

CW3E Winter Storm Outlook: 4 November 2022

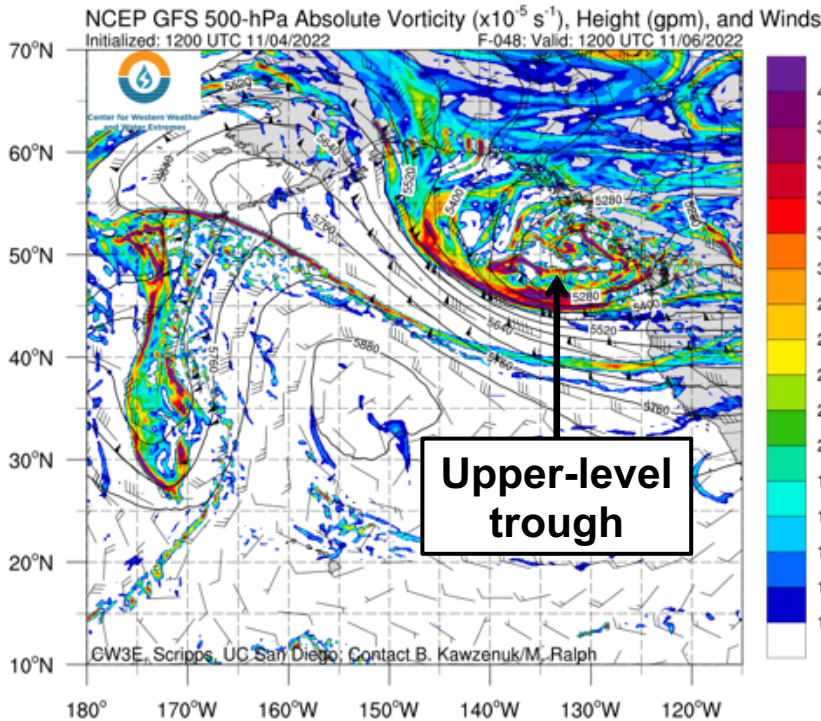
Major Winter Storm Expected to Impact California Early Next Week

- An early-season winter storm is forecast to bring precipitation to much of California, with heavy snow likely in the Sierra Nevada
- Precipitation during this event will be fueled by a combination of strong dynamical forcing downstream of an upper-level trough and upslope moisture flux as the trough interacts with a weakening atmospheric river (AR) currently over the Pacific Northwest
- The heaviest precipitation is forecast over the Sierra Nevada, eastern Transverse Ranges, and Peninsular Ranges, with 3–6 inches of total precipitation expected in these areas
- There is still considerable uncertainty in storm-total precipitation over Central and Southern California, with large differences between the 00Z GFS and 00Z ECMWF models
- Due to low freezing levels, a significant portion of the storm-total precipitation is expected to fall as snow in the watersheds surrounding the Sierra Nevada
- More than 2 feet of snow is forecast over the much of the Sierra Nevada

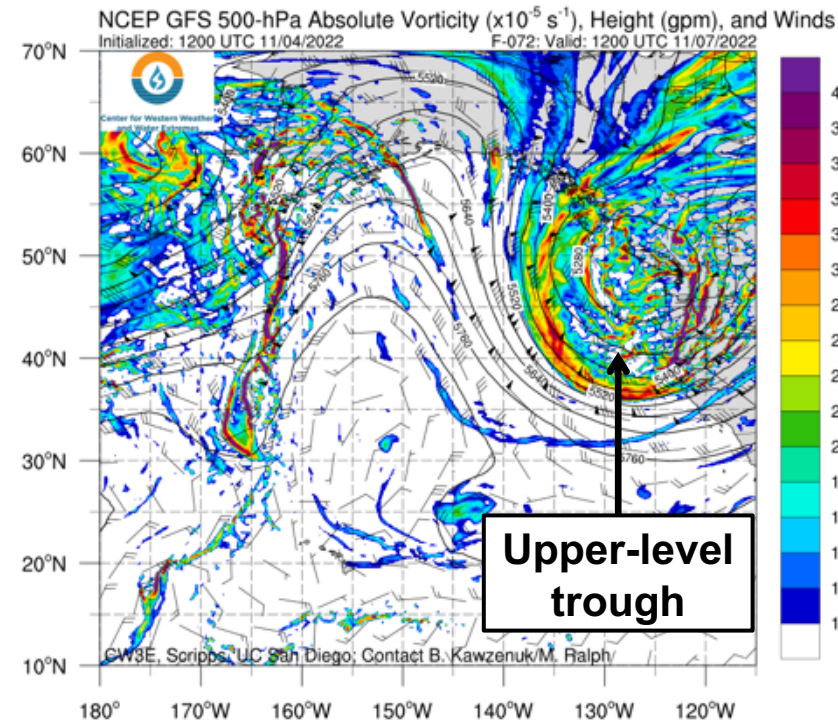
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GFS Forecasts of 500-hPa Absolute Vorticity, Heights, and Wind

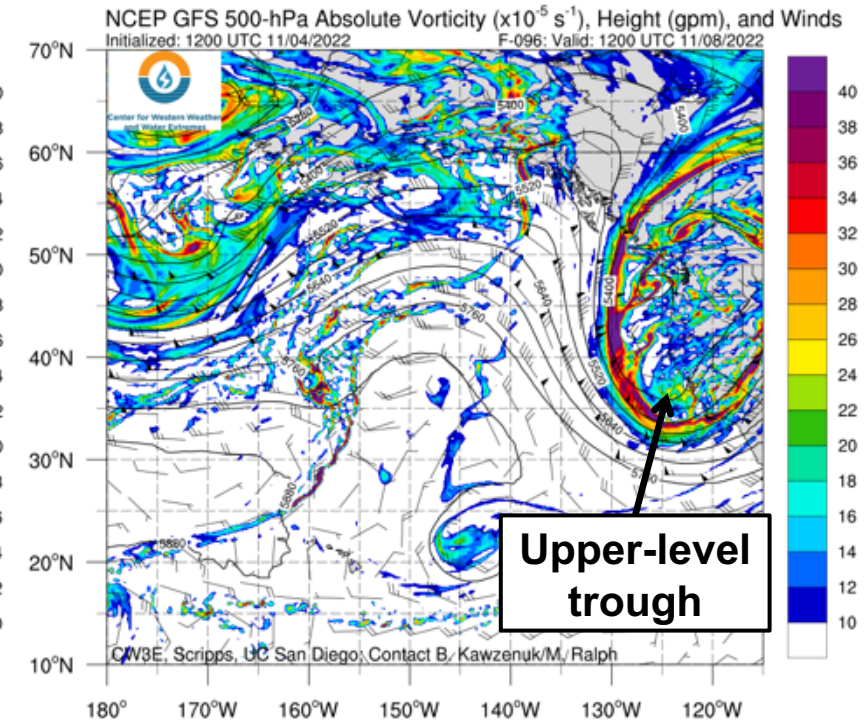
(A) Valid: 4 AM PT 6 Nov (F-48)



(B) Valid: 4 AM PT 7 Nov (F-72)



(C) Valid: 4 AM PT 8 Nov (F-96)

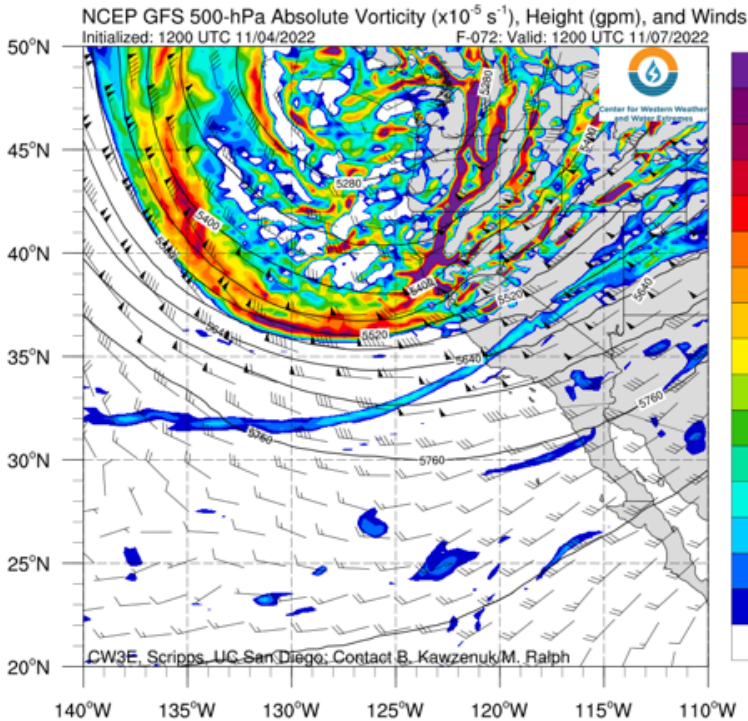


- As the AR currently impacting the Pacific Northwest moves southward and weakens, an upper-level shortwave trough is forecast to develop and deepen along the US West Coast
- The slow-moving nature of this trough will result in a prolonged period of unsettled weather over California and the interior southwestern US

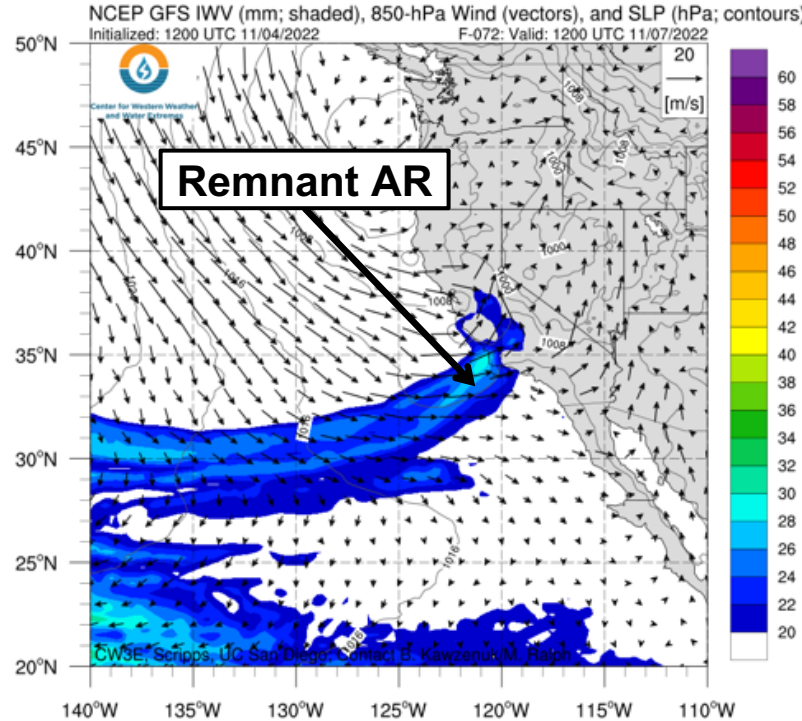
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GFS Model Forecasts: Valid 4 AM PT 7 Nov (F-72)

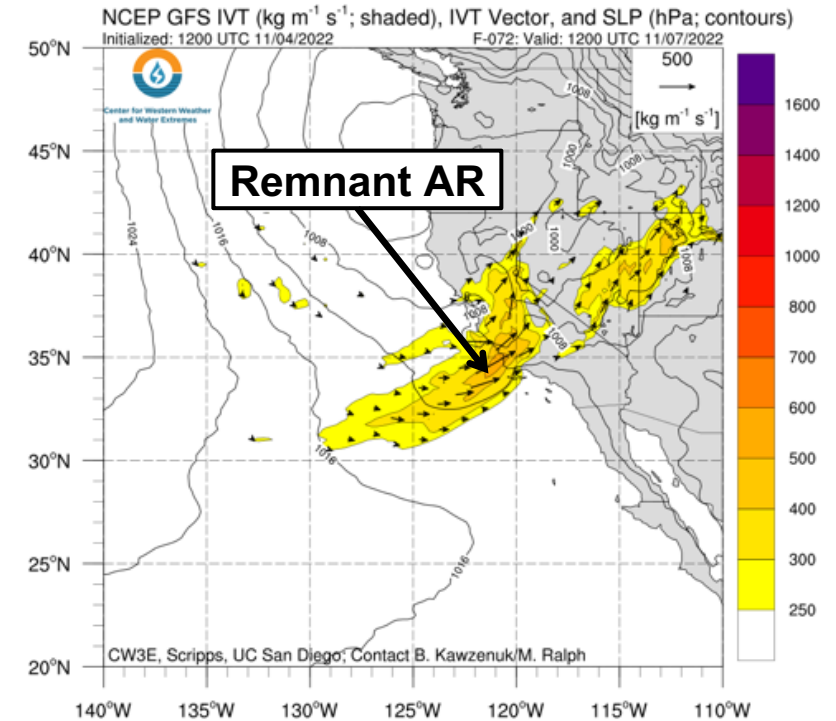
500-hPa Vorticity, Height, and Wind



IWV, SLP, and 850-hPa Wind



IVT and SLP

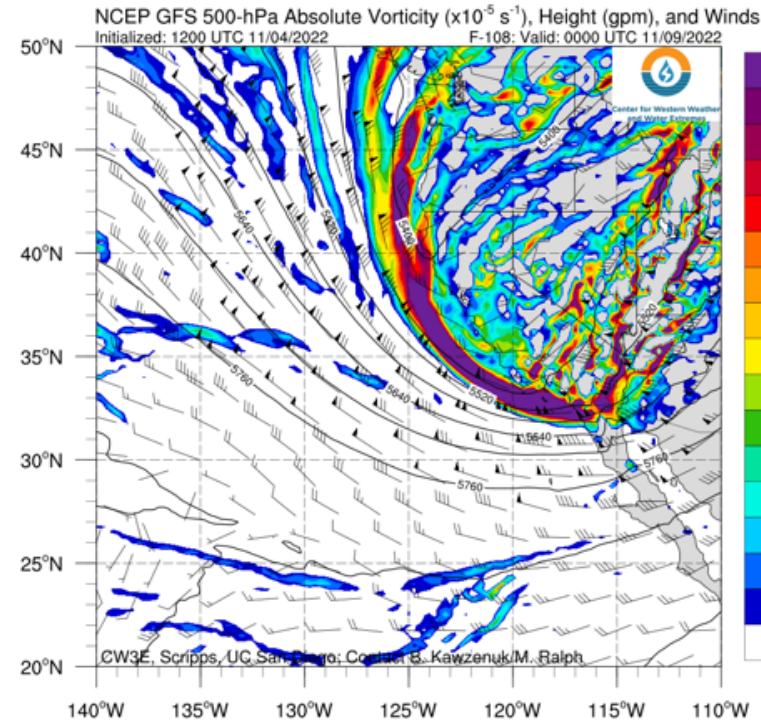


- The upper-level trough will provide a focus for strong dynamical forcing for precipitation over California
- In addition, the upper-level trough is forecast to interact with the remnant AR, leading to a re-intensification of the moisture transport over Central and Southern California on 7–8 Nov
- Strong low-to-midlevel southwesterly flow near the leading edge of the remnant AR will likely lead to orographic enhancement of precipitation over the Sierra Nevada and Transverse Ranges

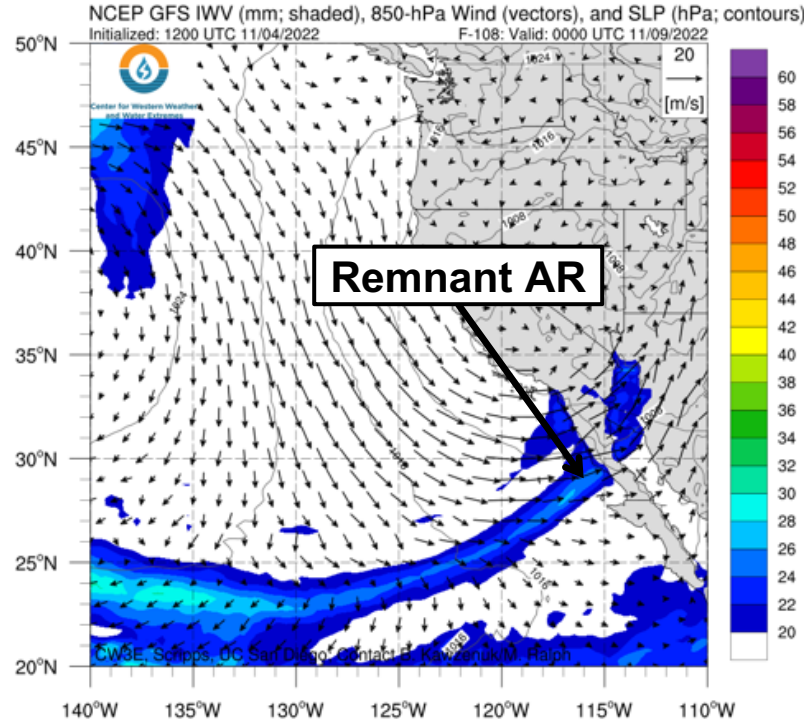
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GFS Model Forecasts: Valid 4 PM PT 8 Nov (F-108)

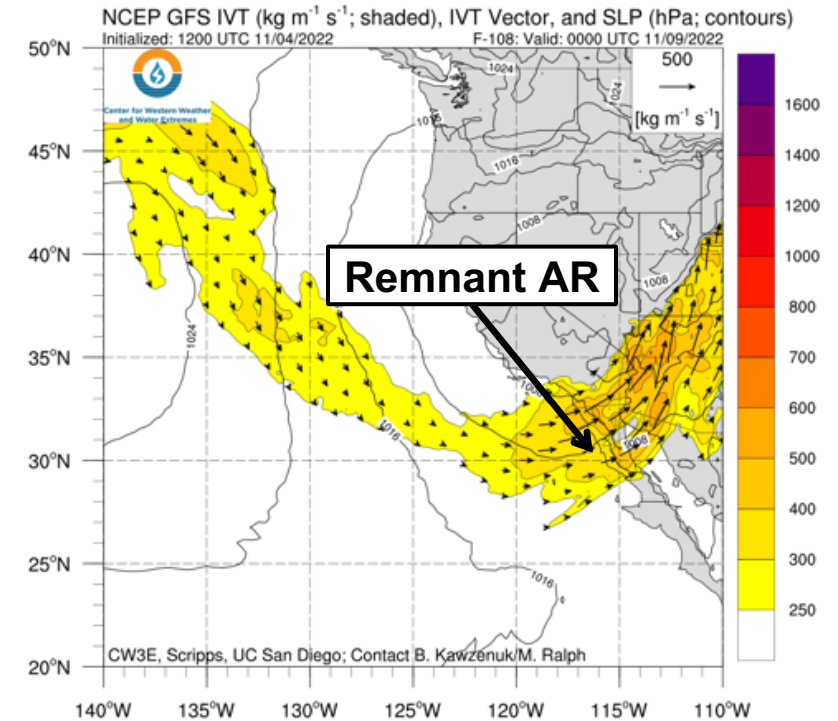
500-hPa Vorticity, Height, and Wind



IWV, SLP, and 850-hPa Wind



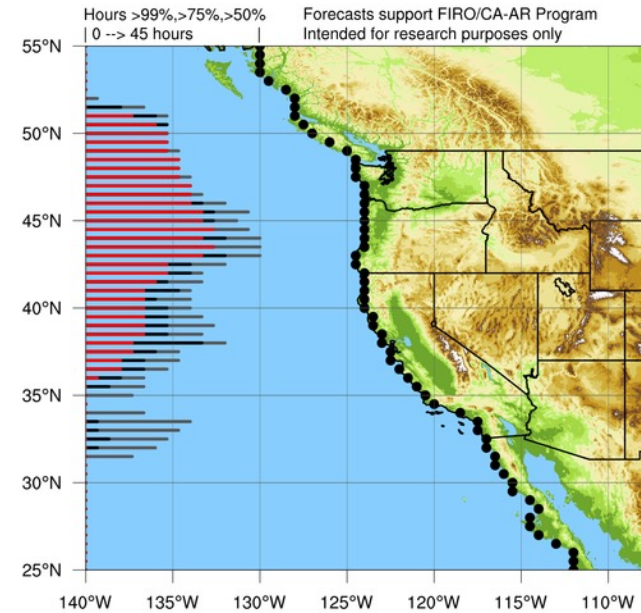
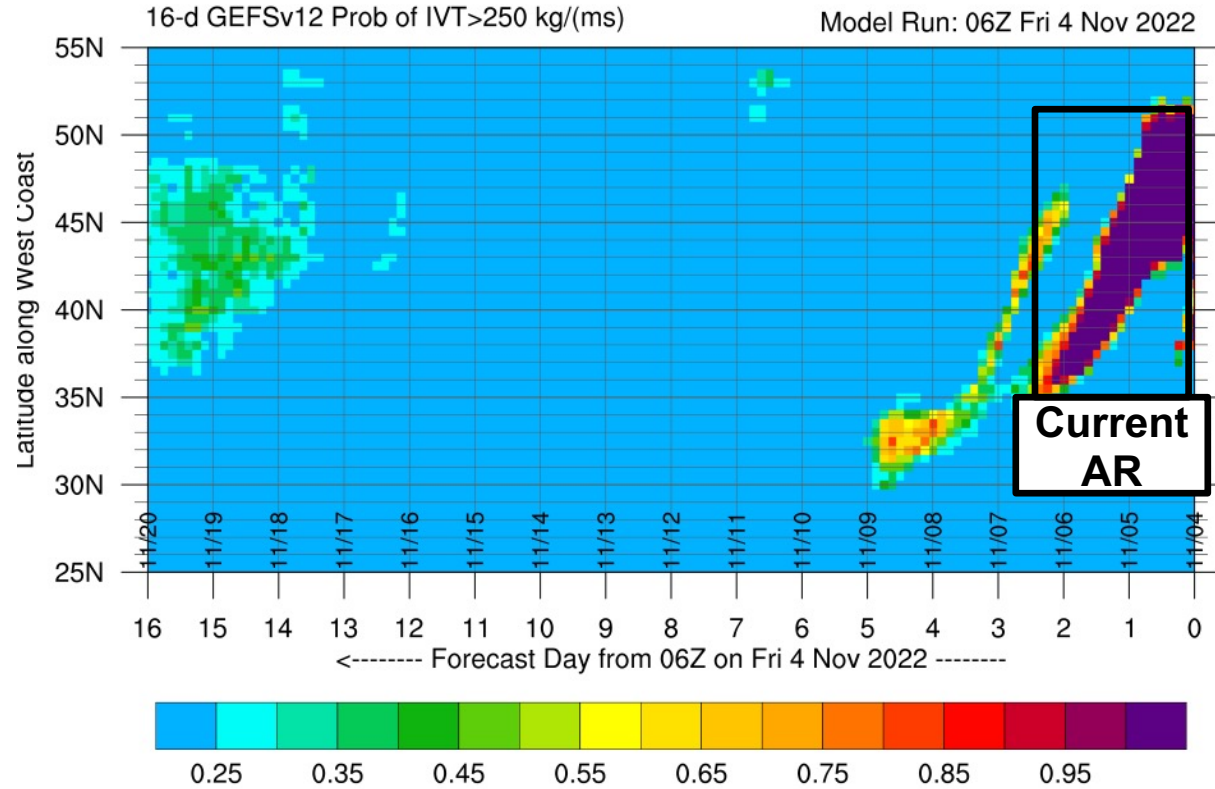
IVT and SLP



- As time progresses, the upper-level trough is forecast to eventually move onshore, bringing widespread precipitation to the interior southwestern US
- Moisture transport in the vicinity of the remnant AR is forecast to continue to strengthen, with IVT values potentially exceeding $500 \text{ kg m}^{-1} \text{ s}^{-1}$ over western Arizona at 00Z 9 Nov (4 PM PT 8 Nov)
- Strong upslope moisture flux will likely lead to orographic enhancement of precipitation in the higher terrain of southwestern Utah

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Probability of AR Conditions Along Coast



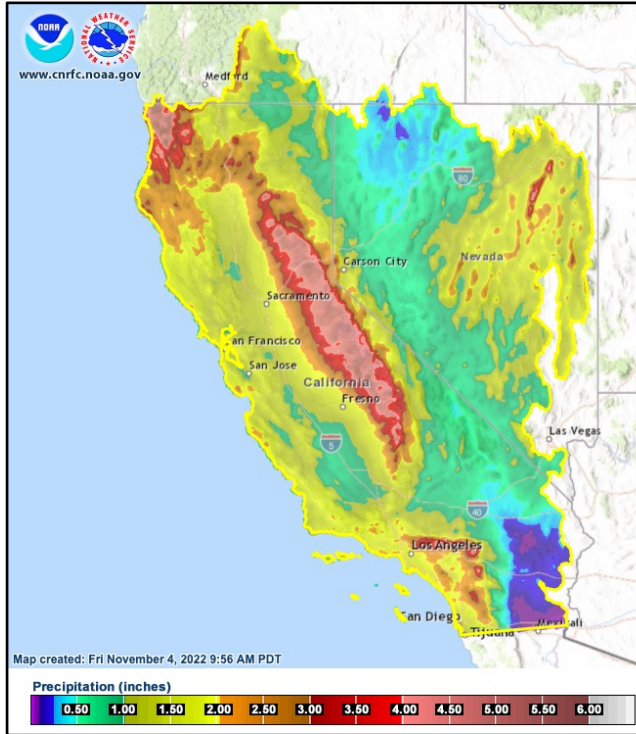
*GEFS = NCEP Global Ensemble Forecast System (United States)

- The 06Z GEFS is showing very high confidence (> 95% probability) in a period of AR conditions ($IVT > 250 \text{ kg m}^{-1} \text{ s}^{-1}$) over coastal Northern and Central California in association with the current AR
- There is also moderate-to-high confidence (60–80% probability) in a brief period of AR conditions over Southern California on 7–8 Nov as the upper-level trough interacts with the remnant AR

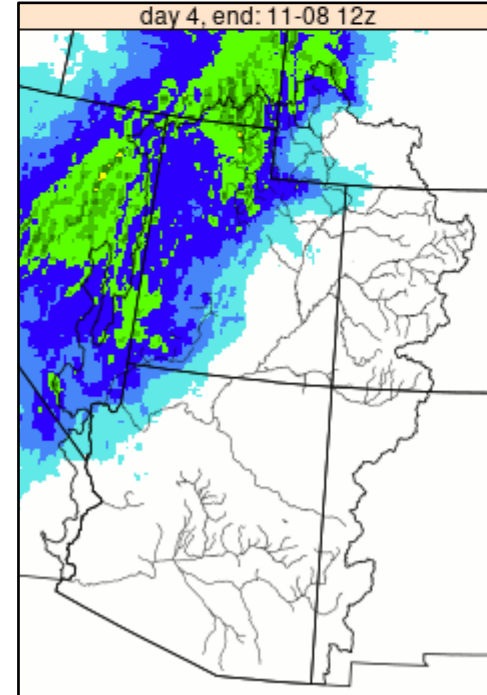
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Precipitation Forecasts

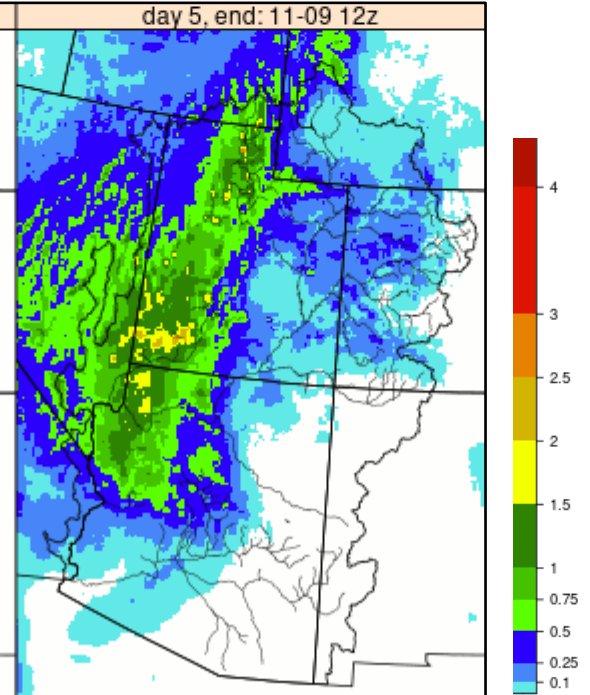
CNRFC 6-day QPF:
Valid 4 AM PT 10 Nov



CBRFC 24-h QPF
Valid 4 AM PT 8 Nov



CBRFC 24-h QPF
Valid 4 AM PT 9 Nov

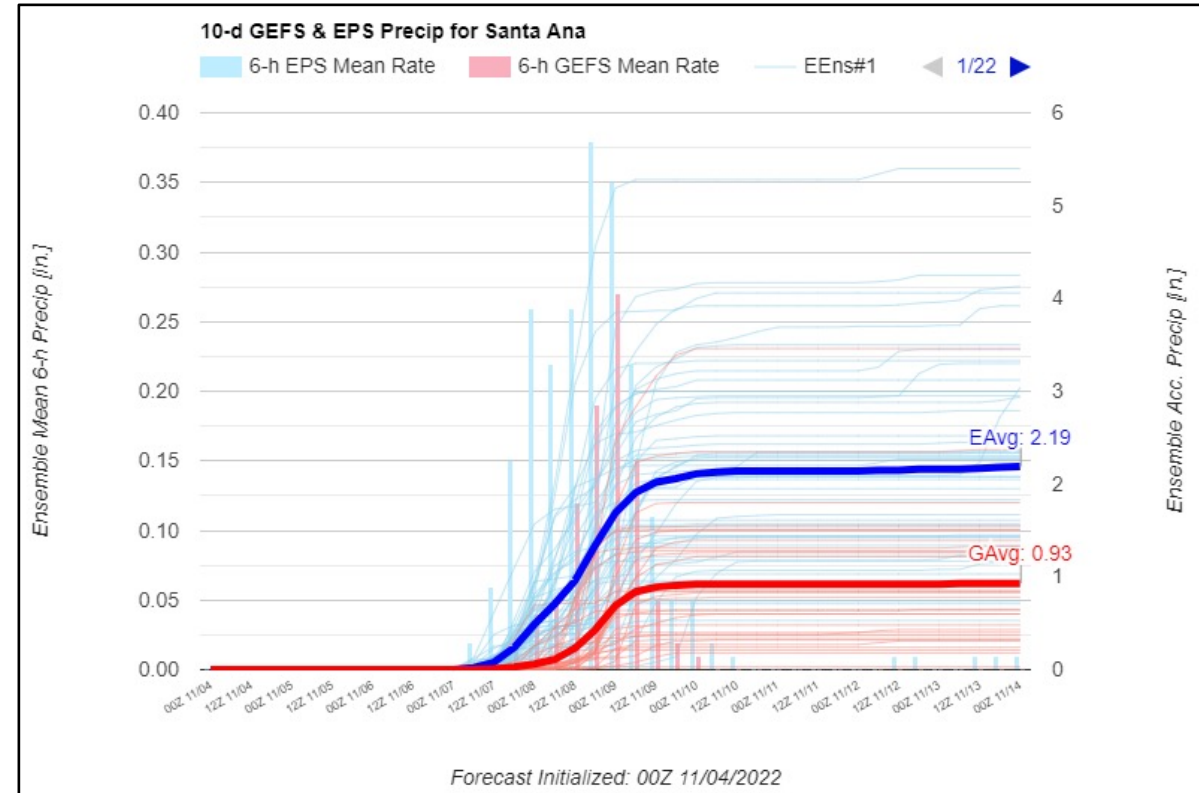
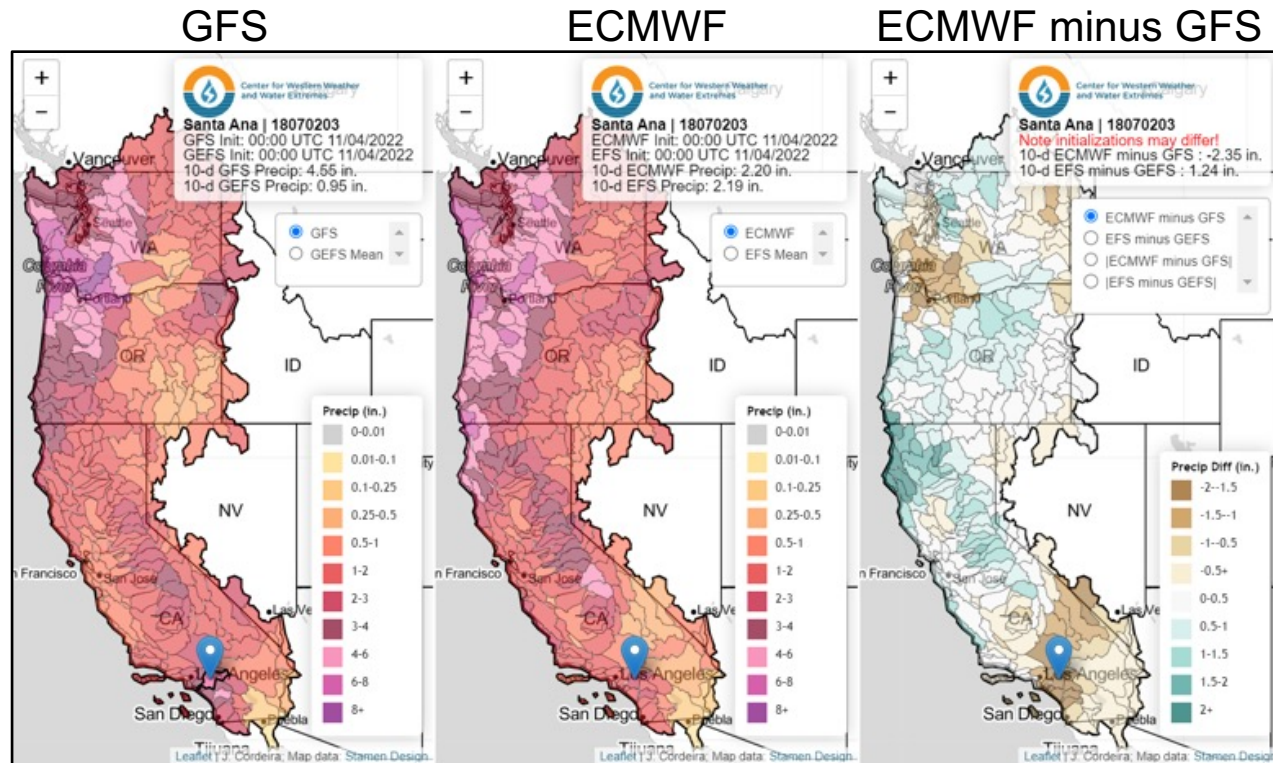


Source: NOAA/NWS Colorado Basin River Forecast Center

- This storm is forecast to bring widespread precipitation to much of California between Sunday and Wednesday
- The highest precipitation amounts (3–6 inches) are forecast in the Sierra Nevada, the eastern Transverse Ranges, and the Peninsular Ranges
- At least 1–3 inches are forecast over coastal portions of Central and Southern California, as well as the Central Valley and the Eastern Sierra
- As the upper-level trough moves onshore, additional precipitation is expected over portions of Colorado River Basin, with more than 2 inches possible across the higher terrain in eastern Nevada and Utah

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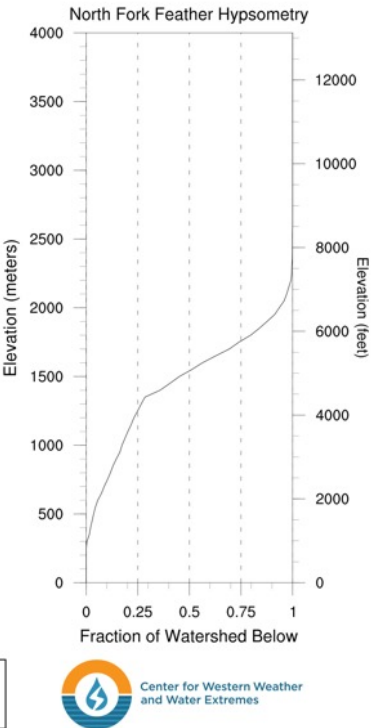
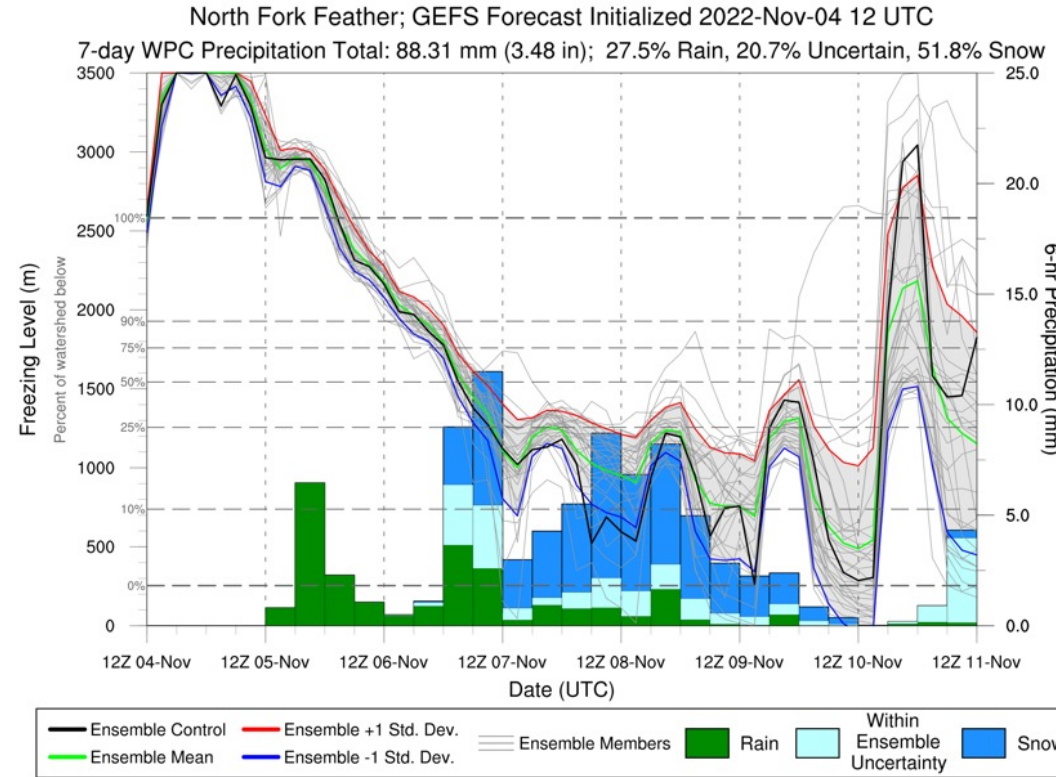
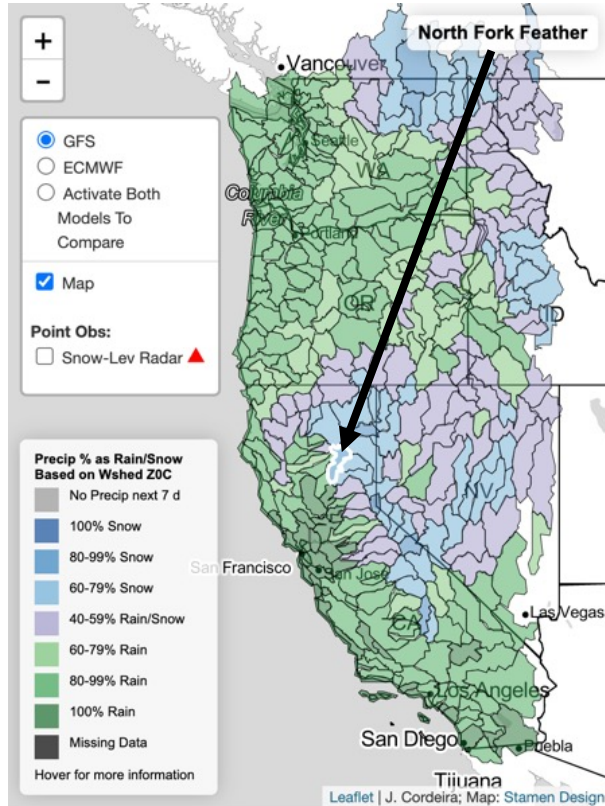
10-day Watershed Precipitation Forecasts



- There is a considerable amount of uncertainty in forecast precipitation over California
- Compared to the 00Z GFS deterministic run, the 00Z ECMWF deterministic run is forecasting higher precipitation over Southern California and lower precipitation over the Northern and Central Sierra Nevada
- For example, the 00Z GFS is forecasting 4.55 inches of watershed mean precipitation in the Santa Ana watershed during the next 10 days, whereas the 00Z ECMWF is only forecasting only 2.20 inches of watershed mean precipitation
- The NCEP and ECMWF ensembles are showing the opposite pattern (EPS mean is higher than GEFS mean)

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Watershed Freezing Level Forecasts



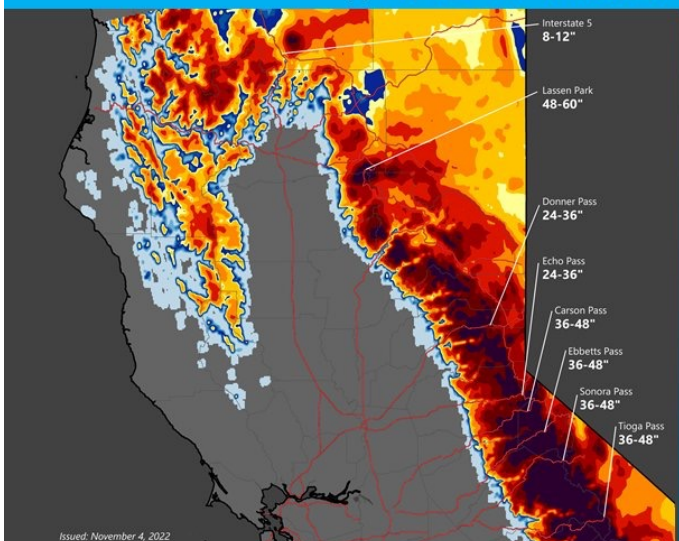
- Due to lower freezing levels, a significant portion of the precipitation from this storm is forecast to fall as snow in the watersheds surrounding the Sierra Nevada
- Freezing levels in the Northern Sierra Nevada are forecast to drop below 4,000 feet by Monday morning, potentially dropping as low as 1,000–2,000 feet on Tuesday and Wednesday

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Snowfall Forecasts

Snow Forecast



National Weather Service - Sacramento, CA
 weather.gov/sto

Updated: Friday, November 4, 2022

Impact



Chain controls and travel delays



Reduced visibility



Strong winds and blowing snow

Snow Levels



5500-6500 feet Sunday, dropping to 2500-3500 feet by Monday morning

Timing



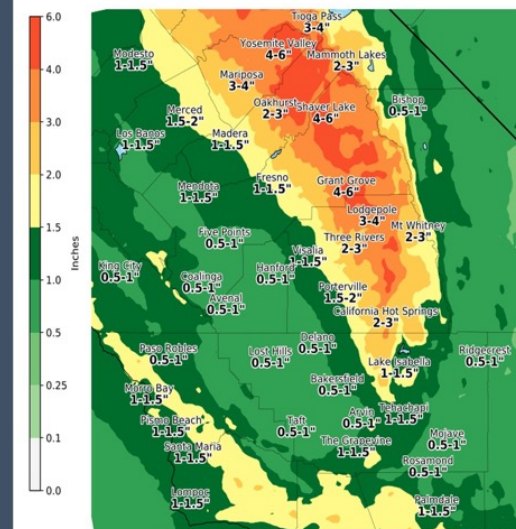
Afternoon on Sunday November 6 - overnight on Tuesday November 8, 2022

Projected Precip Sunday Afternoon Into Wednesday Morning

Information as of Friday, November 4th, 2022 at 6:30 AM PDT

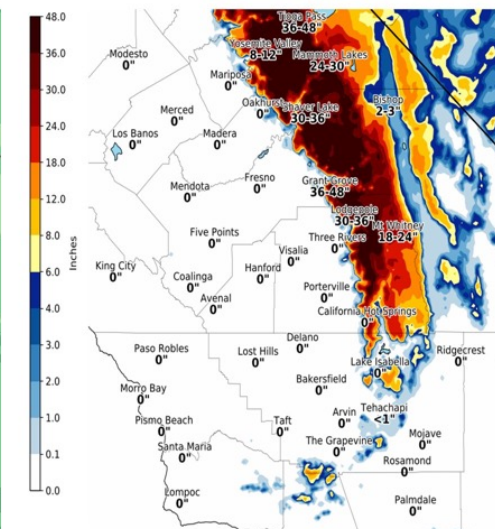
Projected Rainfall Amounts

Valid: 11/6/2022 11:00 AM PST - 11/9/2022 11:00 AM PST



Projected Snowfall Amounts

Valid: 11/6/2022 11:00 AM PST - 11/9/2022 11:00 AM PST



Hanford, CA
 WEATHER FORECAST OFFICE

<http://www.weather.gov/hnx>

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November 4, 2022

- This storm is forecast to produce at least 2–4 feet of snow over much of the Sierra Nevada
- Significant snowfall accumulations are also possible in the higher terrain of the Klamath Mountains and Northern California Coast Ranges
- Heavy snow and strong winds will likely cause very dangerous travel conditions, especially near mountain passes