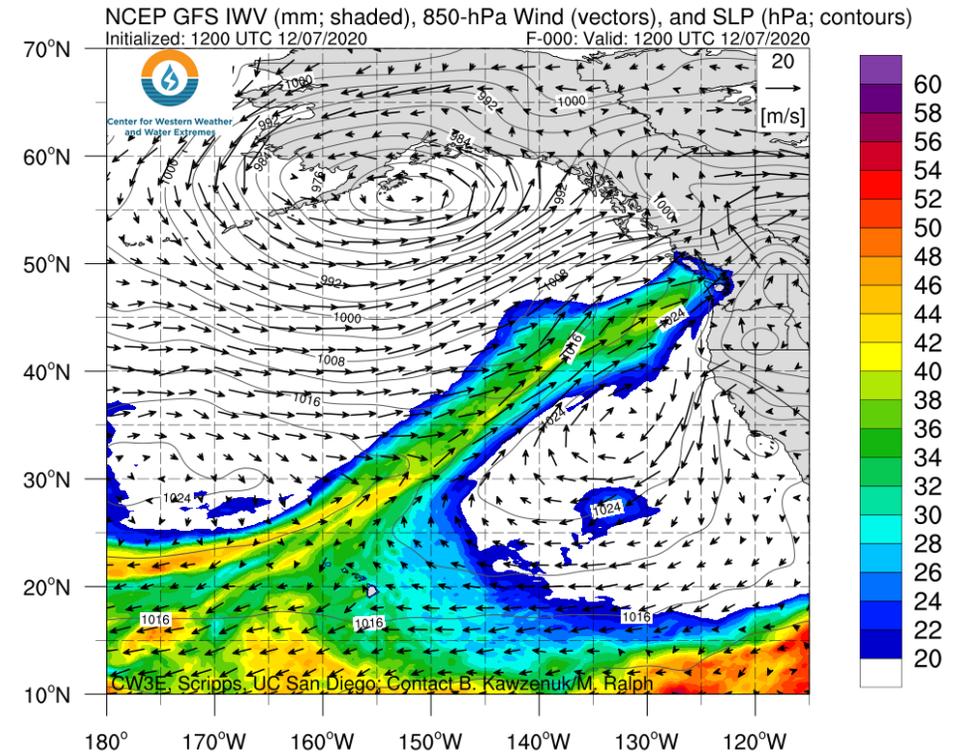
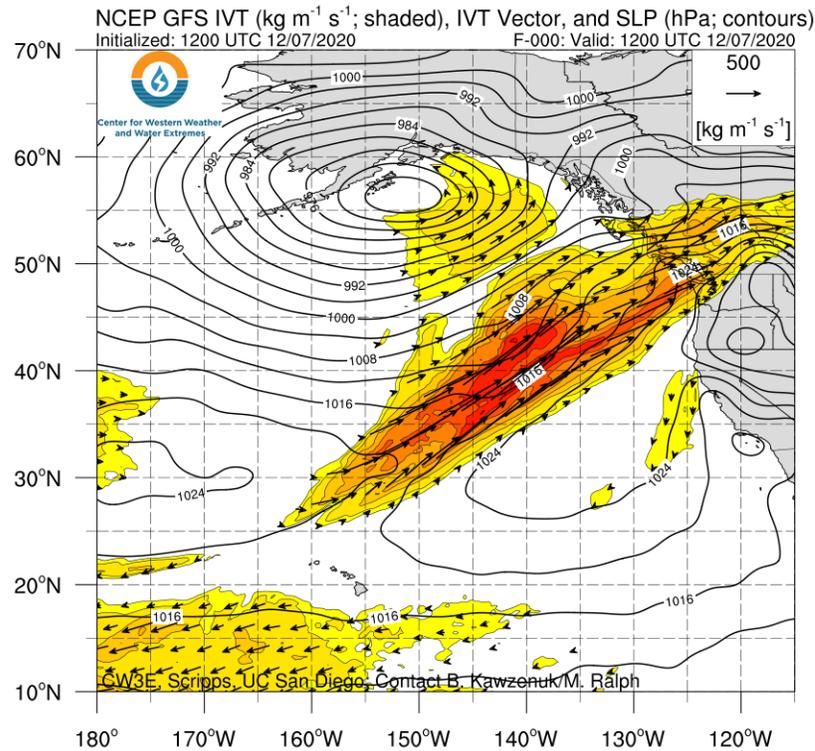


## Multiple AR landfalls possible along the U.S. West Coast during the next 7 days

- An AR over the Northeast Pacific Ocean will bring a period of AR conditions to southern British Columbia and Washington today and tomorrow
- AR 2/AR 3 conditions (based on the Ralph et al. 2019 AR Scale) are forecast over coastal Washington in association with this landfalling AR
- More than 2 inches of precipitation are possible across the Olympic Peninsula and North Cascades
- A second AR may impact the U.S. West Coast this weekend, but forecast uncertainty is still very large

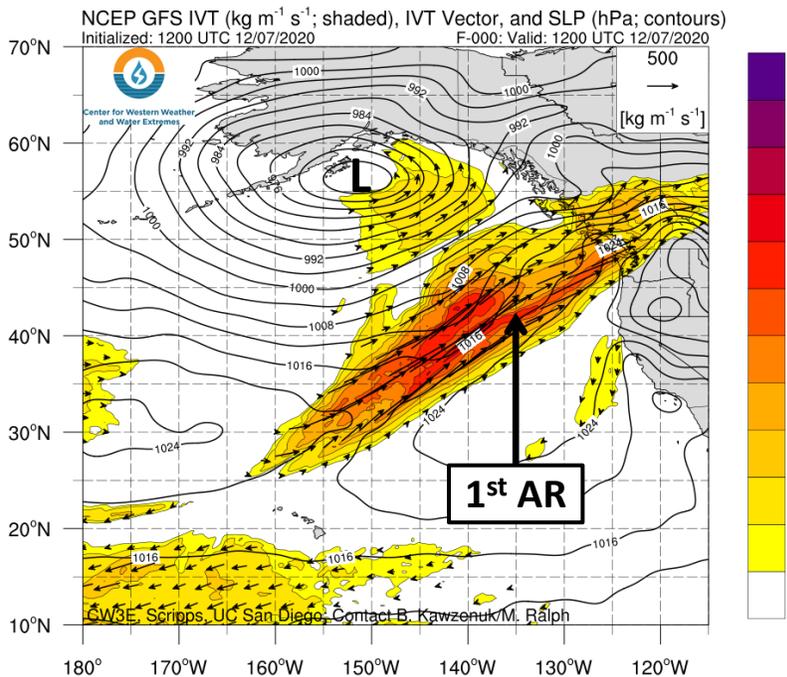


# AR Outlook: 7 Dec 2020

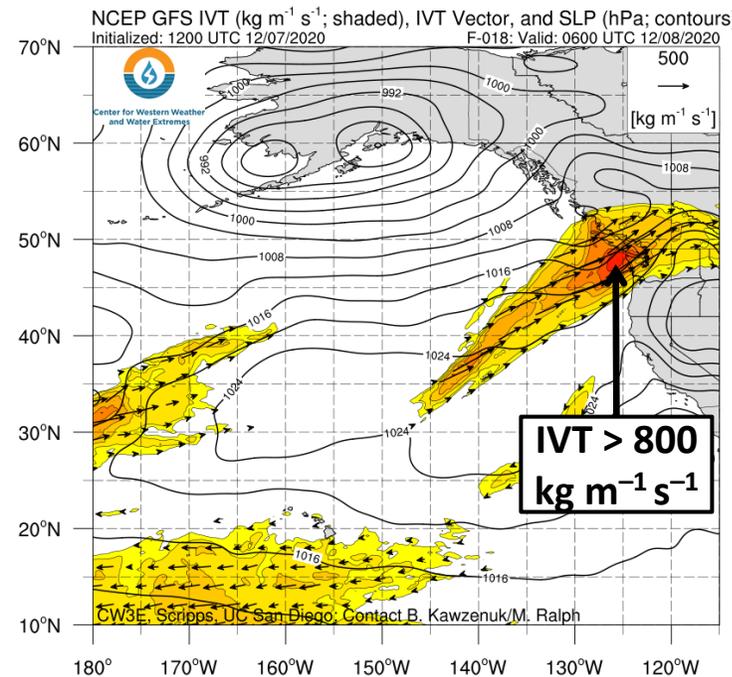
For California DWR's AR Program

## GFS IVT & SLP Forecasts

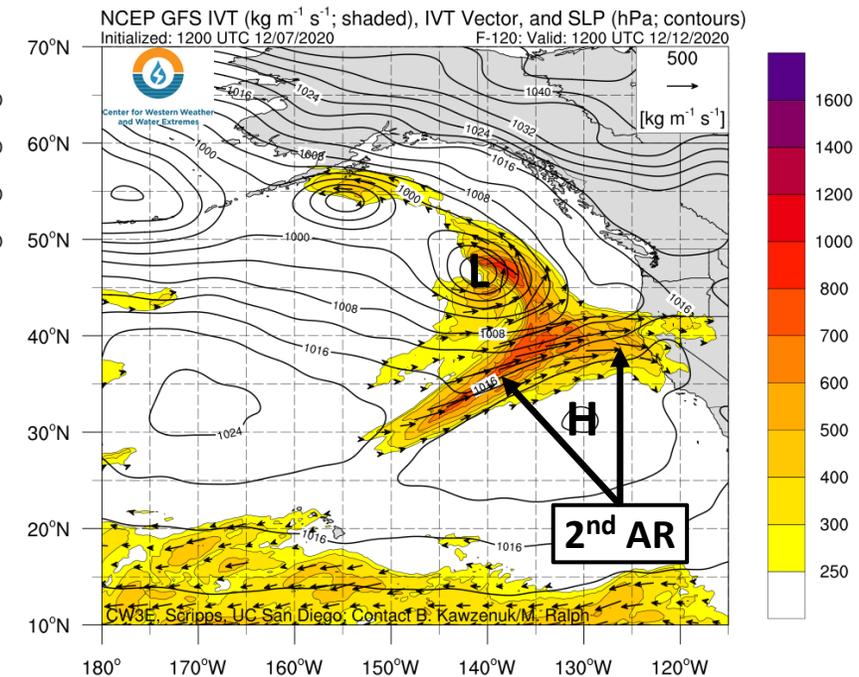
A) Valid 1200 UTC 7 Dec (F-000)



B) Valid 0600 UTC 8 Dec (F-018)



C) Valid 1200 UTC 12 Dec (F-120)

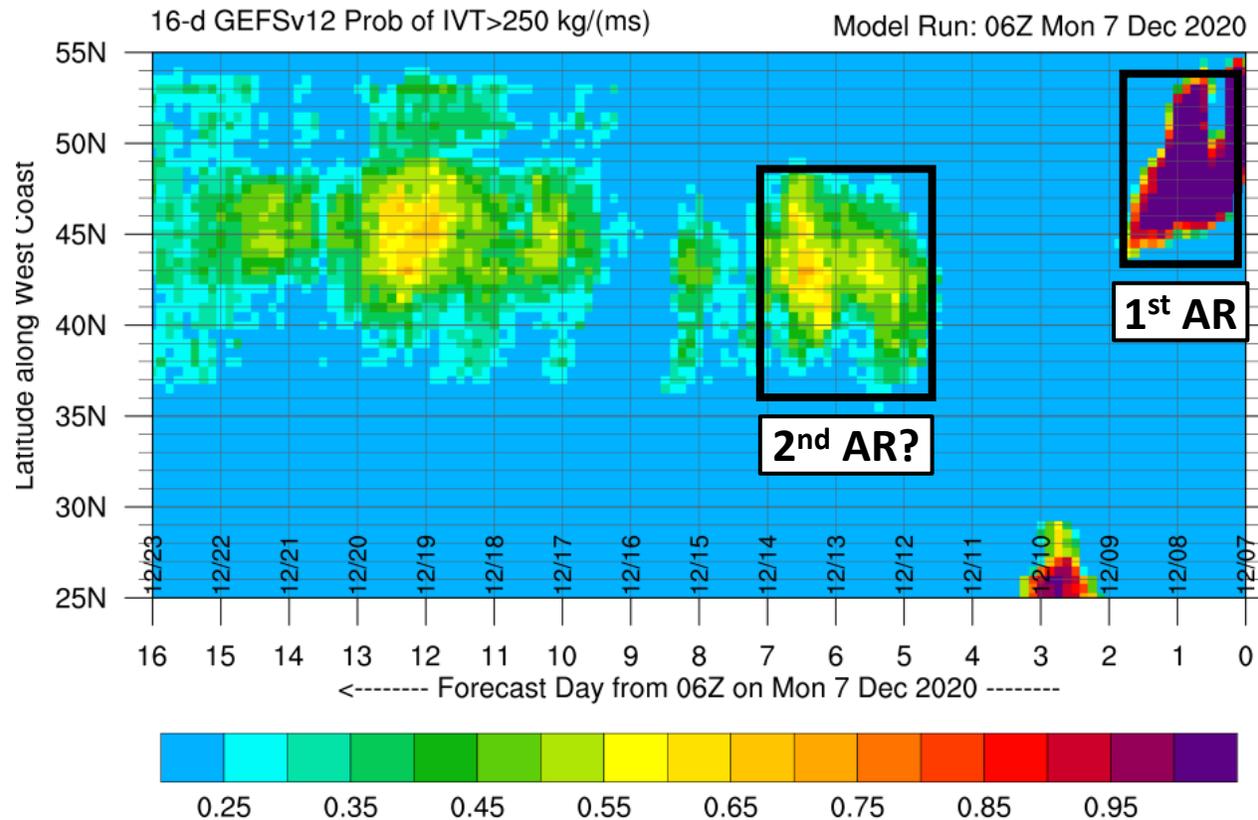


- The first AR made landfall early this morning over southern British Columbia and western Washington (Figure A)
- Moisture transport is expected to peak around 06Z 8 Dec (late this evening), with IVT values approaching  $800 \text{ kg m}^{-1} \text{ s}^{-1}$  over the Olympic Peninsula (Figure B)
- The second AR is forecast to make landfall over Northern California on 12 Dec on the northern periphery of a weak anticyclone in the subtropical Northeast Pacific Ocean (Figure C)

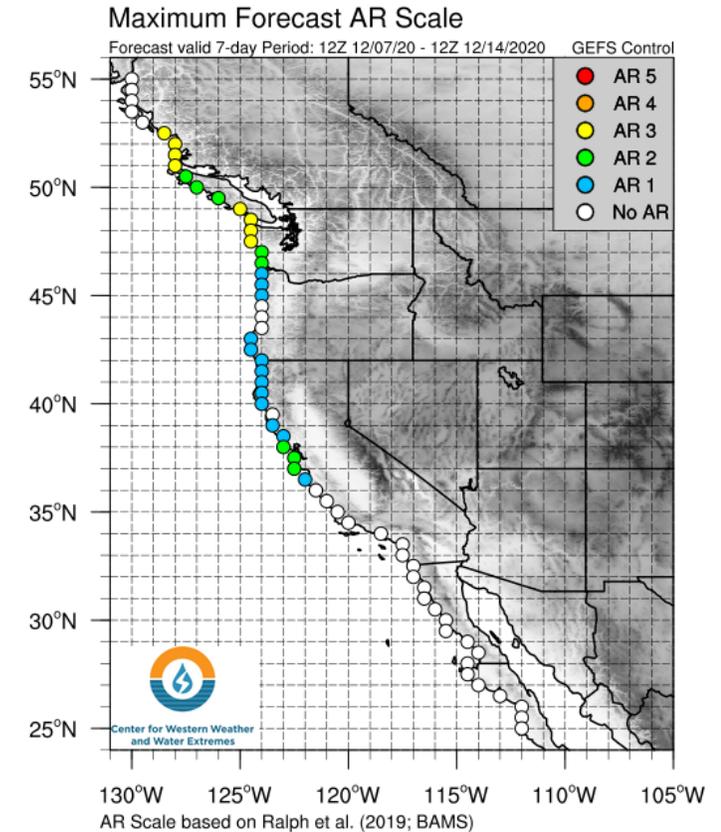
# AR Outlook: 7 Dec 2020

For California DWR's AR Program

## Probability of AR Conditions: Coastal Transect



## AR Scale: Coastal Transect



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

- 06Z GEFS AR landfall tool shows very high confidence (> 95% probability) in a period of AR conditions ( $IVT \geq 250 \text{ kg m}^{-1} \text{ s}^{-1}$ ) over Vancouver Island and coastal Washington between now and 00Z 9 Dec
- AR 2/AR 3 conditions (based on the Ralph et al. 2019 AR Scale) are forecast in association with the first landfalling AR
- A second period of landfalling AR activity is possible (> 50% probability) along the U.S. West Coast during 12–13 Dec
- The 12Z GEFS control member is currently forecasting AR 1/AR 2 conditions over coastal Central and Northern California in association with the second landfalling AR, but forecast uncertainty in AR magnitude and duration is still very large

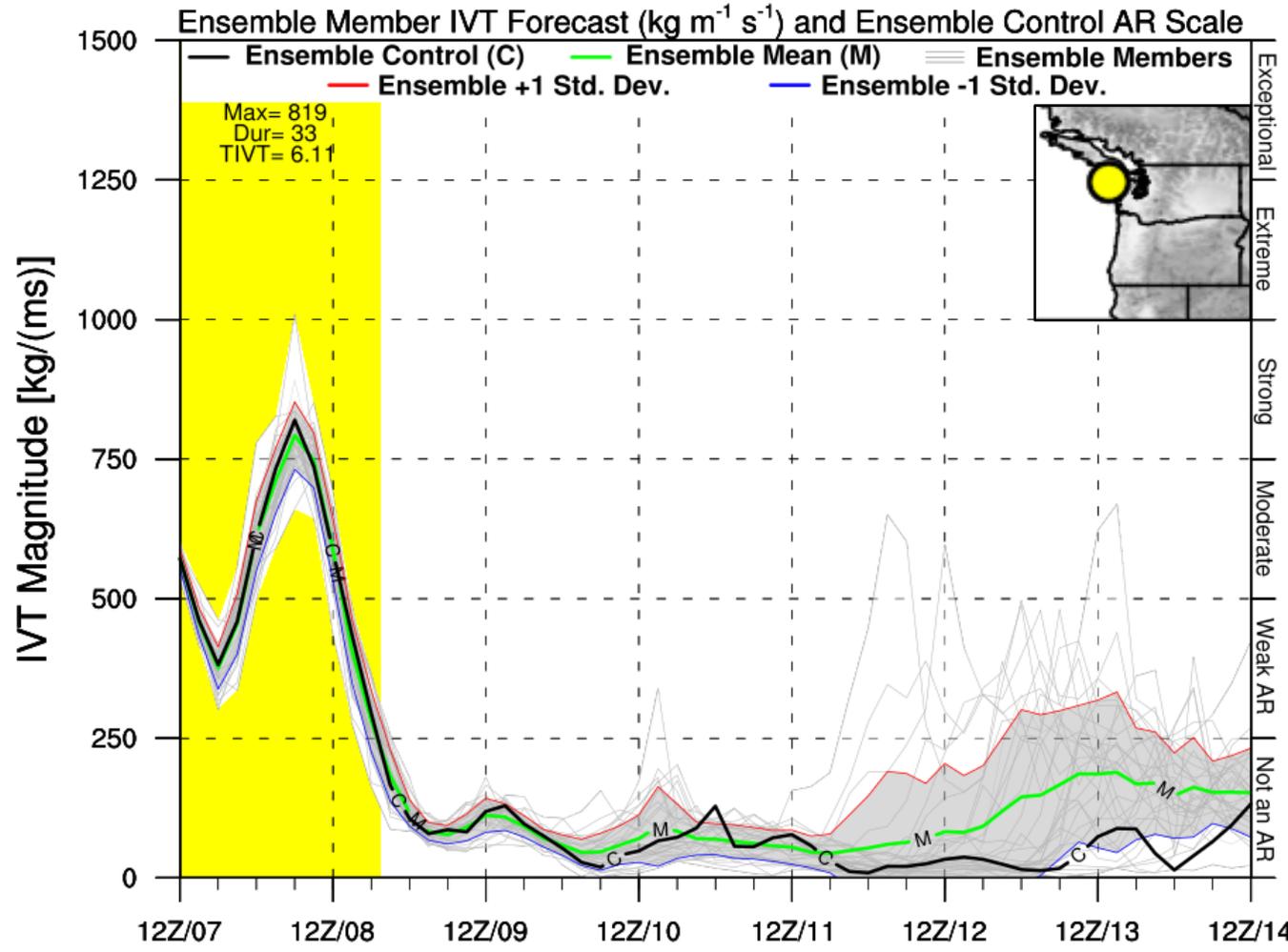
# AR Outlook: 7 Dec 2020

For California DWR's AR Program



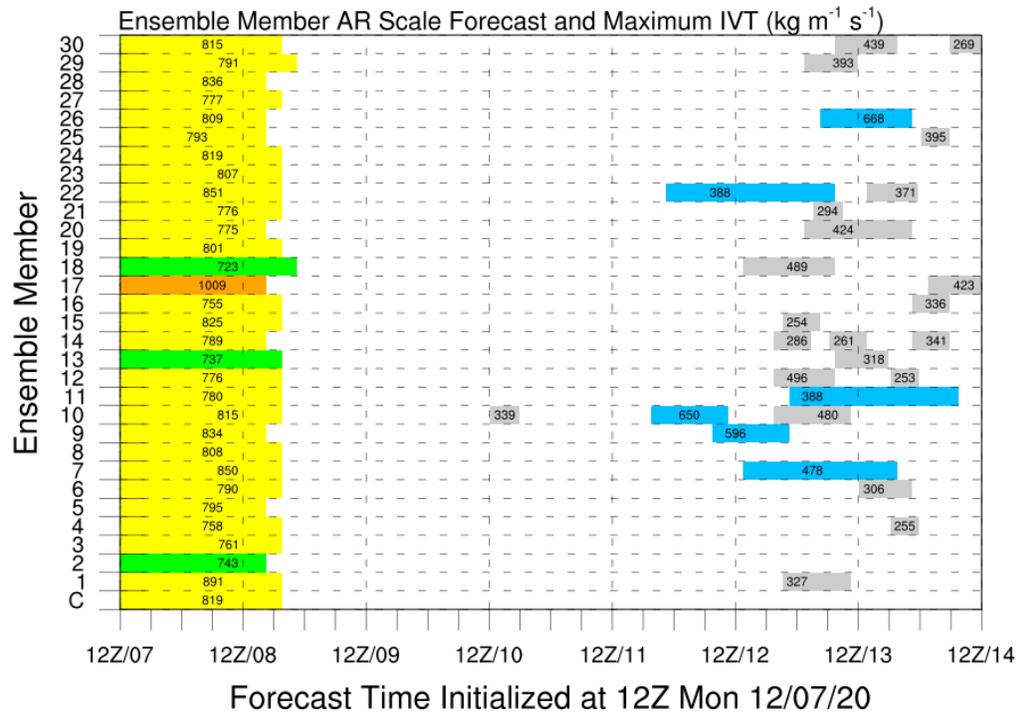
## GEFS AR Scale & IVT Forecasts

GFS Ensemble Initialized: 12Z Mon 12/07/20



Categorical AR Strength by Ralph/CW3E

- The 12Z GEFS control member is forecasting an AR 3 in association with the first landfalling AR at 48°N, 124.5°W (near Quillayute, WA)
- A maximum IVT value of 819 kg m<sup>-1</sup> s<sup>-1</sup> is forecast around 06Z 8 Dec
- There is good ensemble agreement in the IVT forecasts, with 28/31 (90%) ensemble members forecasting an AR 3 at this location



■ AR 1   
 ■ AR 2   
 ■ AR 3   
 ■ AR 4   
 ■ AR 5

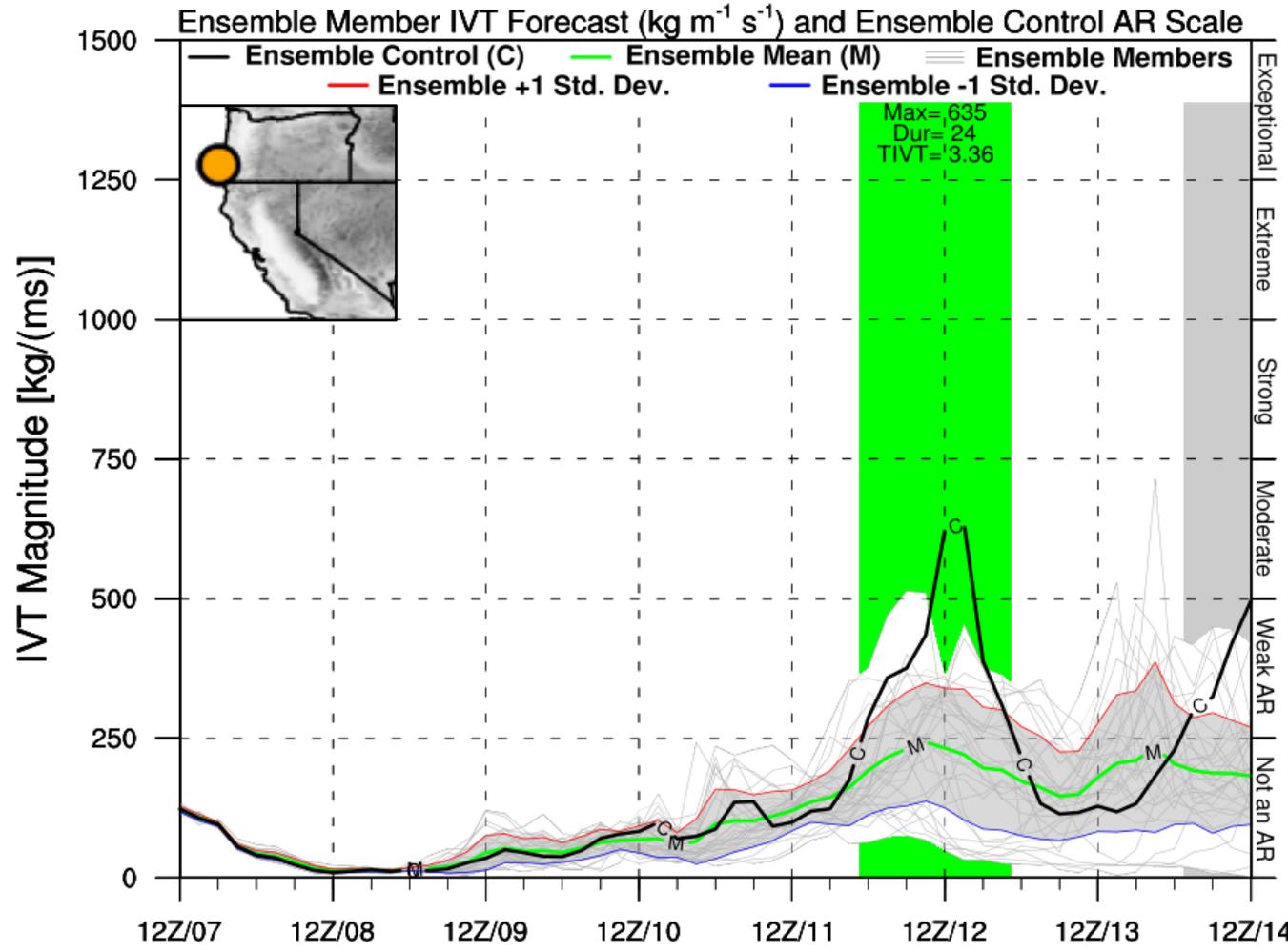
# AR Outlook: 7 Dec 2020

For California DWR's AR Program



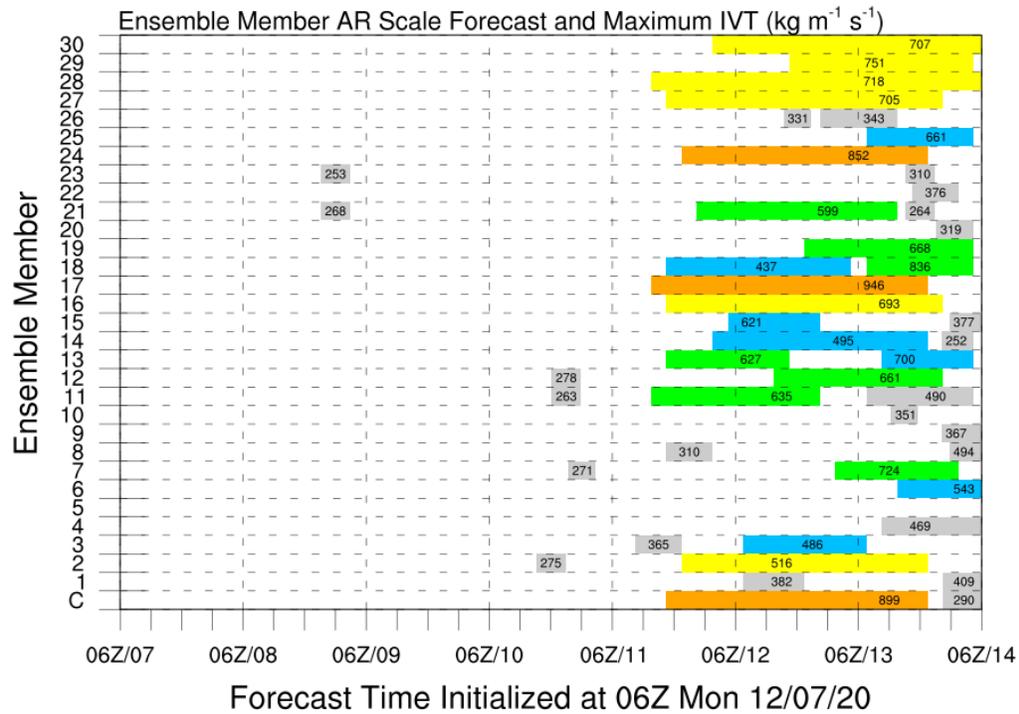
## GEFS AR Scale & IVT Forecasts

GFS Ensemble Initialized: 12Z Mon 12/07/20



Categorical AR Strength by Ralph/CW3E

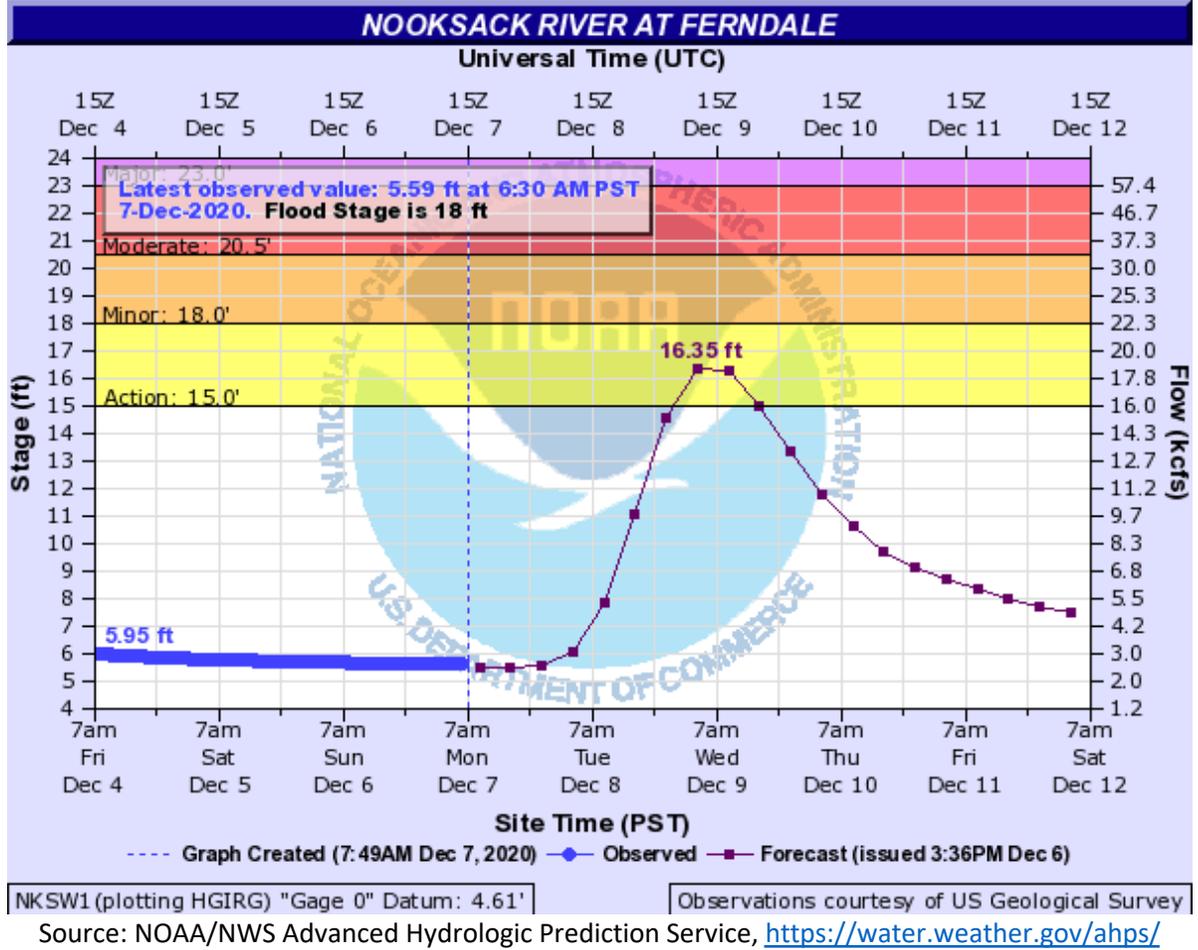
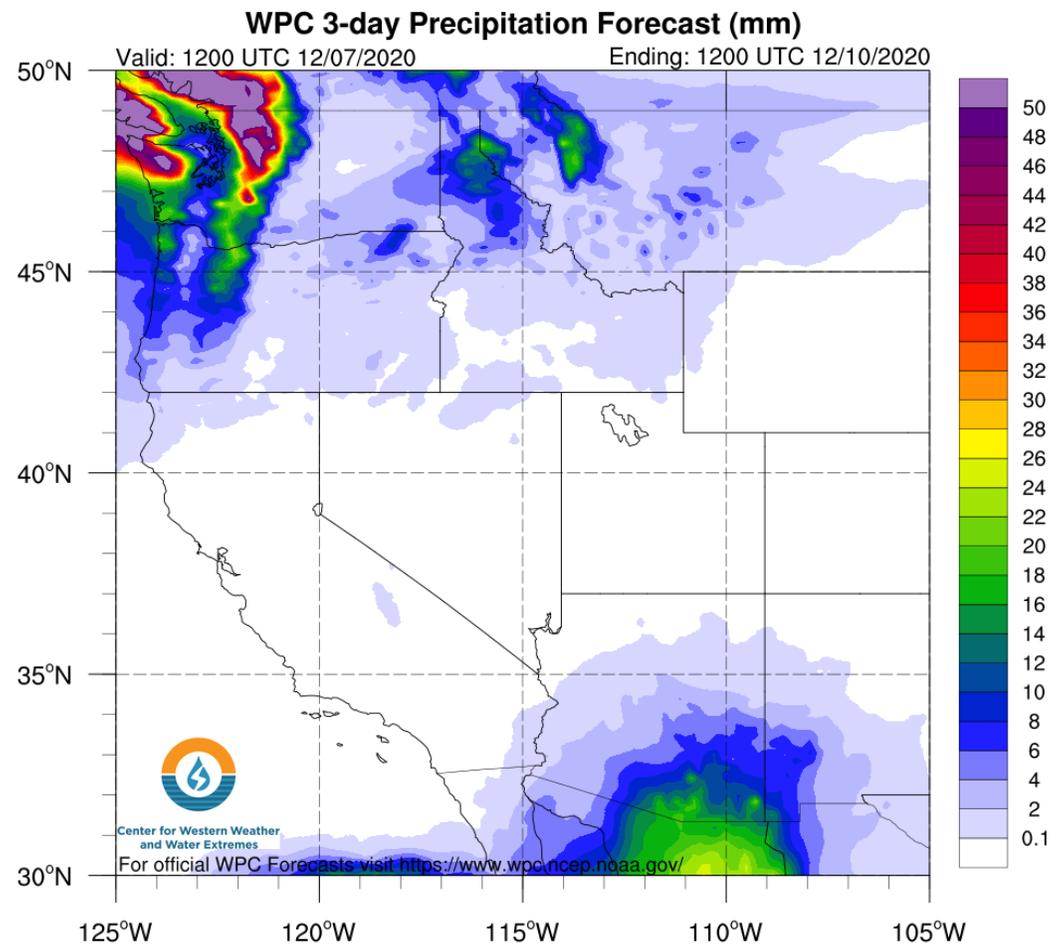
- The 12Z GEFS control member is currently forecasting an AR 2 in association with the second landfalling AR at 38°N, 122.5°W (San Francisco Bay Area)
- However, there is considerable uncertainty in the timing, magnitude, and duration of AR conditions
- 9/31 (29%) ensemble members are forecasting an AR 3 or greater, and 10/31 (32%) ensemble members are forecasting no AR



# AR Outlook: 7 Dec 2020



Center for Western Weather and Water Extremes  
SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

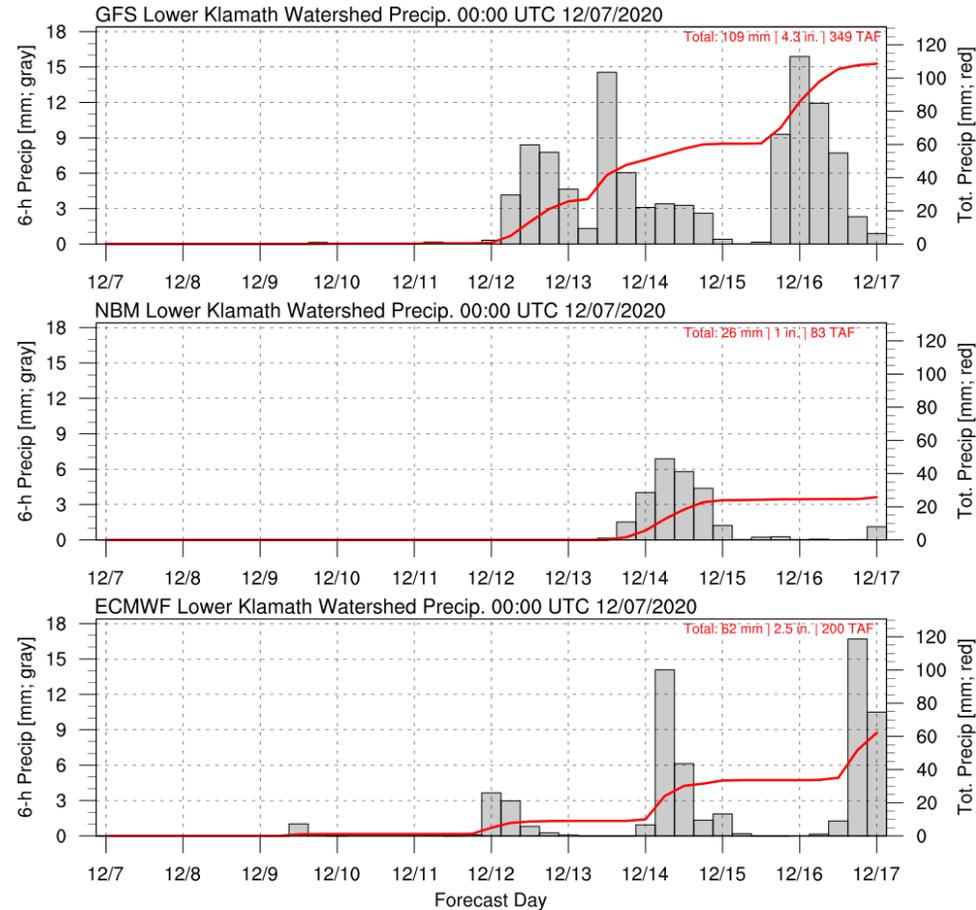
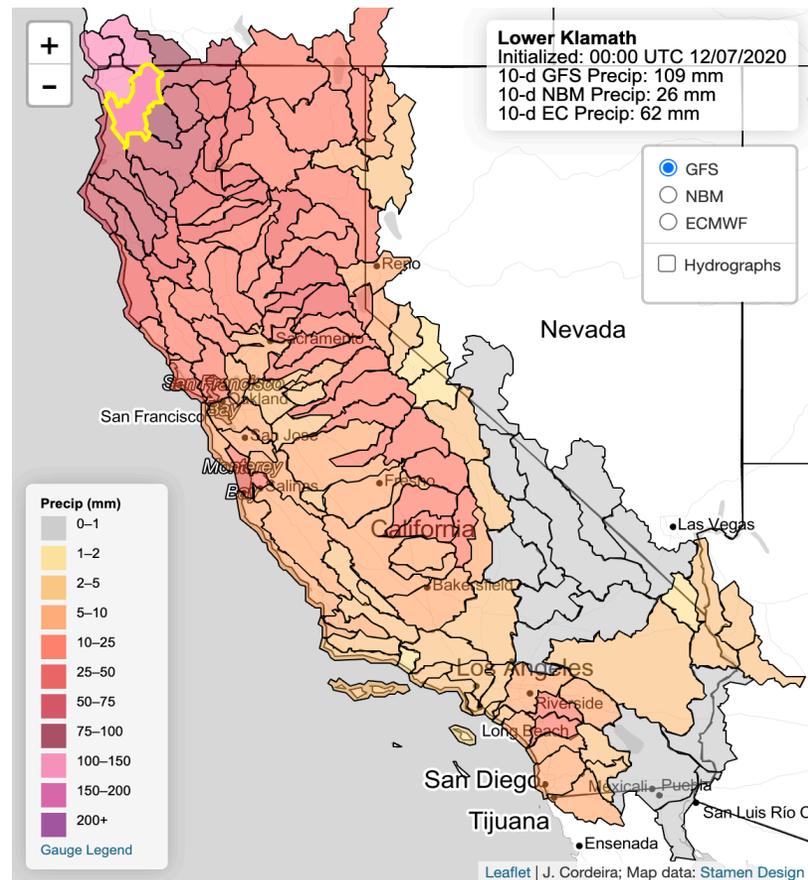


- NWS Weather Prediction Center (WPC) is forecasting more than 2 inches of precipitation over portions of the Olympic Peninsula and North Cascades in association with the first landfalling AR
- Although the precipitation is not expected to be particularly intense, the Nooksack River at Ferndale, WA (western Whatcom County) is forecast to rise above action stage (15.0 ft) on 8–9 Dec, which could lead to localized flooding in low-lying areas

# AR Outlook: 7 Dec 2020

For California DWR's AR Program

## 10-day Watershed Precipitation Forecasts



\*GFS = NCEP **G**lobal **F**orecast **S**ystem (United States)

\*NBM = **N**ational **B**lend of **M**odels (Blend of NWS and non-NWS models)

\*ECMWF = **E**uropean **C**enter for **M**edium-**R**ange **W**eather **F**orecasts (Europe)

- There is significant model disagreement in 10-day forecast precipitation over Northern California
- The 00Z GFS is forecasting 4.3 inches of areal mean precipitation in the Lower Klamath watershed during the next 10 days, whereas the 00Z ECMWF is forecasting 2.5 inches of areal mean precipitation, and the 00Z NBM is forecasting only 1 inch of areal mean precipitation
- Both the GFS and ECMWF are forecasting multiple storms to impact drought-stricken Northern California over the next 10 days