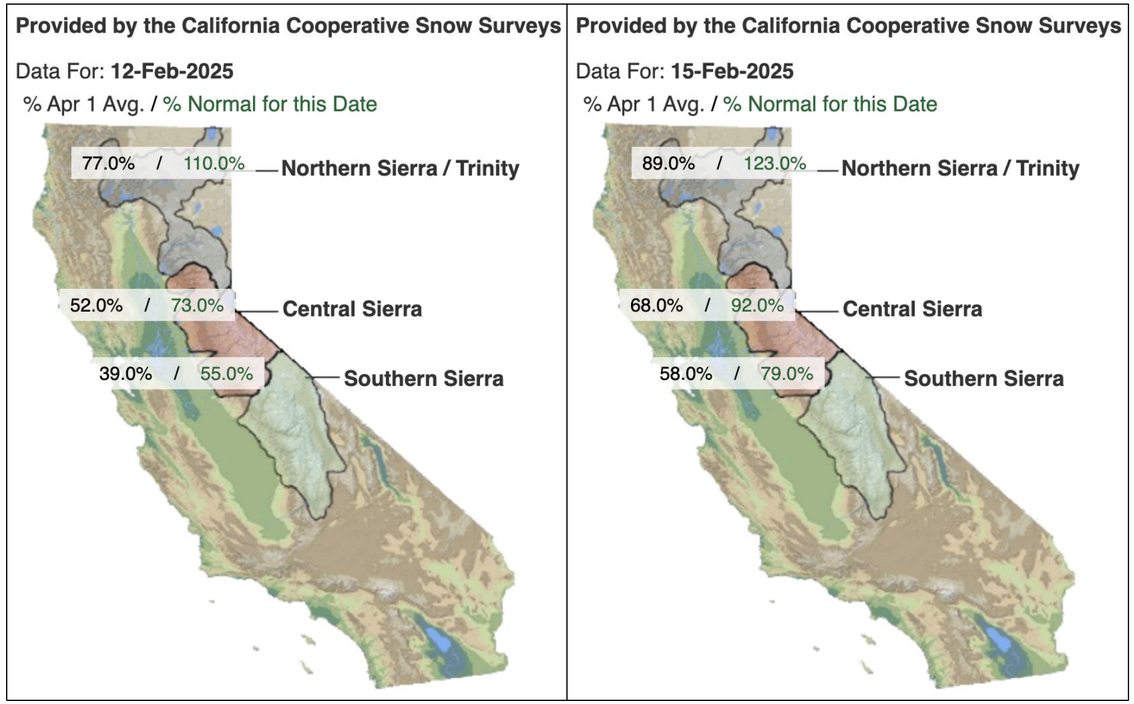


Credit: California-Nevada Applications Program

- This storm brought much-needed precipitation to Central and Southern California.
- Water-year-to-date (WY-to-date) precipitation increased from 30–70% of normal to 50–90% of normal in Central California and from 20–50% of normal to 30–70% of normal in coastal Southern California.
- As of 15 Feb, WY-to-date precipitation was 29% of normal total WY precipitation in the Los Angeles Basin and 21% of normal total WY precipitation in San Diego County.
- The Los Angeles Basin received ~12% of normal total WY precipitation in a single day on 13 Feb.

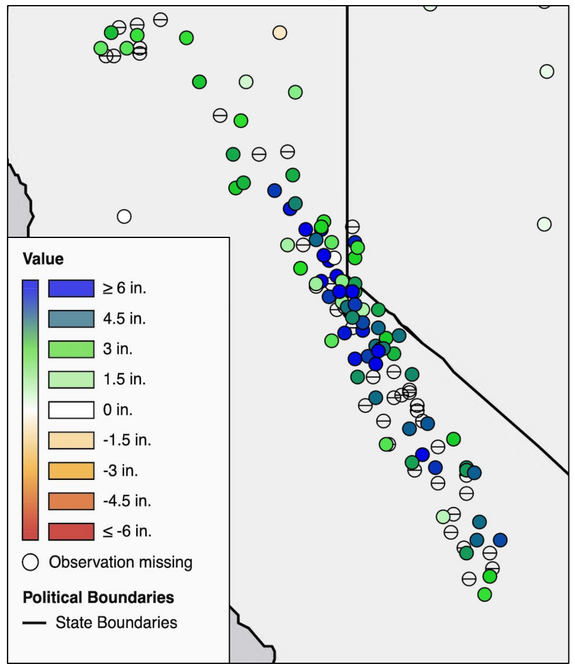
CW3E Event Summary: 12 – 14 February 2025

Changes in Snowpack

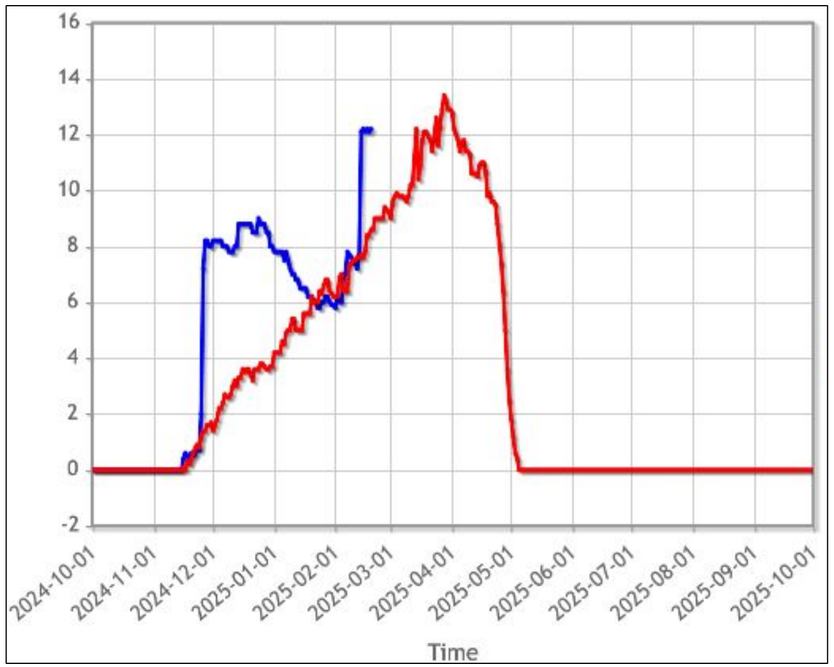


Credit: CDEC, California Department of Water Resources

3-day SWE Change: Valid 15 Feb



WY 2025 SWE: Cottonwood Lakes (10,180 ft)

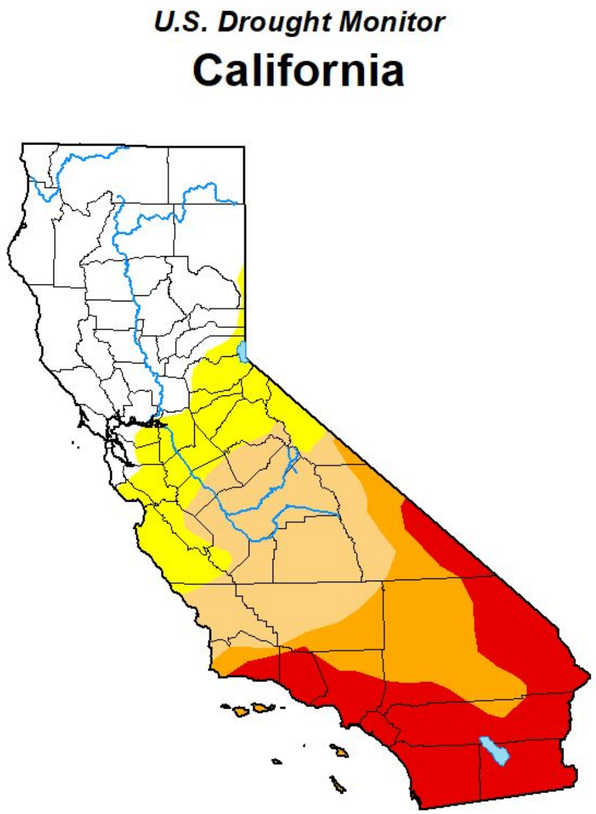


Credit: USDA NRCS National Water & Climate Center

- Heavy snow led to large increases in seasonal snowpack, particularly over the Central and Southern Sierra Nevada, where snowpack increased from 73% and 55% of normal to 92% and 79% of normal, respectively.
- Many SNOTEL and cooperative snow survey stations above 7,000 feet recorded snow water equivalent (SWE) increases on the order of 4-8 inches between 12 Feb and 15 Feb.
- The 3-day SWE increase at Cottonwood Lakes (5.0 inches), located above 10,000 feet in the Southern Sierra Nevada, represents 38% of this station's median peak SWE.

CW3E Event Summary: 12 – 14 February 2025

Drought Conditions



February 11, 2025
(Released Thursday, Feb. 13, 2025)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

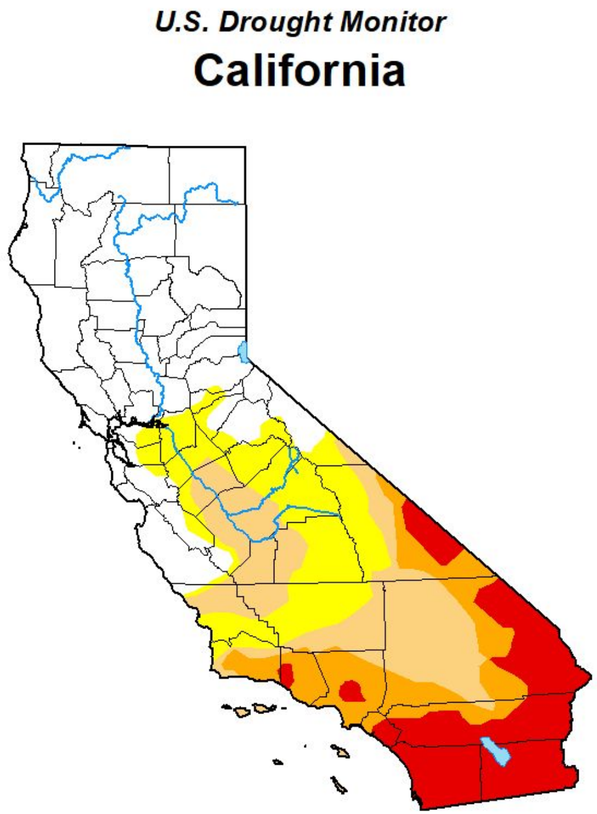
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	33.22	66.78	54.31	34.66	21.21	0.00
Last Week 02-04-2025	33.22	66.78	54.31	34.66	21.21	0.00
3 Months Ago 11-12-2024	25.51	74.49	17.00	5.50	0.95	0.00
Start of Calendar Year 01-07-2025	39.11	60.89	35.93	10.43	1.06	0.00
Start of Water Year 10-01-2024	28.40	71.60	10.67	0.08	0.00	0.00
One Year Ago 02-13-2024	92.81	7.19	0.00	0.00	0.00	0.00

Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

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:
Lindsay Johnson
National Drought Mitigation Center

droughtmonitor.unl.edu



February 18, 2025
(Released Thursday, Feb. 20, 2025)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	41.82	58.18	41.58	24.83	14.75	0.00
Last Week 02-11-2025	33.22	66.78	54.31	34.66	21.21	0.00
3 Months Ago 11-19-2024	28.61	71.39	16.88	5.50	0.95	0.00
Start of Calendar Year 01-07-2025	39.11	60.89	35.93	10.43	1.06	0.00
Start of Water Year 10-01-2024	28.40	71.60	10.67	0.08	0.00	0.00
One Year Ago 02-20-2024	92.97	7.03	0.00	0.00	0.00	0.00

Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

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:
Brian Fuchs
National Drought Mitigation Center

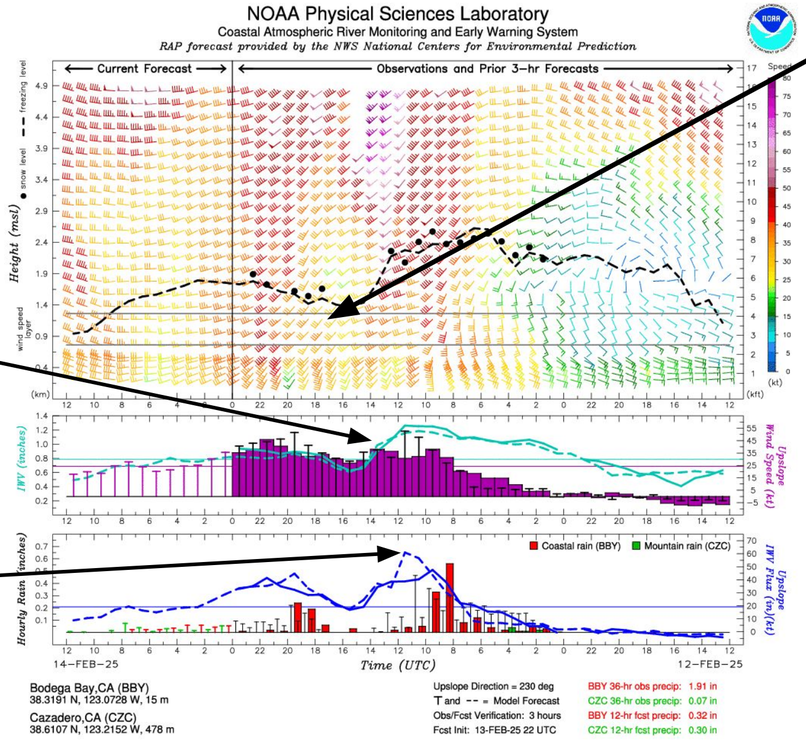
droughtmonitor.unl.edu

- Precipitation from this AR resulted in some improvement in drought conditions over Central and Southern California.
- Between 11 Feb and 18 Feb, the statewide area experiencing moderate drought (D1) or worse decreased from 54% to 42%, and the statewide area experiencing severe drought (D2) or worse decreased from 35% to 25%.
- Extreme drought (D3) still remains in place over far Southern California, including all of San Diego County.

CW3E Event Summary: 12 – 14 February 2025

Bodega Bay (BBY) Event Observations: Valid 12-14 Feb 2025

Wind Profiler and GFS Derived IWV
Valid: 12Z 12-14 Feb

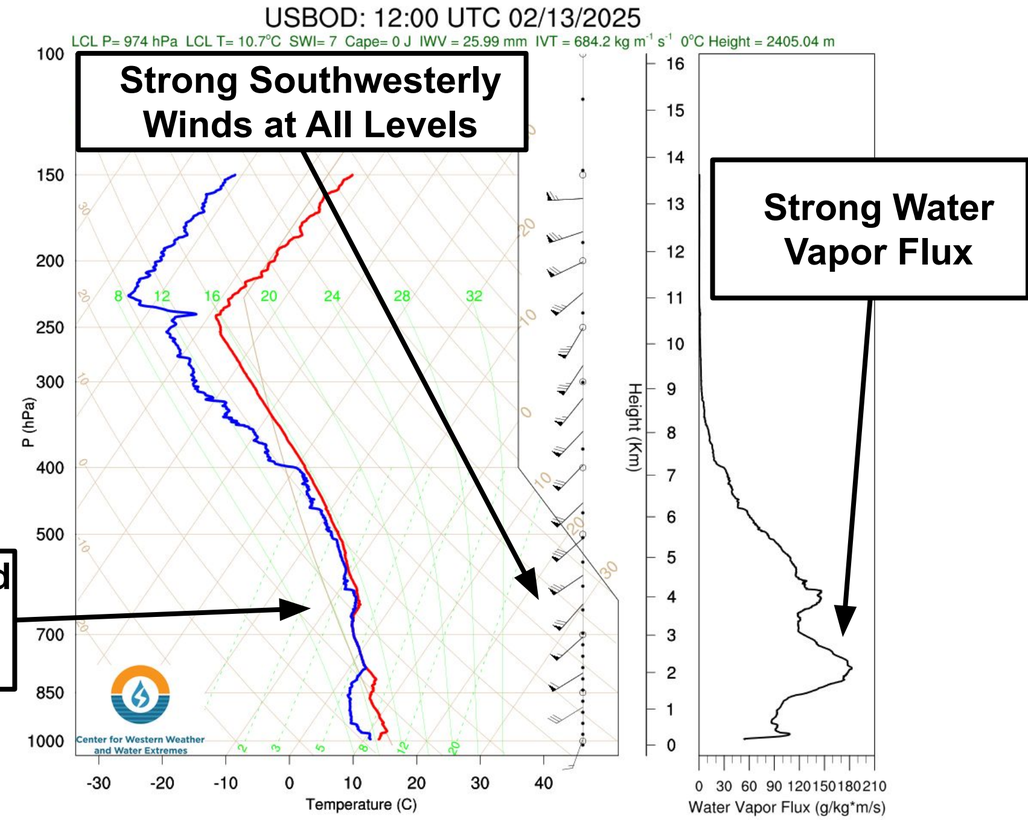


Moderate Southwesterly winds at 1km

Strong upslope wind and high IWV values

Strong upslope moisture flux

CW3E Sounding at 12Z 13 Feb



Strong Southwesterly Winds at All Levels

Strong Water Vapor Flux

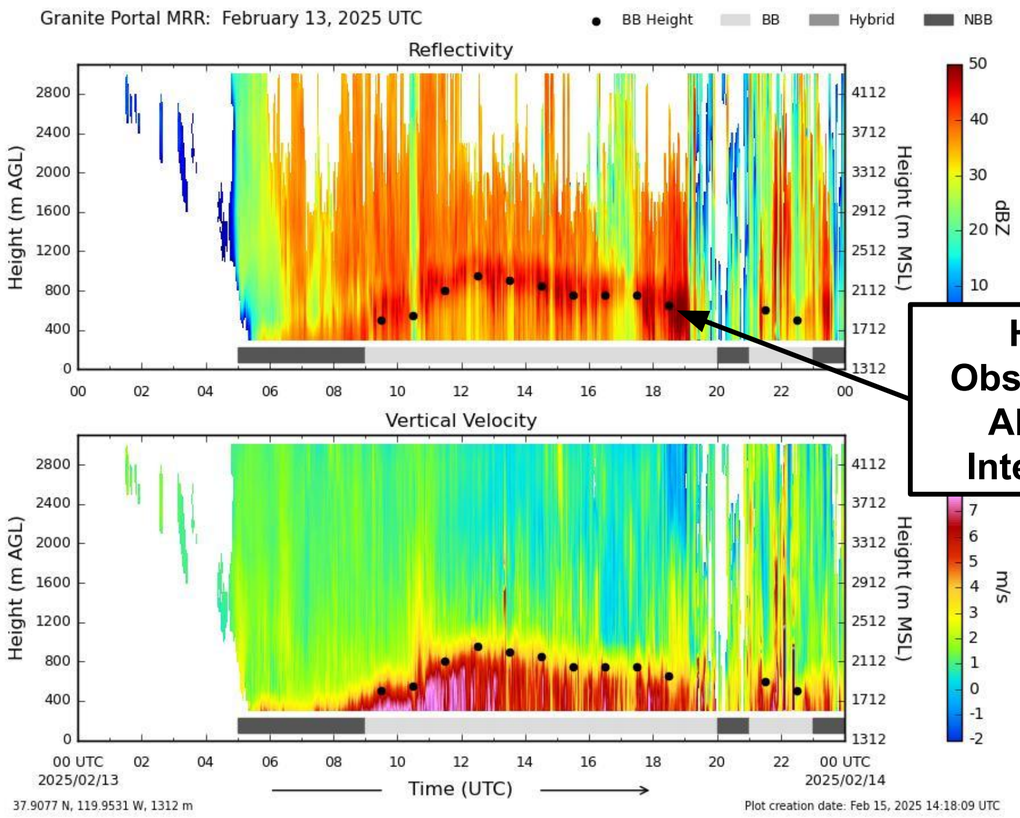
Moist Lower and Mid-Levels of Atmosphere

- The wind profiler at Bodega Bay (left) and the CW3E sounding at Bodega Bay (right) capture the conditions for optimal precipitation enhancement within this event.
- Featured in both the wind profiler and sounding are strong southwesterly, upslope winds with strong water vapor flux at the time of maximum IVT over the region.

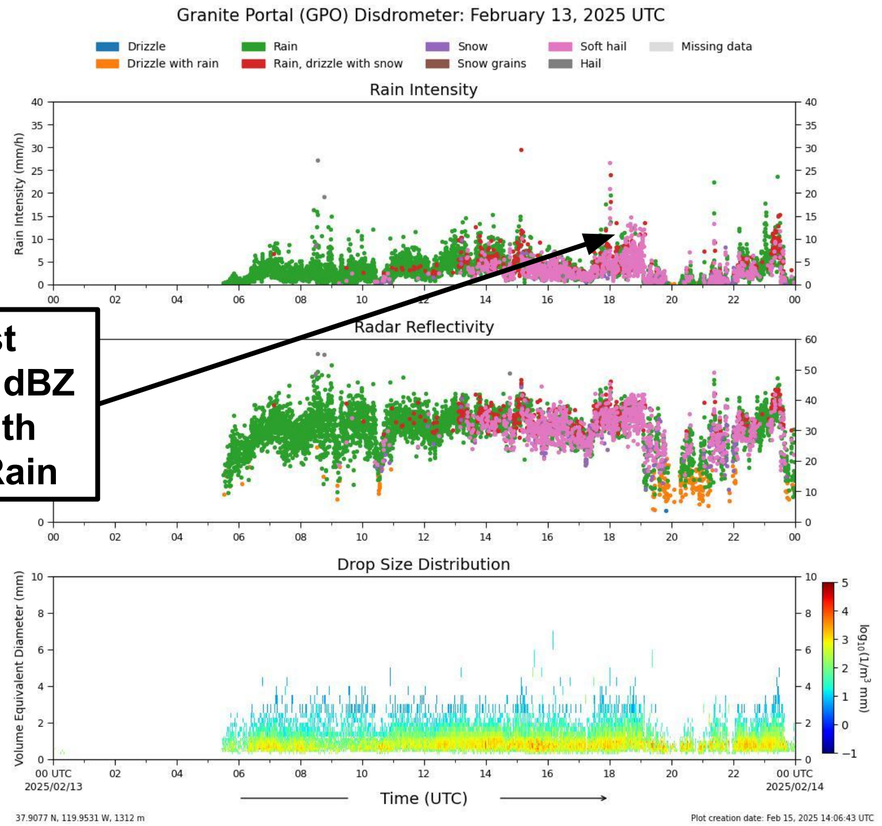
CW3E Event Summary: 12 – 14 February 2025

CW3E Observations at Granite Portal: Valid 00Z 13 Feb - 00Z 14 Feb

MicroRain Radar



Disdrometer



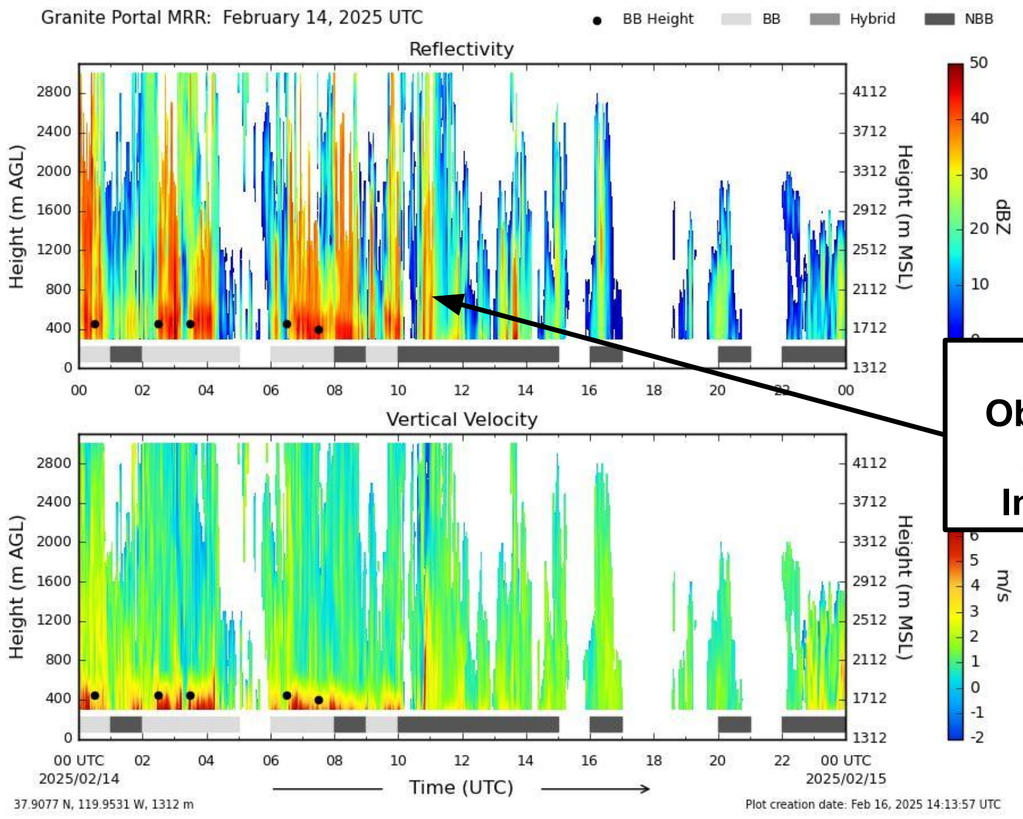
Highest Observed dBZ Align with Intense Rain

- CW3E's MicroRain radar and Disdrometer at Granite Portal in Tuolumne County was able to capture the periods of heavy rains and high winds over the central Sierra Nevada.
- The highest observed dBZ's of near 50 align with the rain intensities exceeding 20 mm/h at the peak of IVT over the region.

CW3E Event Summary: 12 – 14 February 2025

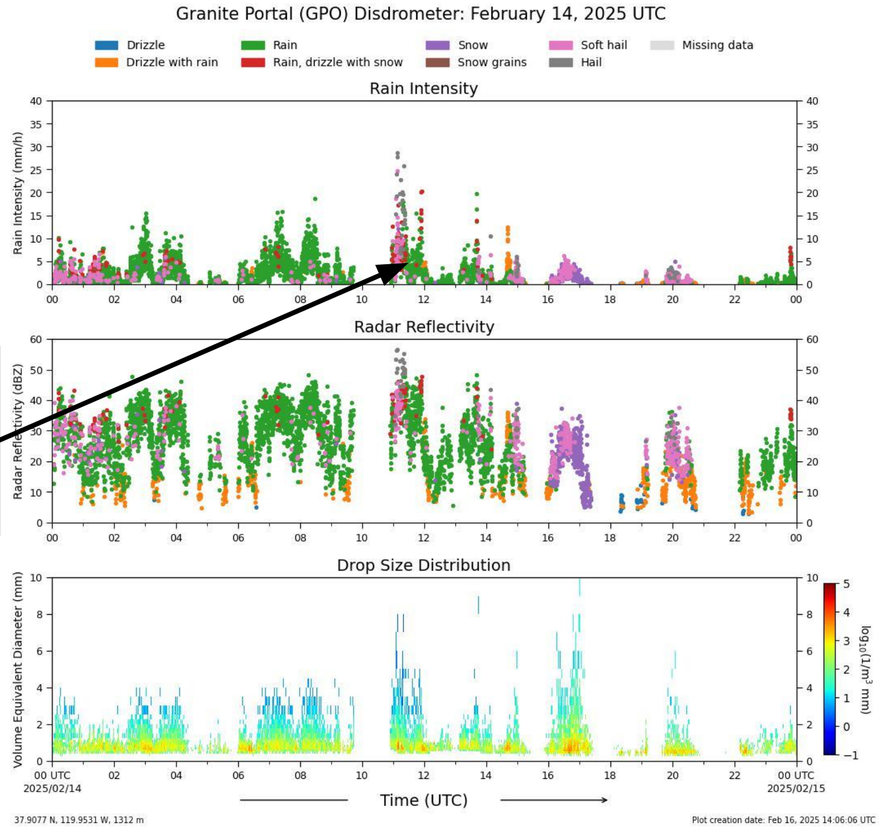
CW3E Observations at Granite Portal: Valid 00Z 14 Feb - 00Z 15 Feb

MicroRain Radar



Highest Observed dBZ Align with Intense Rain

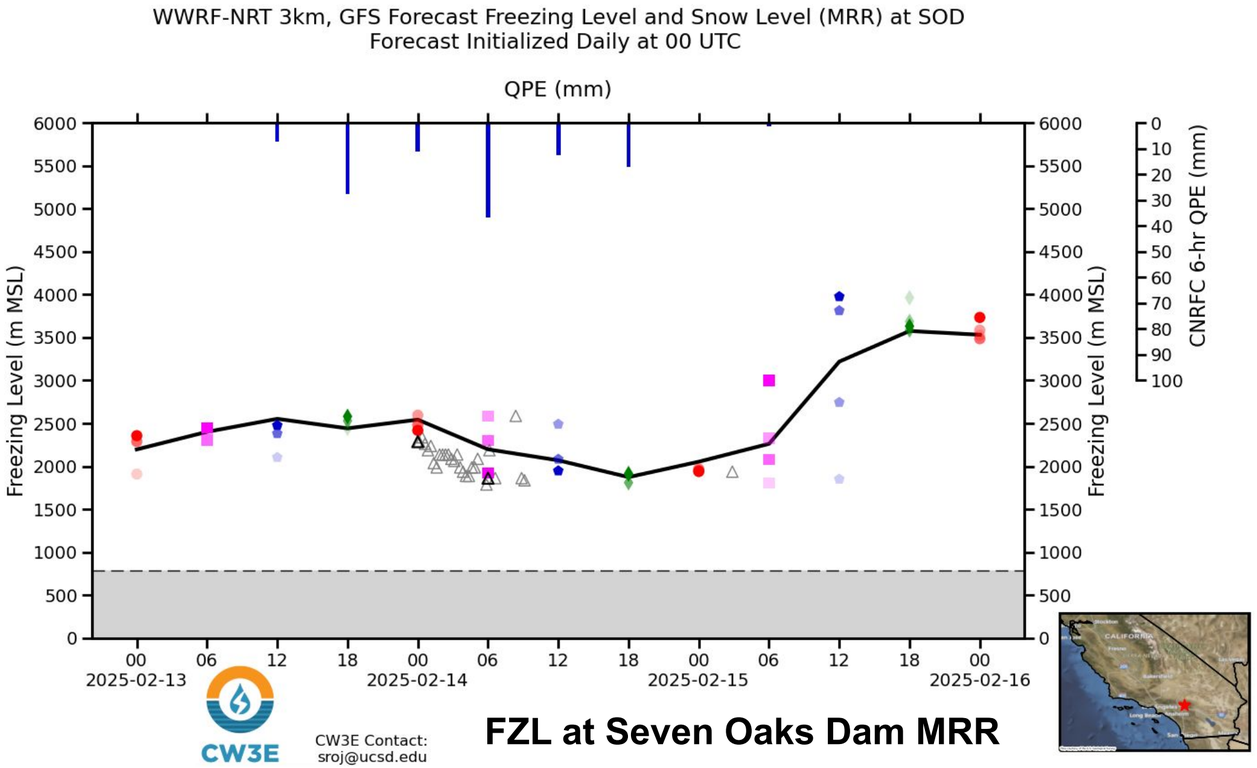
Disdrometer



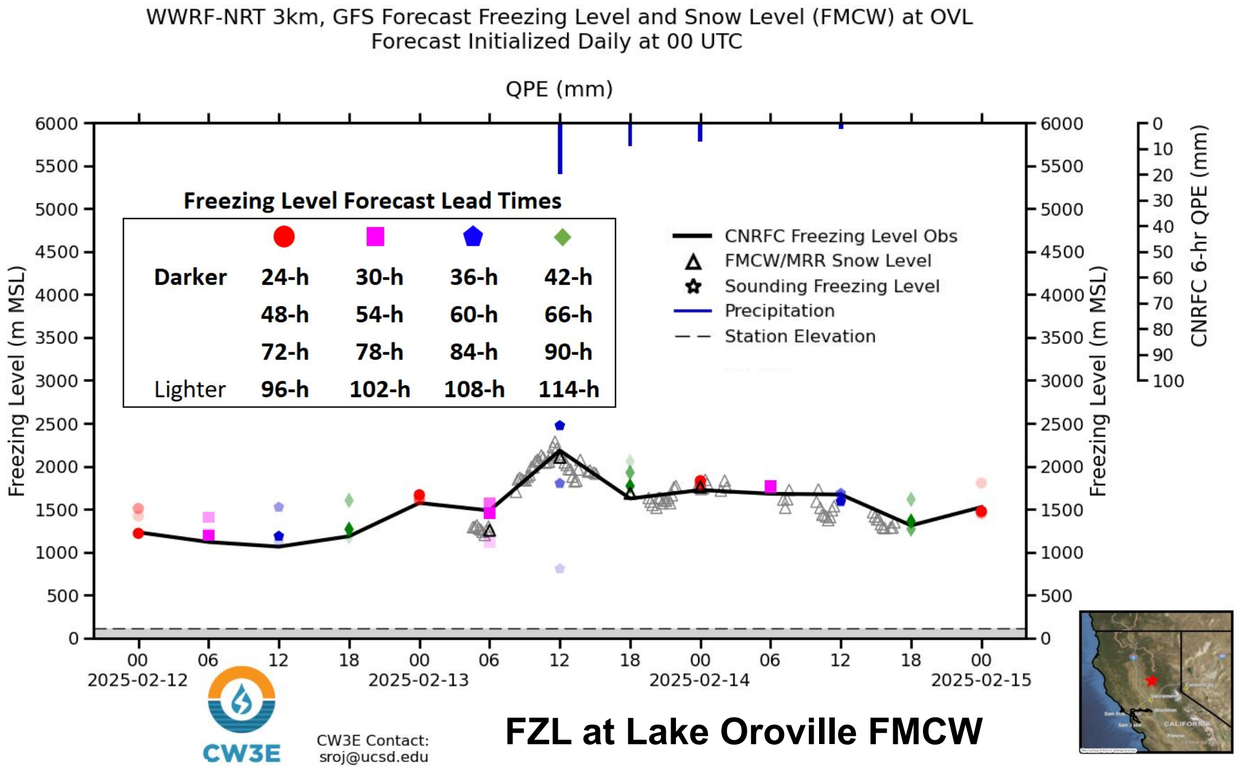
- There were less consistently observed dBZ > 35 on 14 Feb at Granite Portal.
- The periods with dBZ > 35 align with select periods of more intense rain throughout the morning and early afternoon.

CW3E Event Summary: 12 – 14 February 2025

Freezing Level (FZL) Forecast Verification (WWRF 3km GFS) Valid 00Z 13 Feb - 00Z 16 Feb



FZL at Seven Oaks Dam MRR

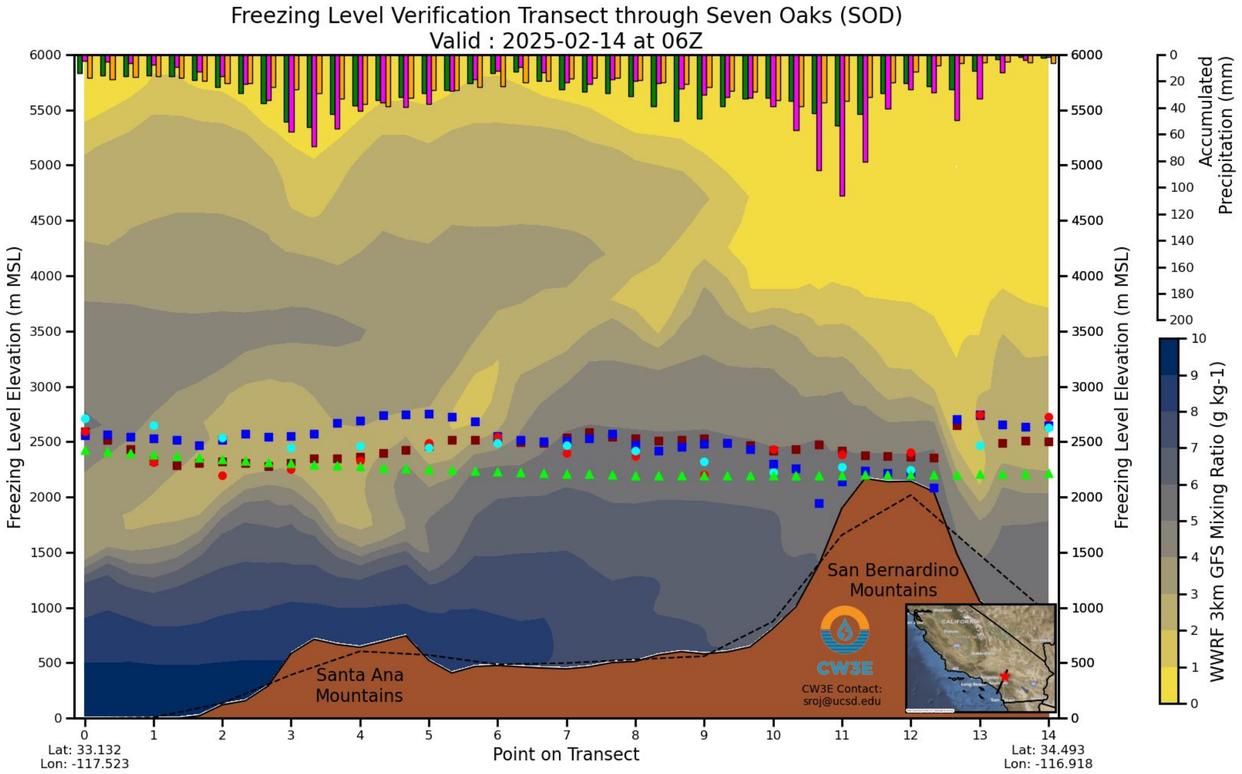


FZL at Lake Oroville FMCW

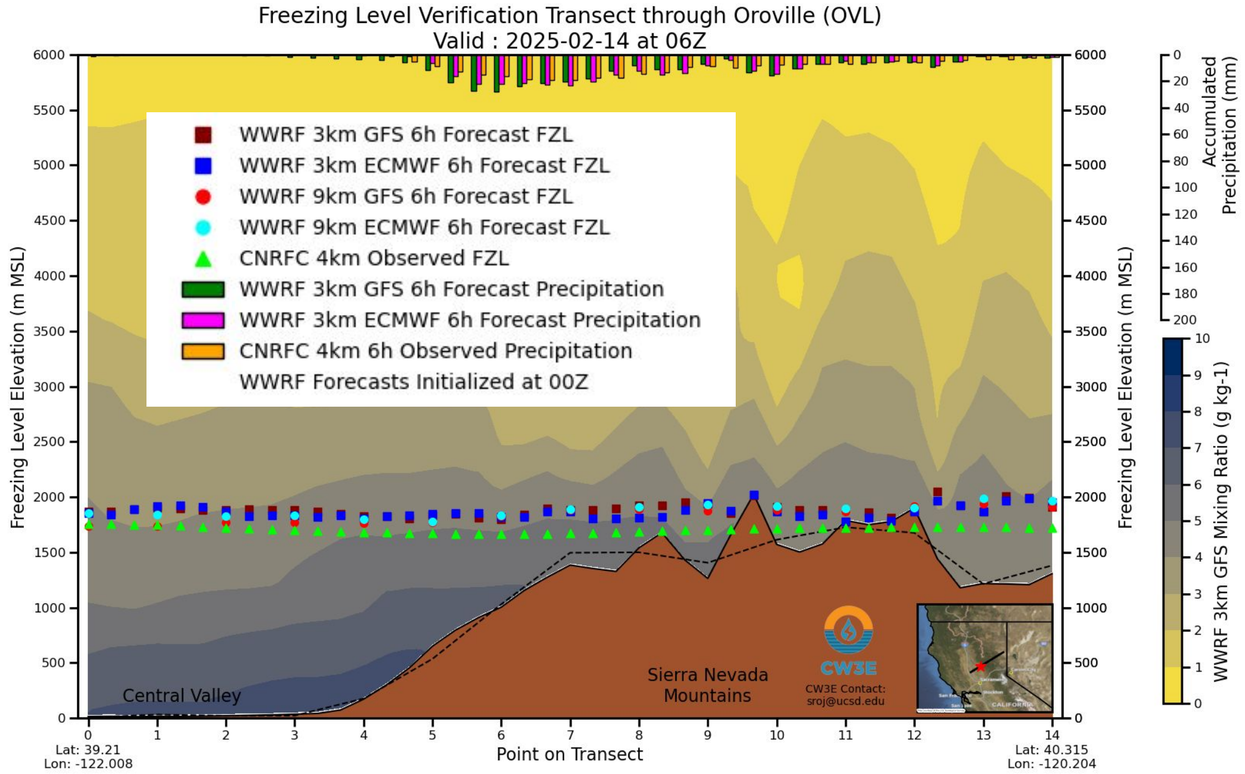
- The 24-h lead time WWRF 3-km GFS freezing level (FZL) forecasts (colored symbols) at the Oroville FMCW were in line with CNRFC 4km FZL analysis (black line) at each 6-h valid time with freezing levels generally higher in altitude than the snow level observations (black and gray triangles) from the FMCW, as expected.
- Freezing levels at Oroville rose ~1 km before and at the onset of precipitation before leveling out at ~1.6 km.
- At Seven Oaks Dam, FZLs dropped ~0.6 km during the most intense portion of precipitation with a quick rise on 15 Feb.

CW3E Event Summary: 12 – 14 February 2025

Freezing Level (FZL) Forecast Verification Valid 06Z 14 Feb 2025



FZL transect through Seven Oaks Dam MRR



FZL transect through Lake Oroville FMCW

- WWRF 6-h lead time forecast FZLs show more variation in the FZL along transects through the Seven Oaks Dam MRR and the Lake Oroville FMCW as compared to the CNRFC analysis FZLs.
- In general, at 06Z on 14 Feb, FZL were at the ridge lines of both watersheds during times of precipitation.

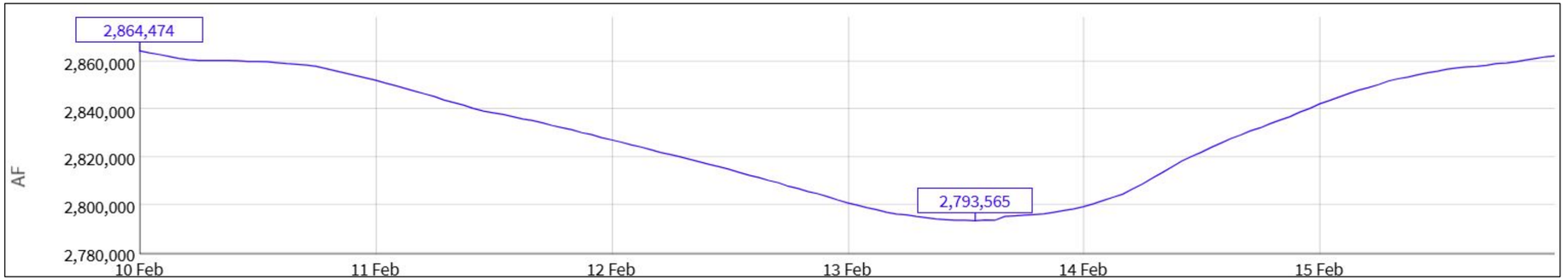
CW3E Event Summary: 12 – 14 February 2025

Reservoir Operations: Lake Oroville

OROVILLE DAM (ORO)

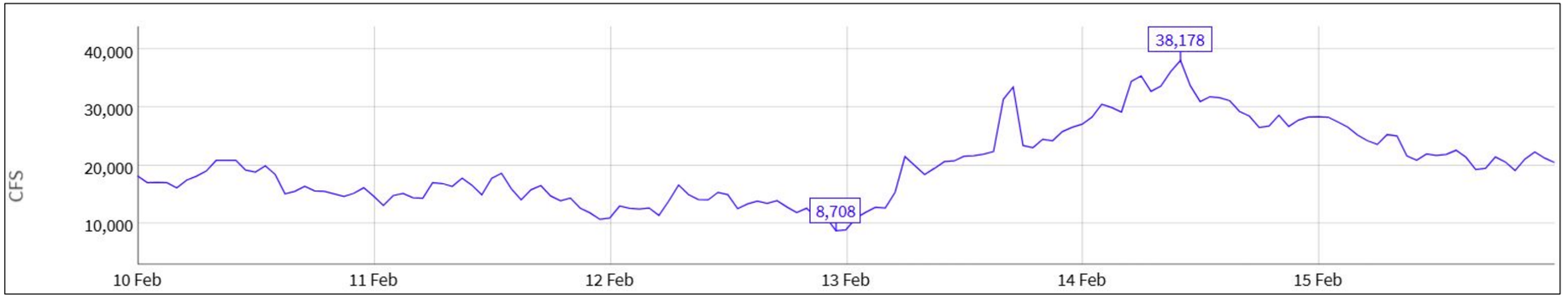
Date from 02/10/2025 00:00 through 02/16/2025 00:00 Duration: 6 days

Reservoir Storage



- Reservoir storage at Oroville Dam increased 68,849 AF from 1 PM PST 13 Feb to 12 AM PST Feb 16.

Reservoir Inflow



- Reservoir inflows exceeded 10,000 cfs every hour after 12 AM PST 13 Feb, peaking at 38,178 cfs at 10 AM PST 14 Feb.

Credit: CDEC, California Department of Water Resources

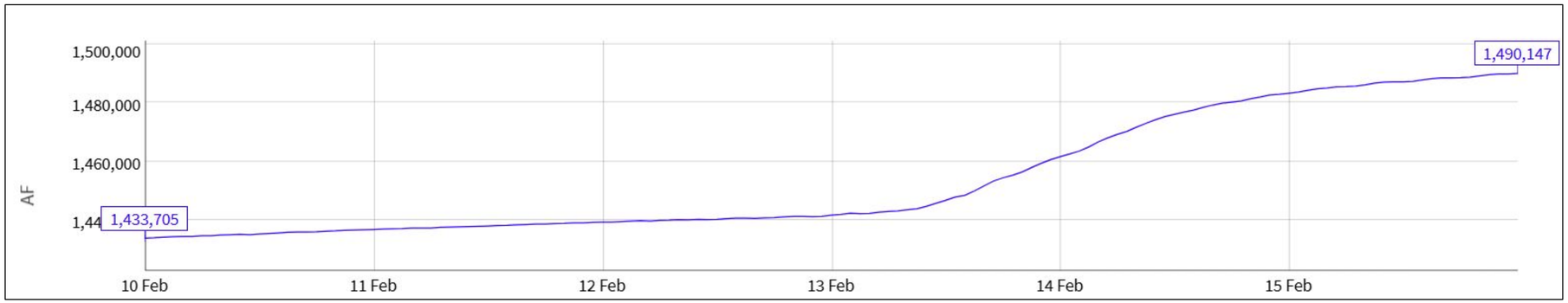
CW3E Event Summary: 12 – 14 February 2025

Reservoir Operations: Don Pedro

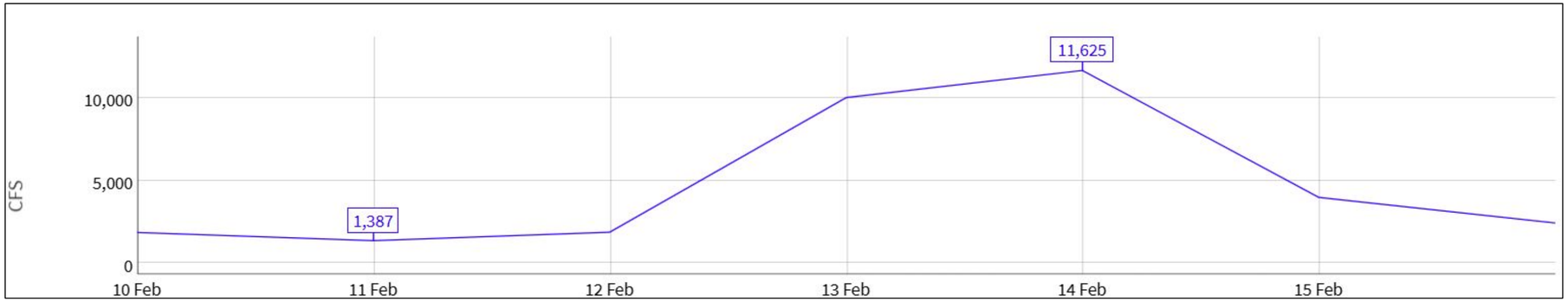
DON PEDRO RESERVOIR (DNP)

Date from 02/10/2025 00:00 through 02/16/2025 00:00 Duration: 6 days

Reservoir Storage



Reservoir Inflow



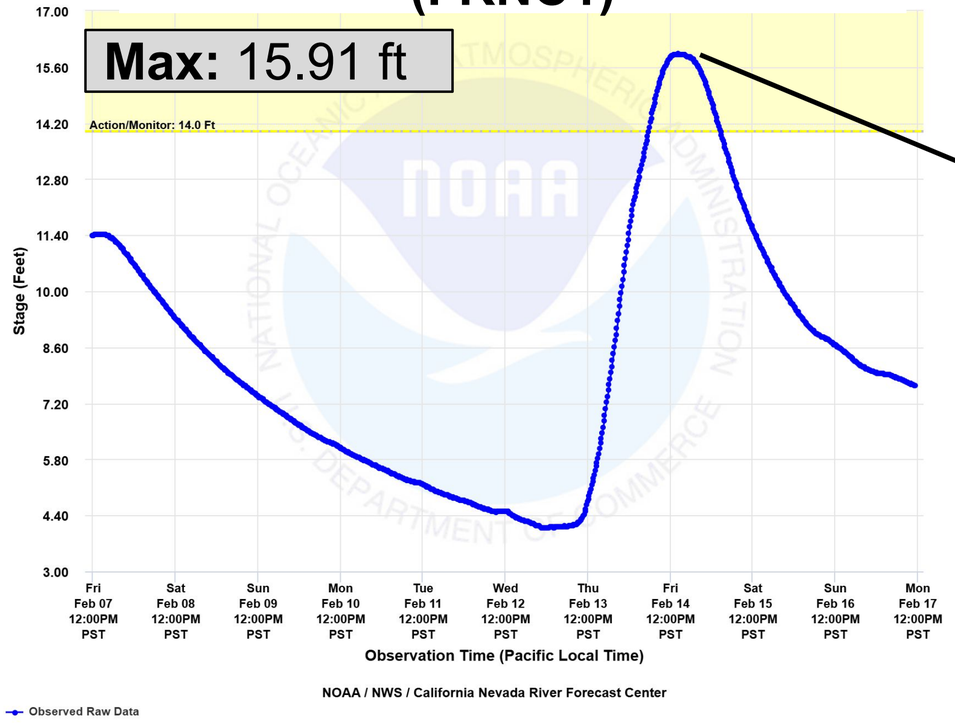
Credit: CDEC, California Department of Water Resources

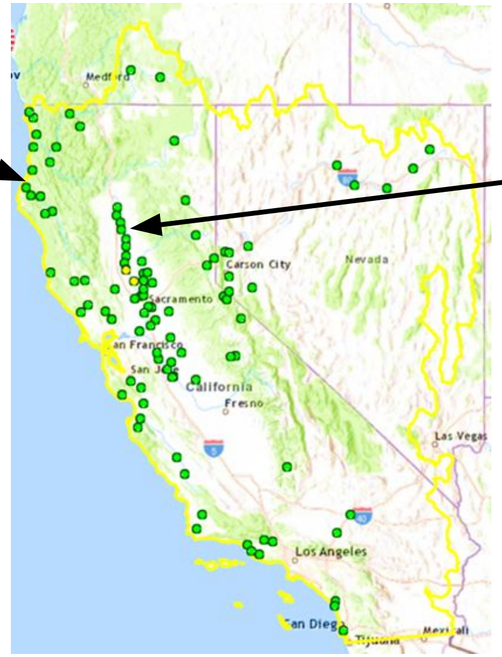
- Reservoir storage at Don Pedro Reservoir increased 56,442 AF from 12 AM PST 10 Feb to 12 AM PST 16 Feb.
- Reservoir inflows exceeded 5,000 cfs from early Wed 12 Feb through late Fri 14 Feb.

CW3E Event Summary: 12 – 14 February 2025

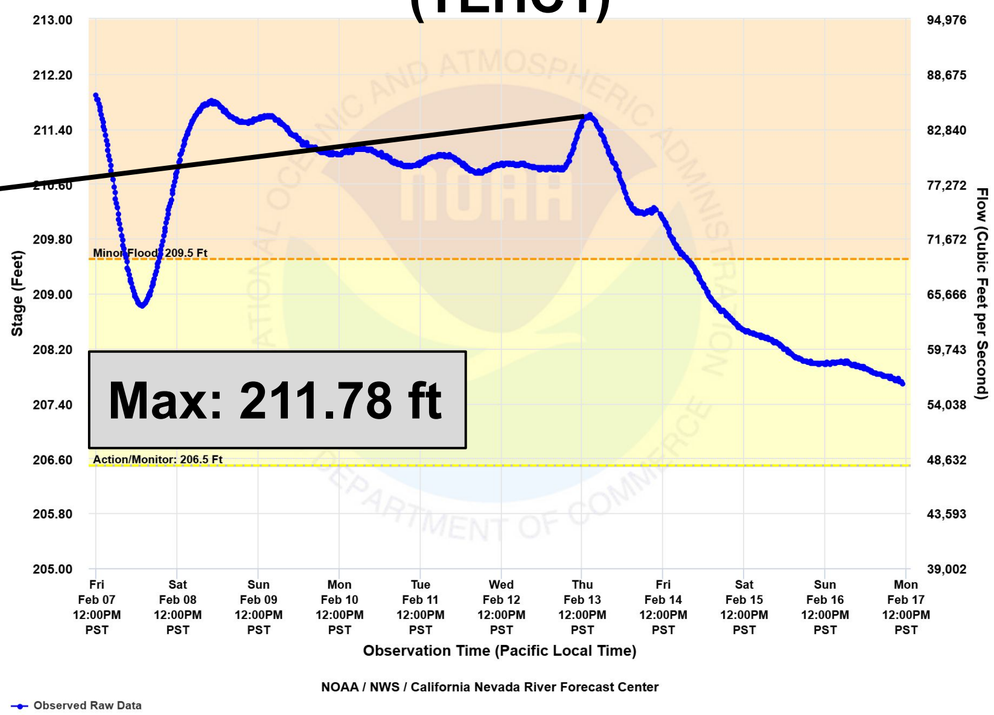
Hydrographs - Northern California & Sierra Nevada

Eel River - Fernbridge (FRNC1)





Sacramento River - Tehama Bridge (TEHC1)



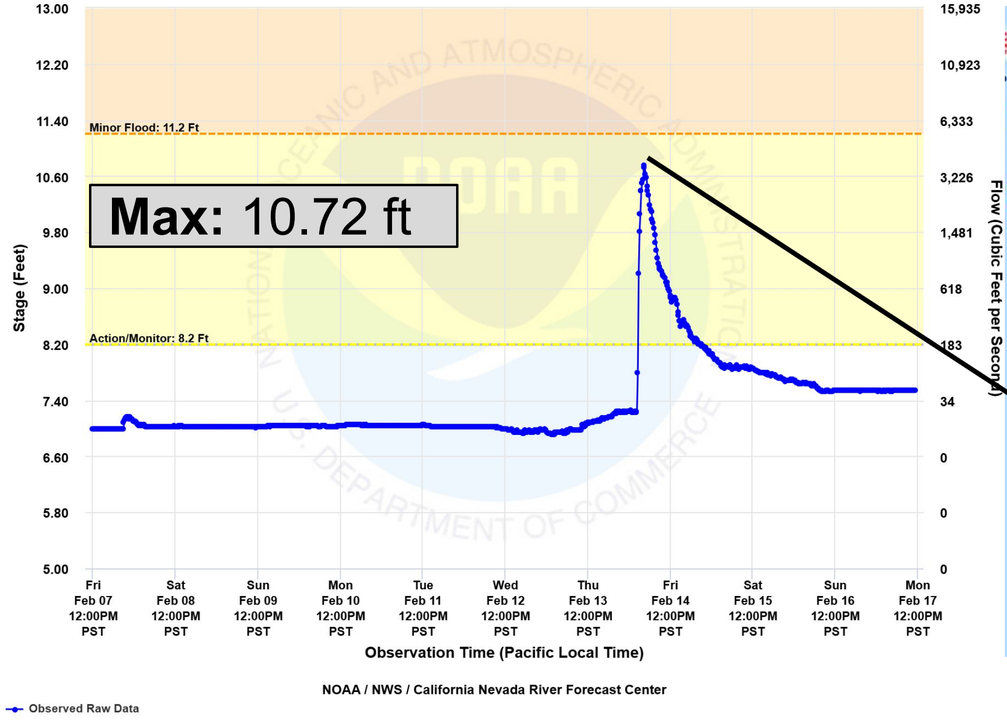
- The Eel River at Fernbridge rose approximately 12 feet, exceeding Action/Monitor stage.

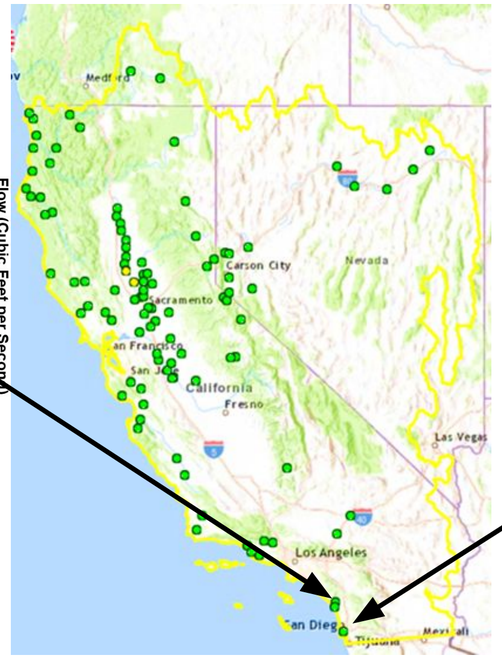
- The Sacramento River at Tehama Bridge was above Minor Flood stage ahead of this event following the previous AR. THe precipitation from this event kept this gage above Minor Flood stage through the duration of the event.

CW3E Event Summary: 12 – 14 February 2025

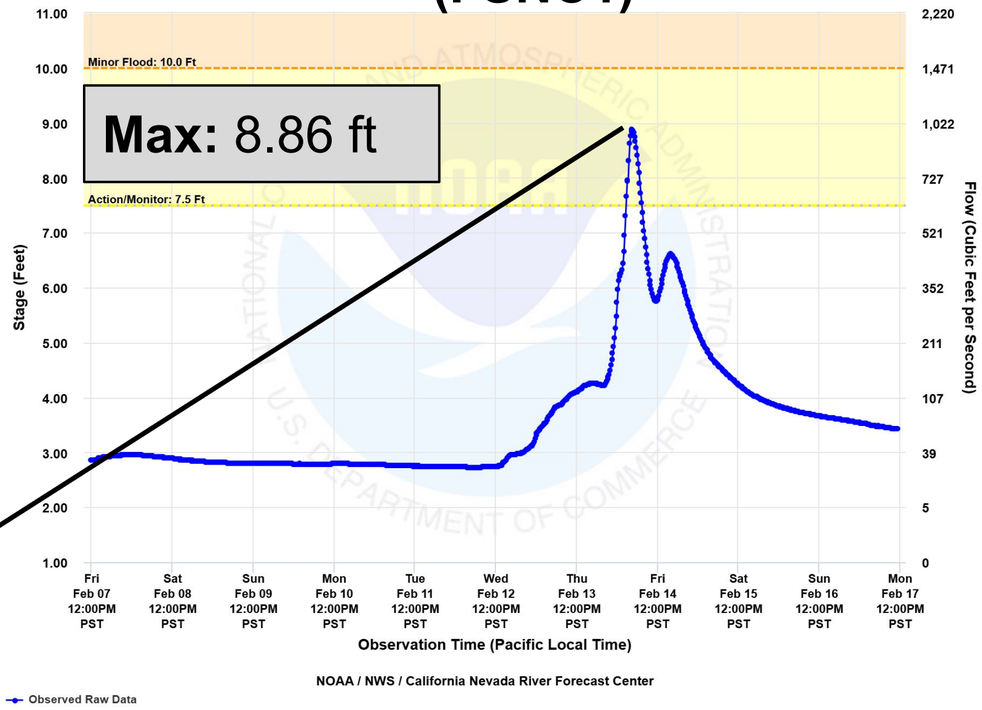
Hydrographs - Southern California

Santa Margarita River - Ysidora (YDRC1)





San Diego River - Fashion Valley (FSNC1)

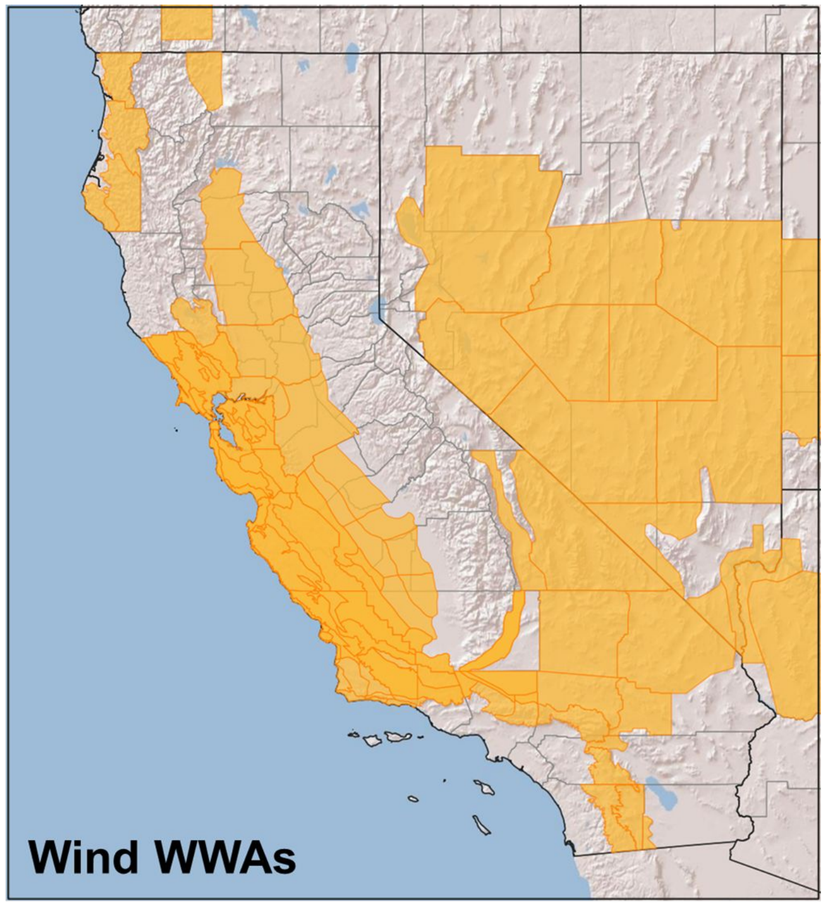


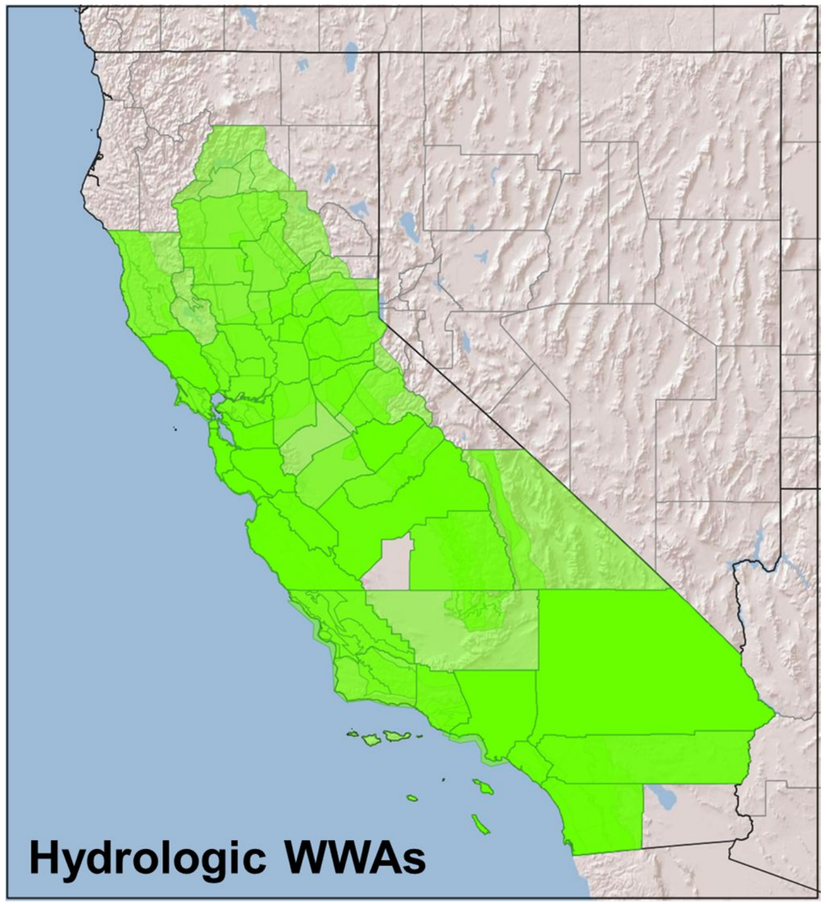
- The Santa Margarita River at Ysidora rose approximately 3 feet in 2 hrs, exceeding Action/Monitor stage.
- The Russian River at Hopland rose approximately 4 feet, exceeding Action/Monitor stage.

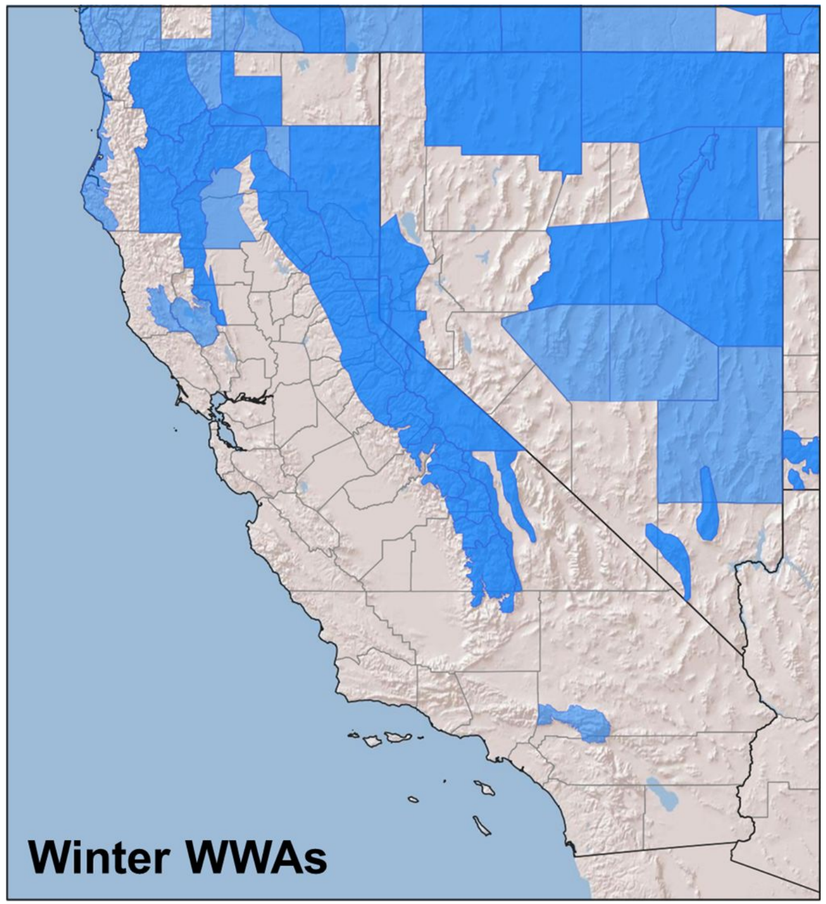
CW3E Event Summary: 12 – 14 February 2025

NWS Watches, Warnings, Advisories via Iowa State Archive
https://mesonet.agron.iastate.edu/request/gis/watchwarn.phtml

Impacts: NWS Watches, Warnings, and Advisories - Valid 4 PM 11 Feb – 4 PM 14 Feb 2025





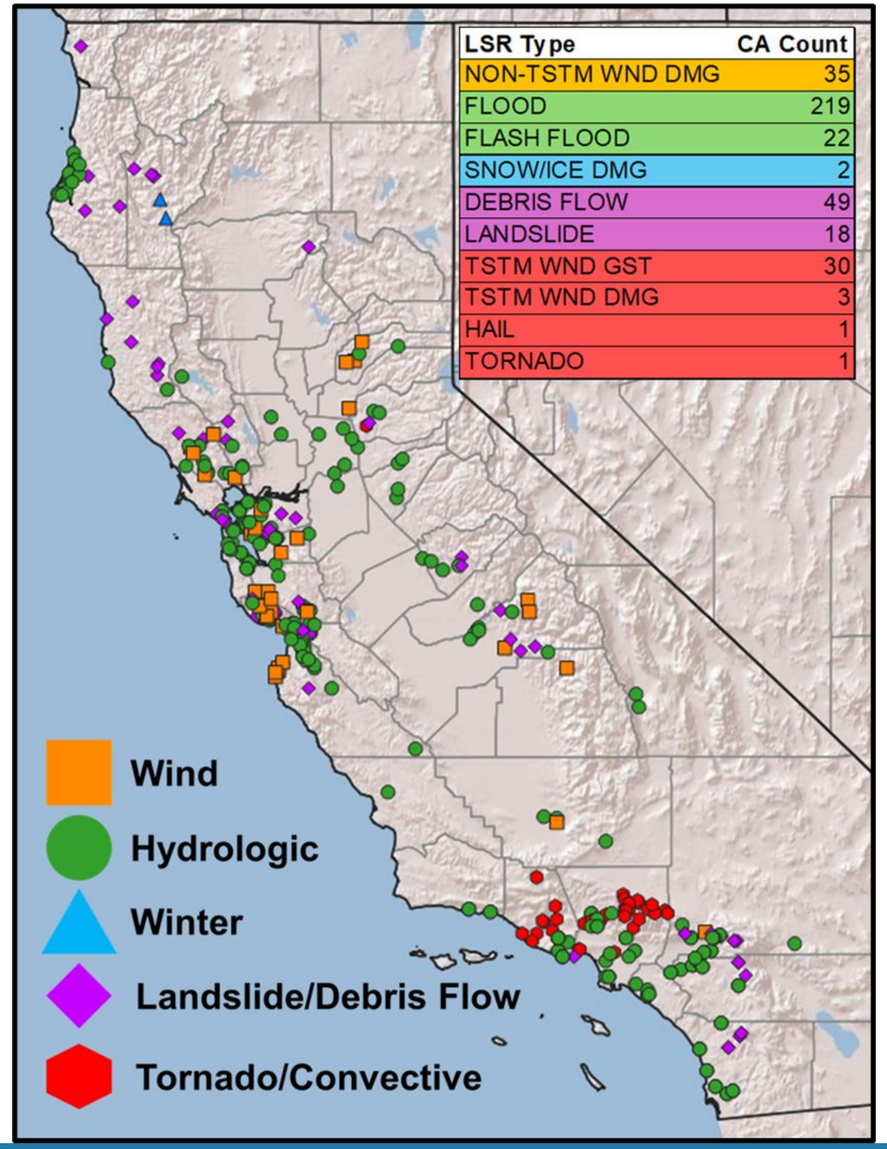


- Numerous watches, warnings, and advisories were issued by NWS weather forecast offices across the western US for wind related, hydrologic (i.e. flood, flash flood warnings), and winter weather hazards.
- Not picture are severe thunderstorm warnings issues for a storm cell over Los Angeles County on 13 Feb

CW3E Event Summary: 12 – 14 February 2025

NWS Local Storm Reports accessed via Iowa State Archive
https://mesonet.agron.iastate.edu/request/gis/lsrs.phtml

Impacts: NWS Local Storm Reports: Valid 4 PM 11 Feb – 4 PM 14 Feb 2025



- A tornado was observed in Oxnard, CA on 13 Feb with EF-0 damage confirmed by an NWS storm survey team. Additional hail and thunderstorm wind damage & gusts were reported in Ventura and Los Angeles counties.

- Numerous landslides and debris flow LSRs were reported across CA as a result of the rainfall during this event, with debris flows forcing evacuations near burn scars over the recent Eaton and Palisades fires in Los Angeles.

- Flood and flash flood reports were also observed across the state in coastal Northern, Central, and Southern California, with additional reports in the Central Valley.

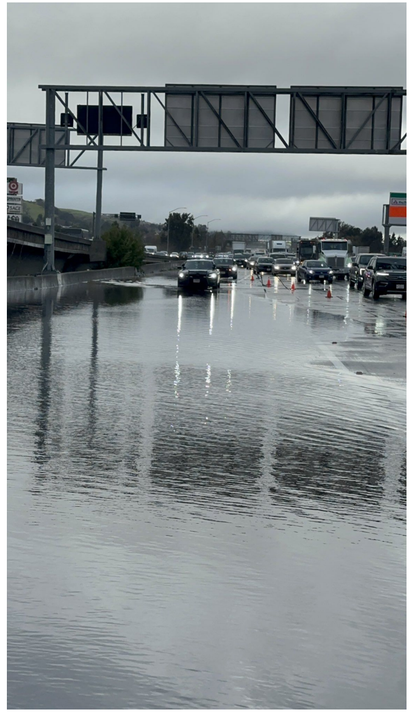
Local storm reports only represent impacts as reported to and distributed preliminarily by the NWS, other impacts may have occurred but not been reported.
LSRs accessed: DATE TIME

CW3E Event Summary: 12 – 14 February 2025

Impacts: Flooding

Credit: CAL FIRE CZU
(https://x.com/CALFIRECZU/status/1890076732650377614)

Credit: CHP Dublin Area
(https://x.com/CHPDublin/status/1890088049863983342)



Credit: NBC 7 San Diego
https://www.nbcsandiego.com/news/local/flooding-downed-trees-left-behind-by-san-diegos-most-powerful-storm-yet-this-season/3755302/

- Flood waters along the San Lorenzo River crested at action stage in Santa Cruz County (*left*).
- Heavy rains in Alameda County, near the Bay Area, caused water to pool along the Southbound 680 at the 580 interchange resulting in lane closures (*center left, center right*).
- San Diego flooding was seen under the I-5 near the onramp at 17th Avenue (*right*).

CW3E Event Summary: 12 – 14 February 2025

Impacts: Northern California Landslides & Debris Flows

Credit: Caltrans District 8
(https://x.com/Caltrans8/status/1890554084232466743)

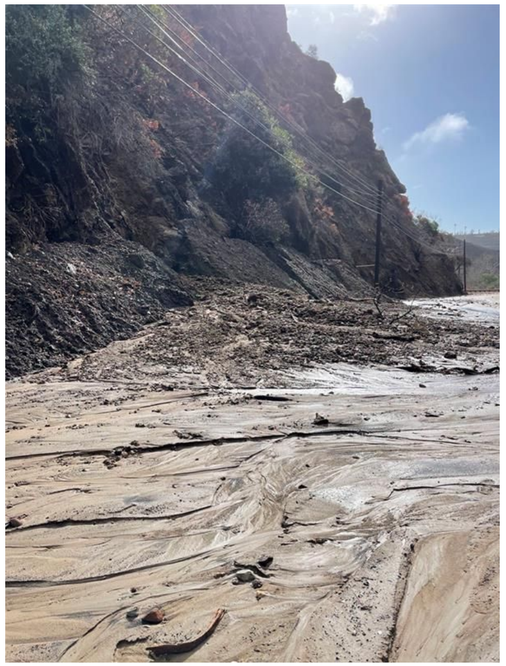
Credit: Caltrans District 4
(https://x.com/CaltransD4/status/1890475105836306908)

CHP Santa Cruz (https://x.com/CHPscrz/status/1890091906086105334)

- SR-330 in San Bernardino County fully blocked by a major debris flow within the Line Fire (2024) burn scar (*left*).
- A landslide occurred along US 101 between Marin City and Spencer Ave in Marin County (*center left)*
- Debris from a landslide in Santa Cruz blocks Soquel San Jose Rd. (*center right, right)*

CW3E Event Summary: 12 – 14 February 2025

Impacts: Southern California Debris Flows



Debris flows onto the Pacific Coast Highway (*left*) and material covering Topanga Canyon Boulevard after a significant debris flow, both within the Palisades Fire Burn.
Credit: Caltrans District 7 (https://x.com/CaltransDist7/status/1890150590044614933, https://x.com/CaltransDist7/status/1890510423134208062)

A debris basin in Bailey Canyon captures a significant amount of material which flowed from the Eaton Fire burn car
Credit: Alert California (https://alertcalifornia.org/)

- As defined by the California Geological Survey, debris flows are geological hazards consisting of a fast-moving slurry of water, rock, soil, vegetation, and other materials - often triggered by short-duration, high intensity rainfall.
- Burn scars of recent fires, such as those from the Palisades and Eaton fires, are especially susceptible to debris flows - which are described more specifically as post-wildfire debris flows.

CW3E Event Summary: 12 – 14 February 2025

F. Martin Ralph (UCSD/SIO/CW3E) - PI
Vijay Tallapragada (NWS/NCEP) - Co-PI
Anna Wilson (UCSD/SIO/CW3E) - Coordinator

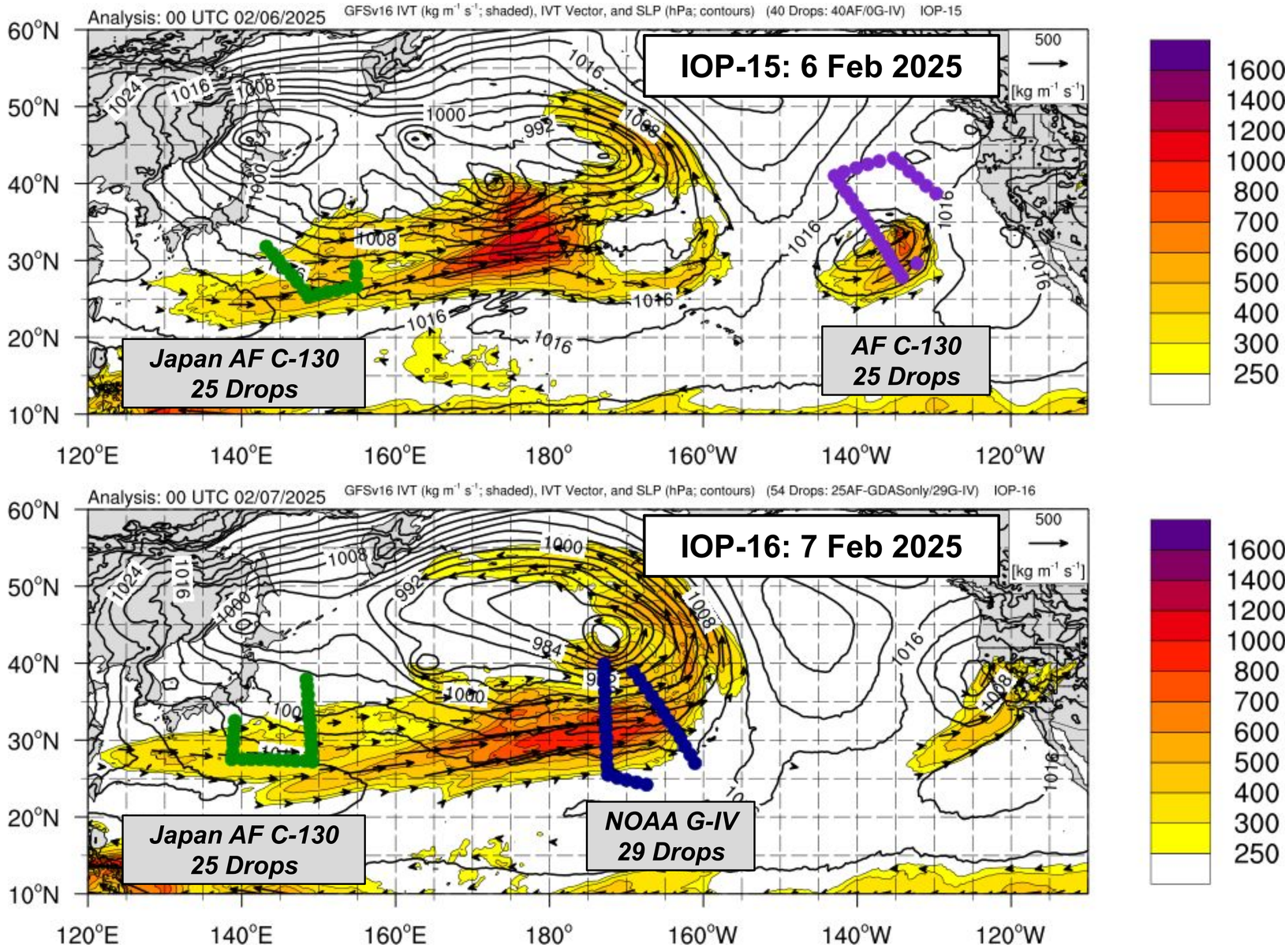
AR Recon Flights

- In coordination with NOAA and the Air Force, CW3E's Atmospheric River Reconnaissance (AR Recon) field campaign successfully carried out multiple flights into this system as it developed and moved over the North Pacific

- This AR Recon sequence feature a series of flights from Yokota, Japan - new for this AR Recon season - designed to sample ARs and related atmospheric features well upstream as they develop over the Pacific

- These AR Recon flights the targeted the AR, as well as nearby essential atmospheric features and regions of high forecast sensitivity.

- Flights from Japan during this sequence targeted a long, narrow corridor of elevated atmospheric moisture across the N. Pacific

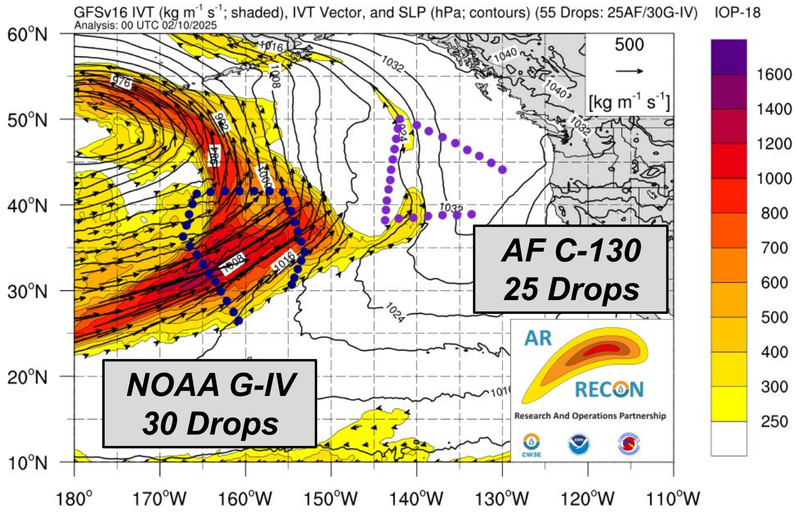


CW3E Event Summary: 12 – 14 February 2025

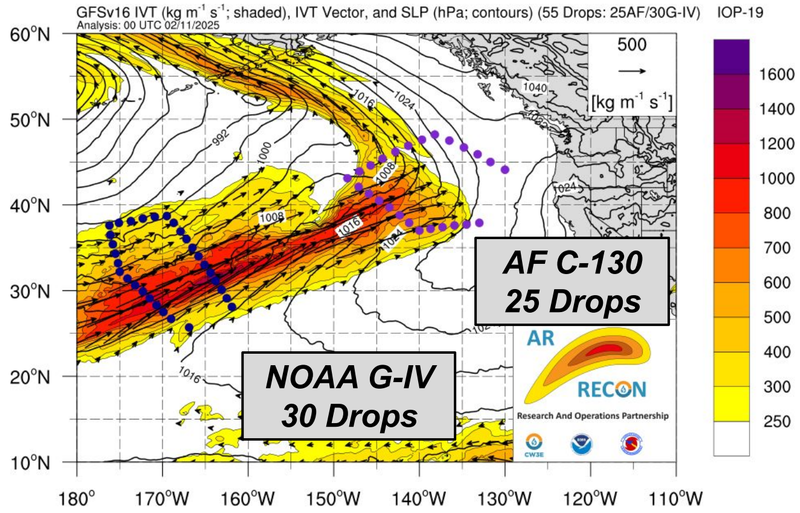
F. Martin Ralph (UCSD/SIO/CW3E) - PI
Vijay Tallapragada (NWS/NCEP) - Co-PI
Anna Wilson (UCSD/SIO/CW3E) - Coordinator

AR Recon Flights

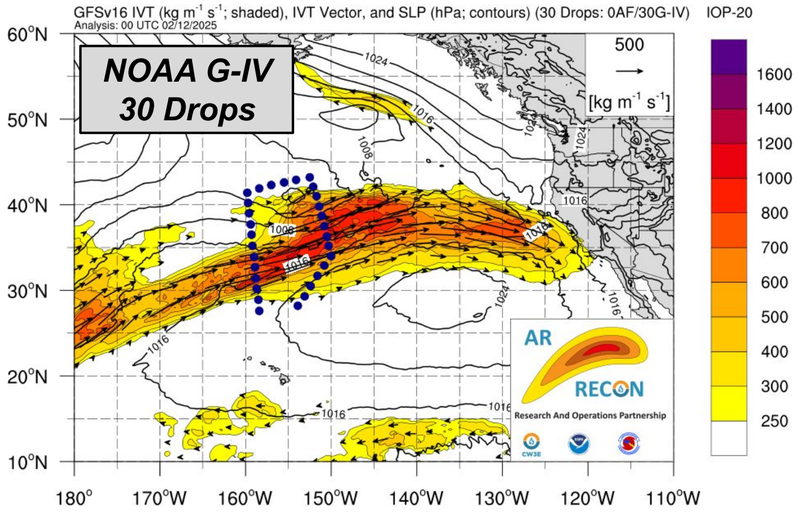
IOP-18: 10 Feb 2025



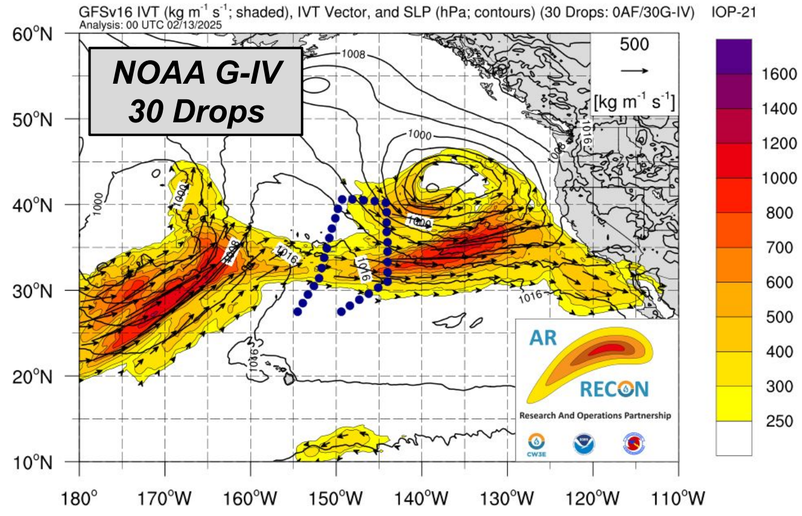
IOP-19: 11 Feb 2025



IOP-20: 12 Feb 2025



IOP-21: 13 Feb 2025



- In addition to the new flights from Japan, regular flights by the NOAA G-IV from Hawaii and USAF C-130s from California continued.
- These flights targeted the AR and it's related atmospheric features as it strengthened north of Hawaii and moved onshore over California.
- Data from these flights were assimilated in near-real time into global forecast models and will be archived for future research purposes.