

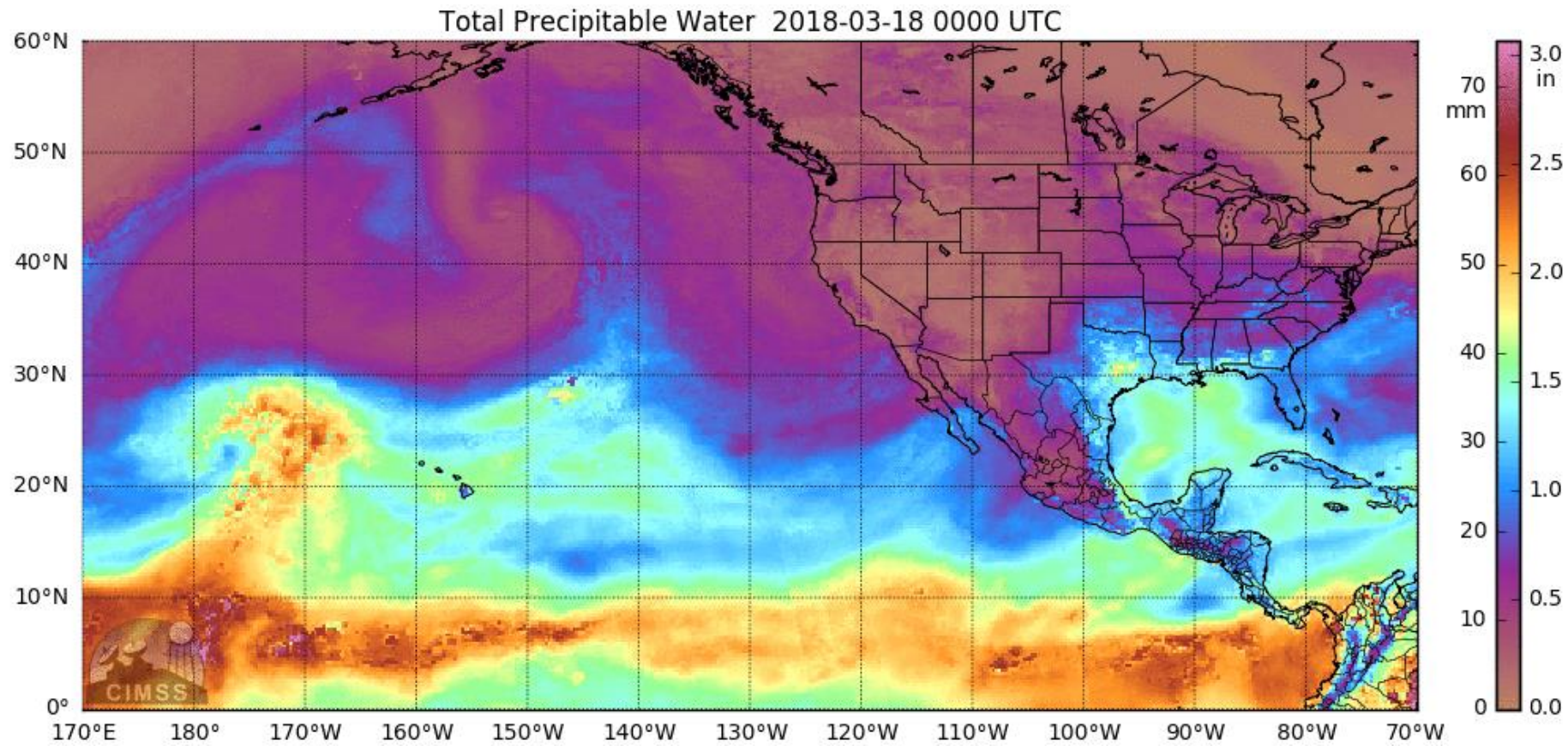
CW3E Atmospheric River Outlook



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Update on Atmospheric River Forecast to Impact California Next Week

- The terminus of the atmospheric river plume is approaching coastal CA and precipitation will begin today
- Models are suggesting potentially strong (IVT $>750 \text{ kg m}^{-1} \text{ s}^{-1}$) AR conditions over San Luis Obispo and Santa Barbara Counties
- Locations further south may experience moderate strength AR conditions (IVT $>500 \text{ kg m}^{-1} \text{ s}^{-1}$)
- AR conditions are forecast to peak over portions of SoCal between Midnight and 11 AM PDT on Thursday, 22 March 2018
- As much as 10 inches of precipitation may fall over the higher elevations of Santa Barbara and Ventura Counties
- The National Weather Service has issued numerous Flash Flood Watches and Winter Weather Warnings in California

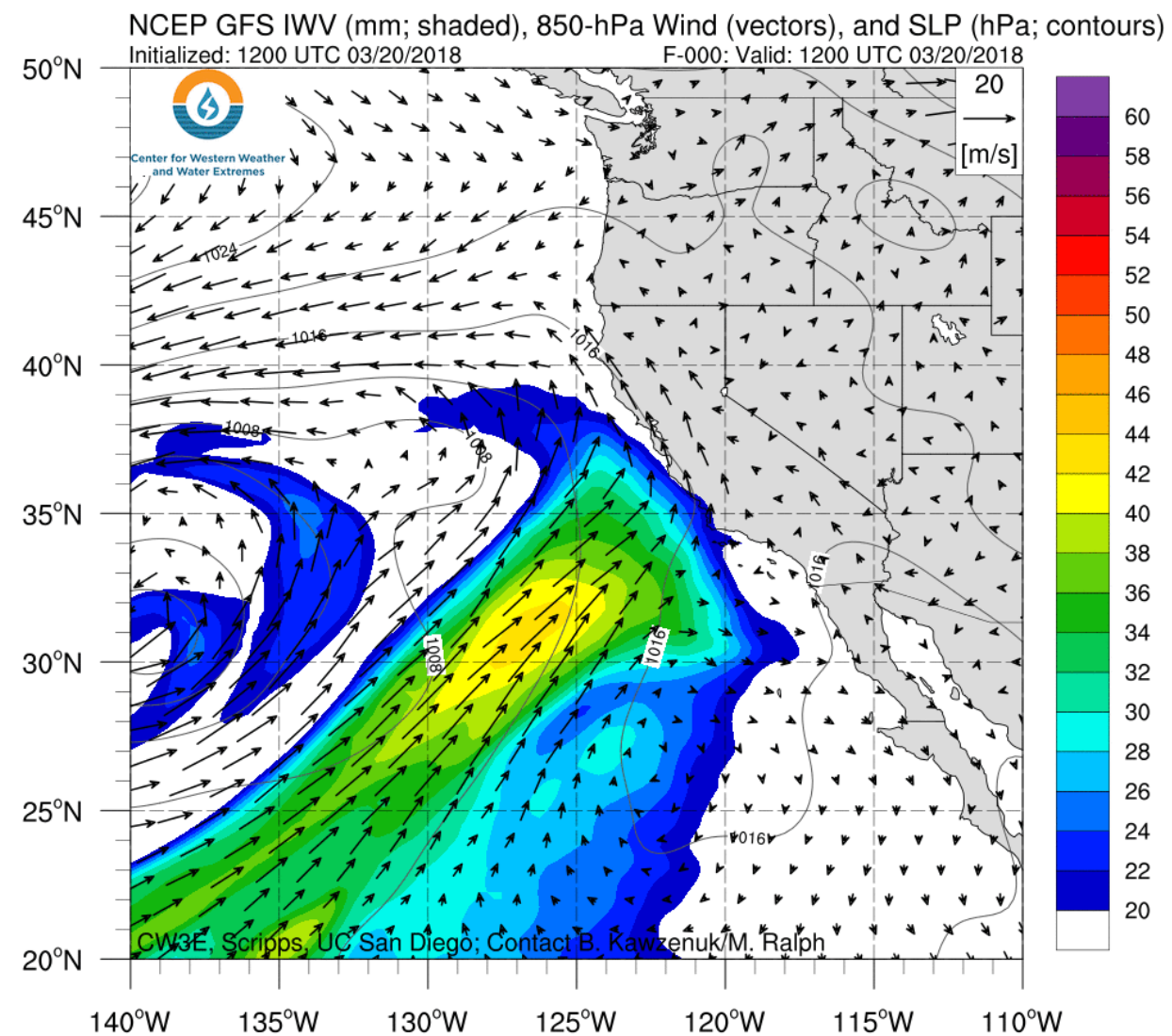
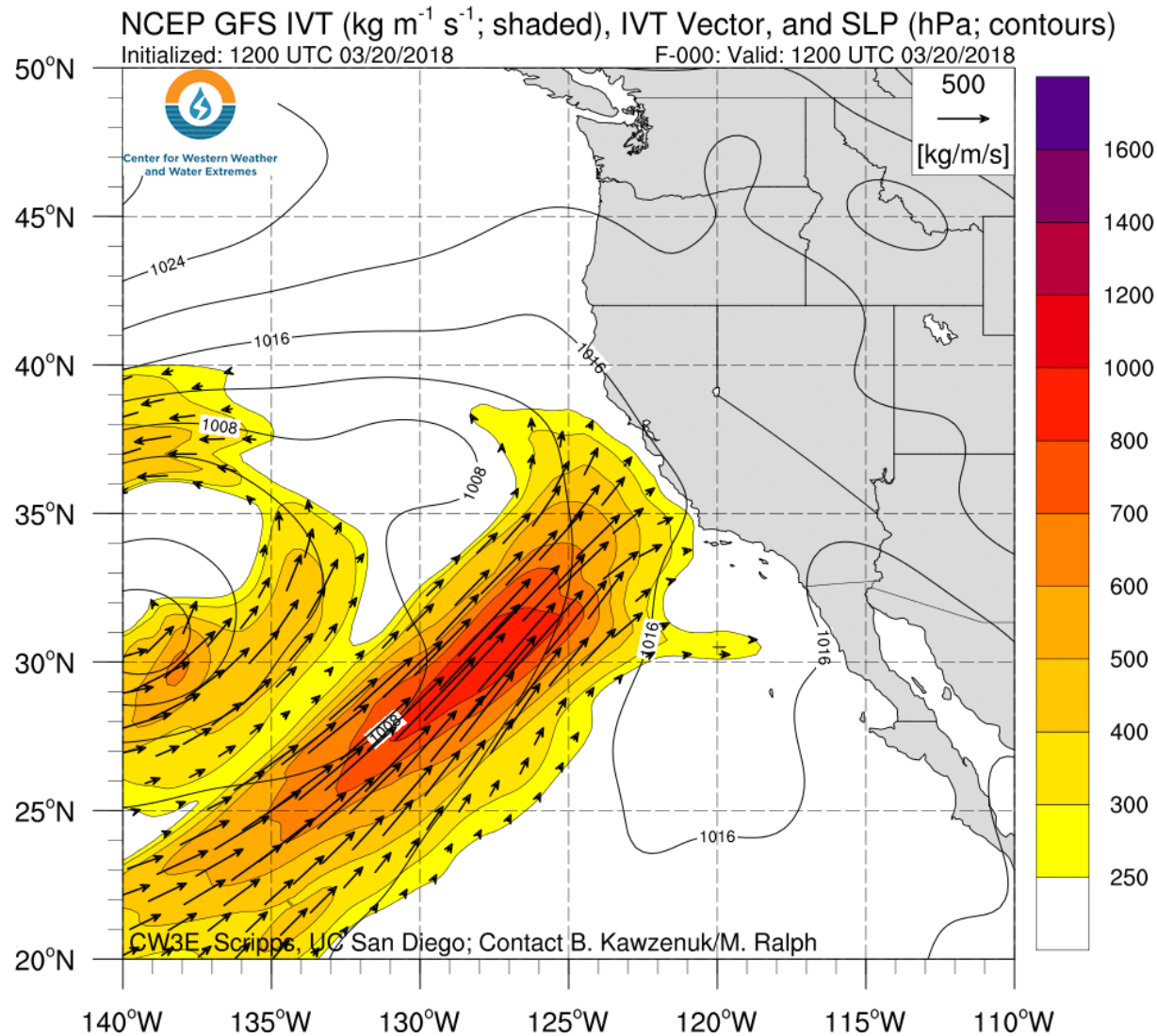


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AR Outlook: 20 March 2018

Model Comparison to Yesterday

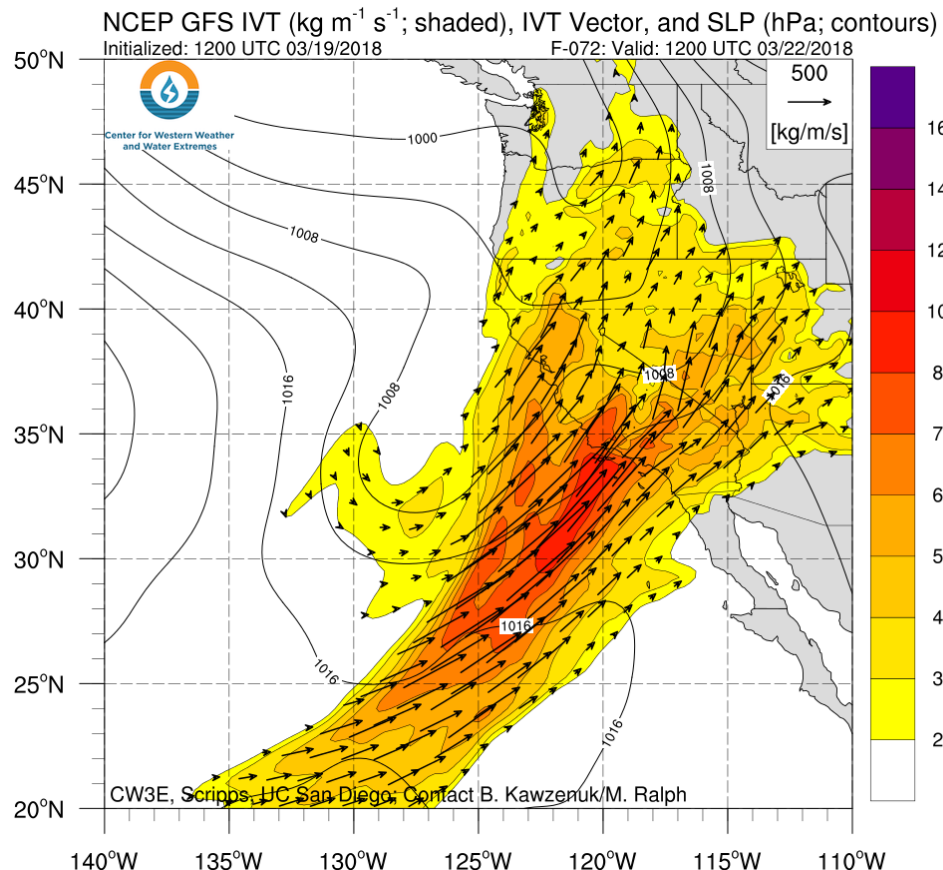
For California DWR's AR Program



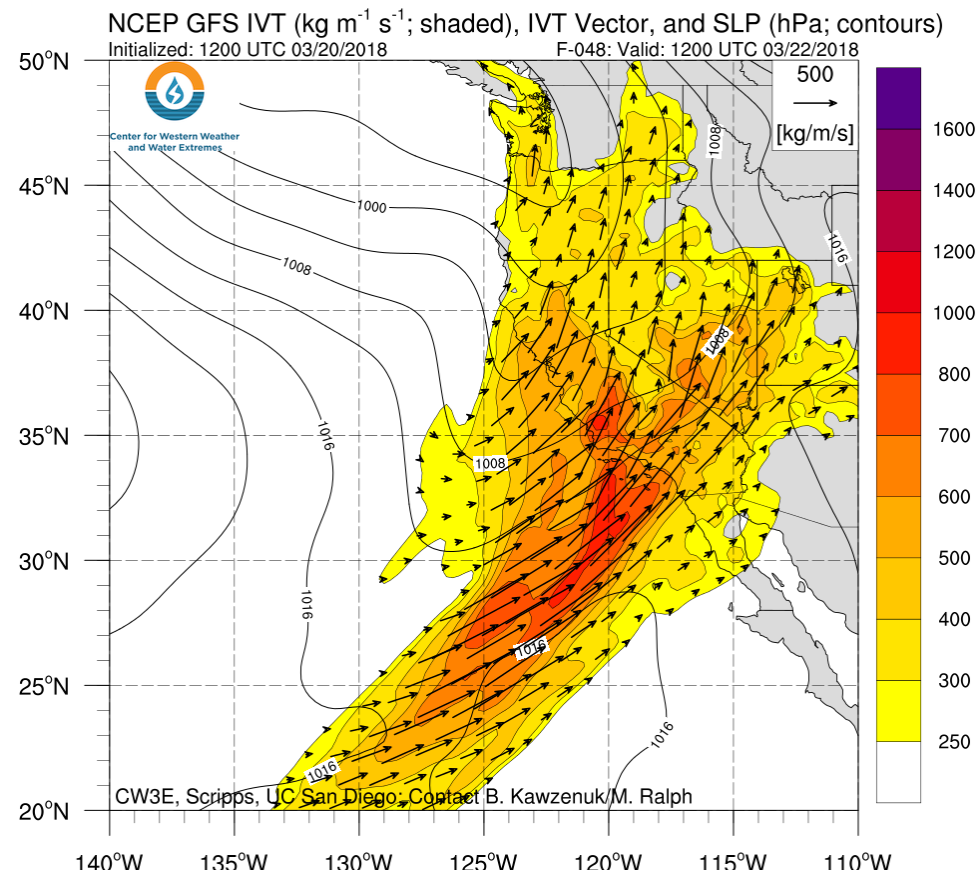
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Initialized 12Z 19 March



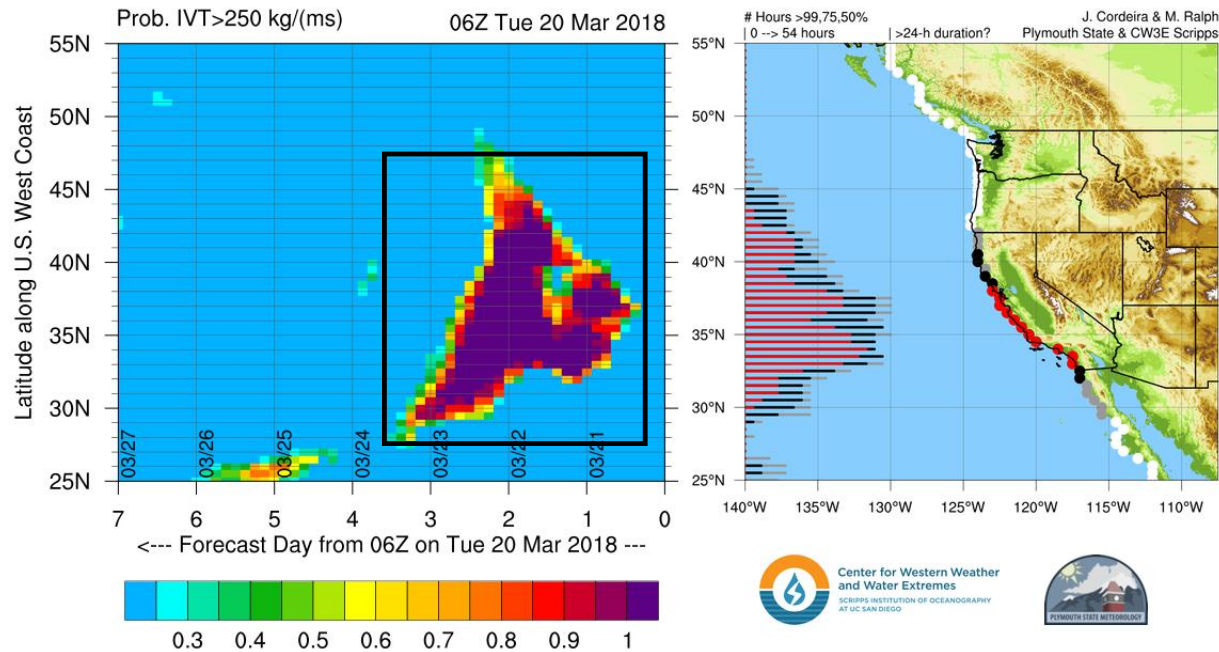
Initialized 12Z 20 March



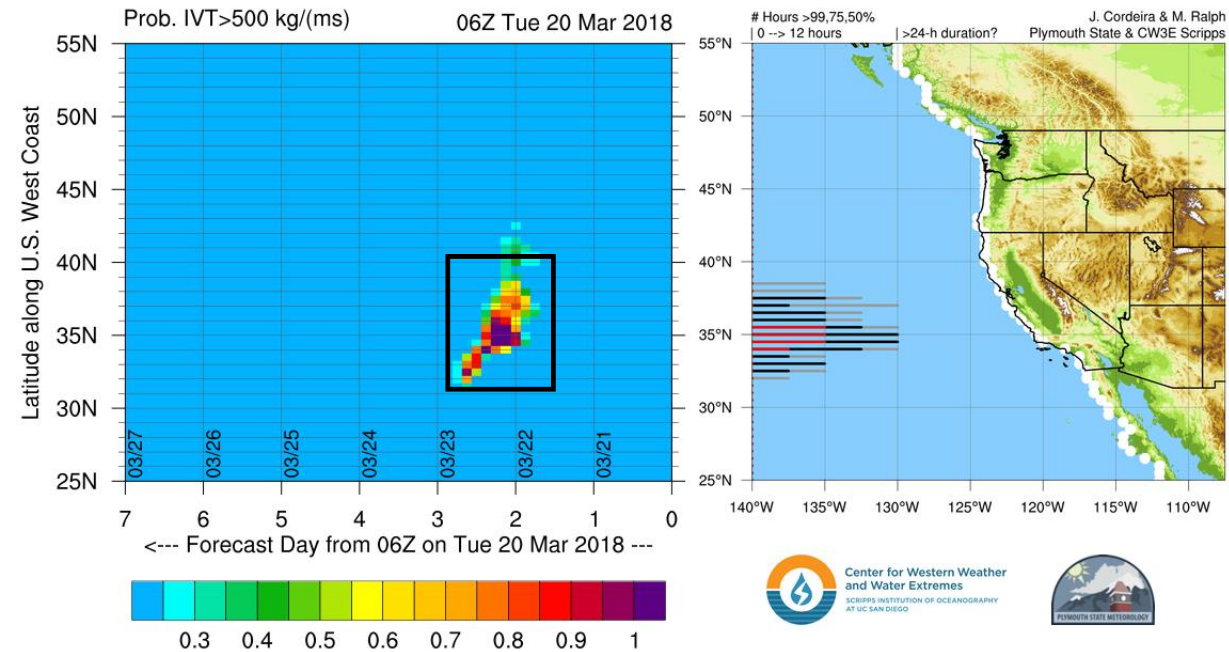
- There have been a few minor changes in the GFS forecast of IVT since yesterday's update
- While there are no major changes in the overall magnitude of IVT within the core of the AR, the core of the AR is shifted a few degrees east
- The orientation of IVT within the AR as it is impacting SoCal does not seem to have changed dramatically from yesterday's forecast



Odds of at least a **WEAK** AR making landfall



Odds of **Moderate** AR making landfall



- The probability of at least weak AR conditions ($IVT > 250 \text{ kg m}^{-1} \text{ s}^{-1}$) has continued to increase to 95–100% for much of CA
- The northern extent of AR conditions has also increased to $\sim 45^\circ\text{N}$ into Oregon

- The probability of moderate strength AR conditions ($IVT > 500 \text{ kg m}^{-1} \text{ s}^{-1}$) has continued to increase to $> 95\%$ for $\sim 34\text{--}36^\circ\text{N}$
- Coastal California locations south of 34°N also have a high probability of brief (~ 3 hours) moderate strength AR conditions

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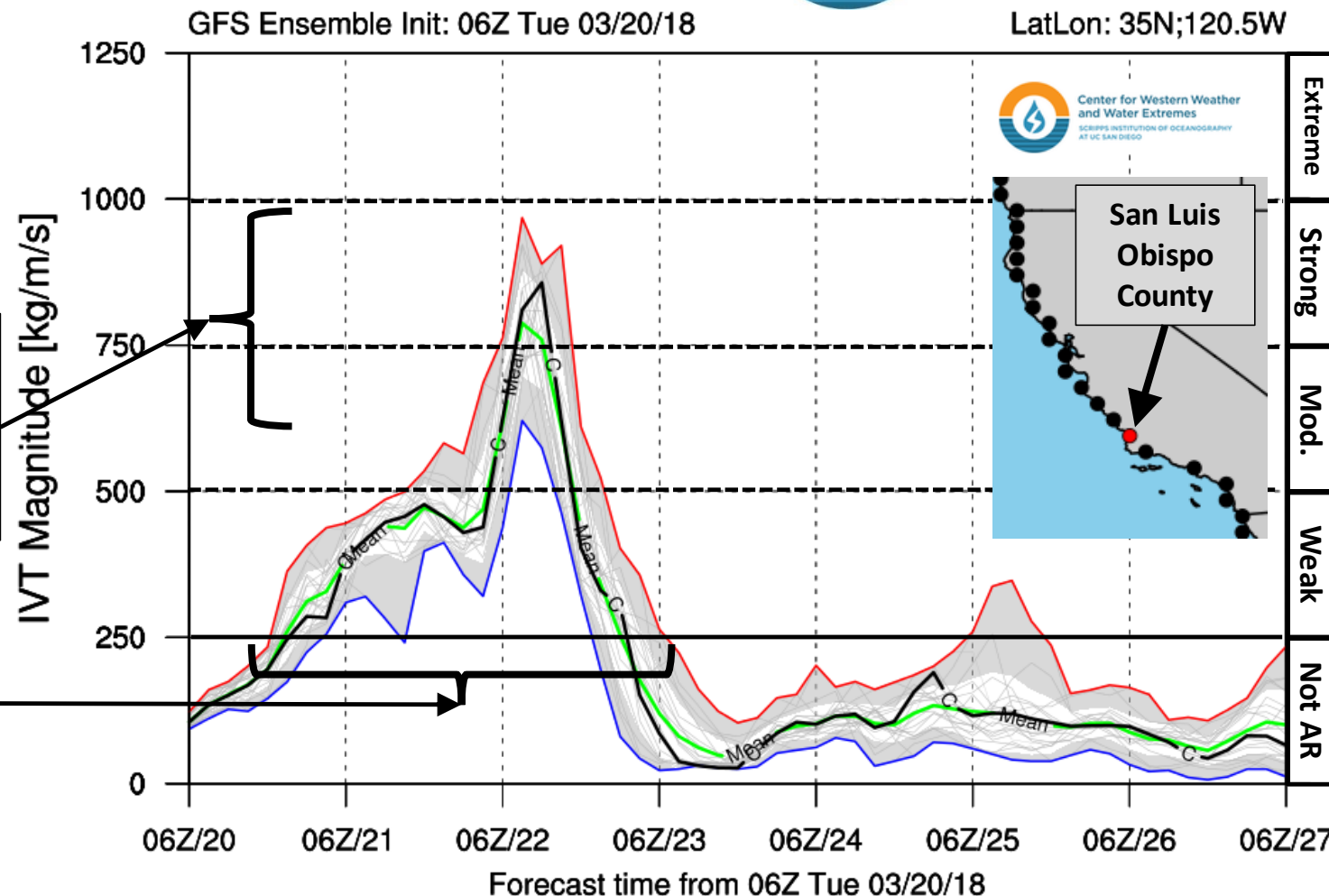
The control and GFS Ensemble mean forecast are predicting strong (IVT > 750 kg m⁻¹ s⁻¹) AR conditions for coastal San Luis Obispo County between 12 and 5 AM PDT on Thursday, 22 March 2018

Magnitude of Potential AR

- Maximum predicted IVT ~950 kg m⁻¹ s⁻¹
- Mean IVT ~800 kg m⁻¹ s⁻¹
- Minimum IVT ~675 kg m⁻¹ s⁻¹

Duration of AR conditions by strength

- Weak: ~50 hours +/- 18 h
- Moderate: ~15 hours +/- 6 h
- Strong: ~6 hours +/- 6 h



AR Outlook: 20 March 2018

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GFS ensemble members have slightly decreased the magnitude of this event over San Diego County since yesterday's update

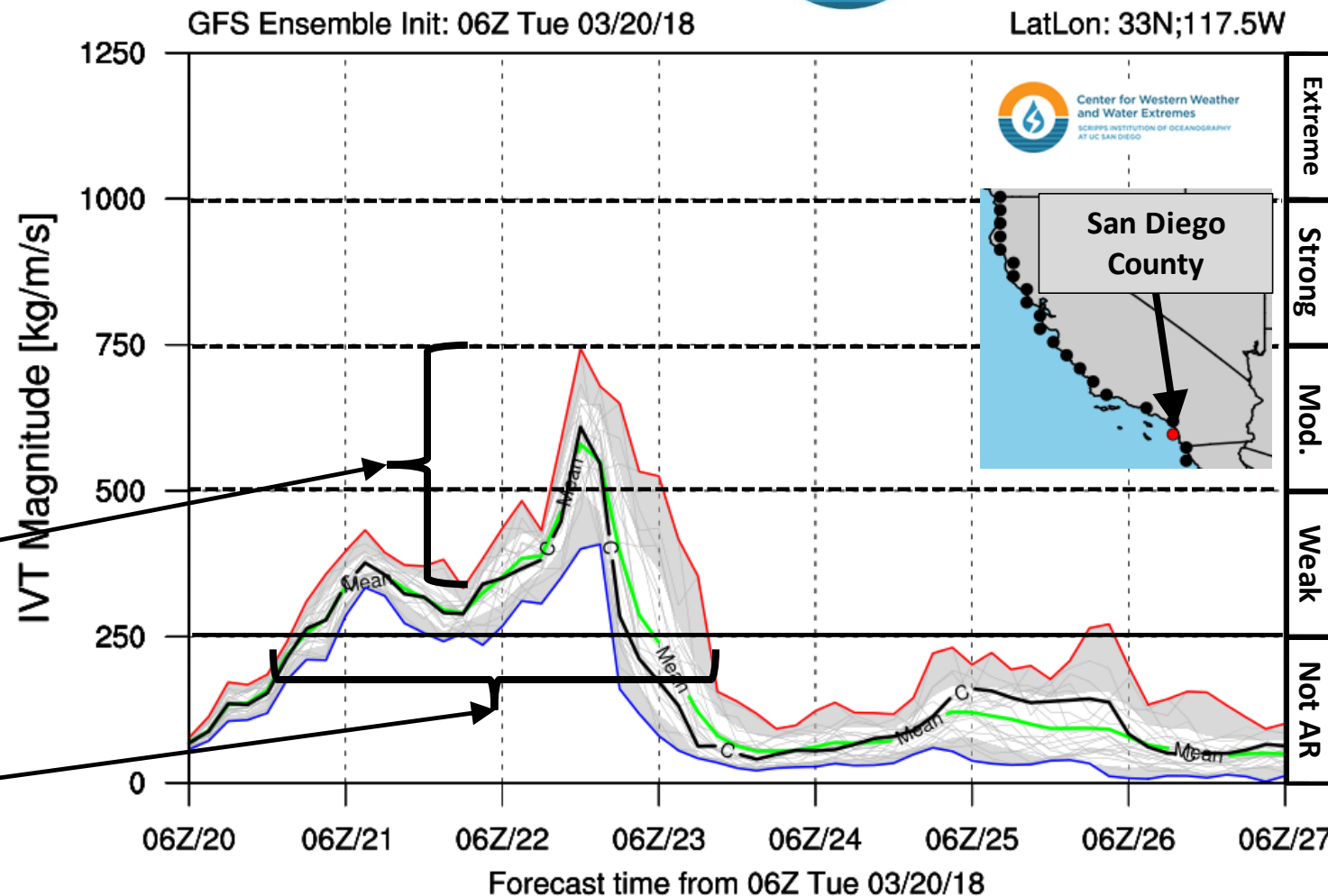
Ensemble members and the control forecast are suggesting that this event will bring moderate strength AR conditions ($IVT > 500 \text{ kg m}^{-1} \text{ s}^{-1}$) to San Diego County

Magnitude of Potential AR

- Maximum predicted IVT $\sim 750 \text{ kg m}^{-1} \text{ s}^{-1}$
- Mean IVT $\sim 625 \text{ kg m}^{-1} \text{ s}^{-1}$
- Minimum IVT $\sim 400 \text{ kg m}^{-1} \text{ s}^{-1}$

Duration of AR conditions by strength

- Weak: $\sim 50 \text{ hours} \pm 18 \text{ h}$
- Moderate: $\sim 6 \text{ hours} \pm 6 \text{ h}$
- Strong: $\sim 0 \text{ hours}$



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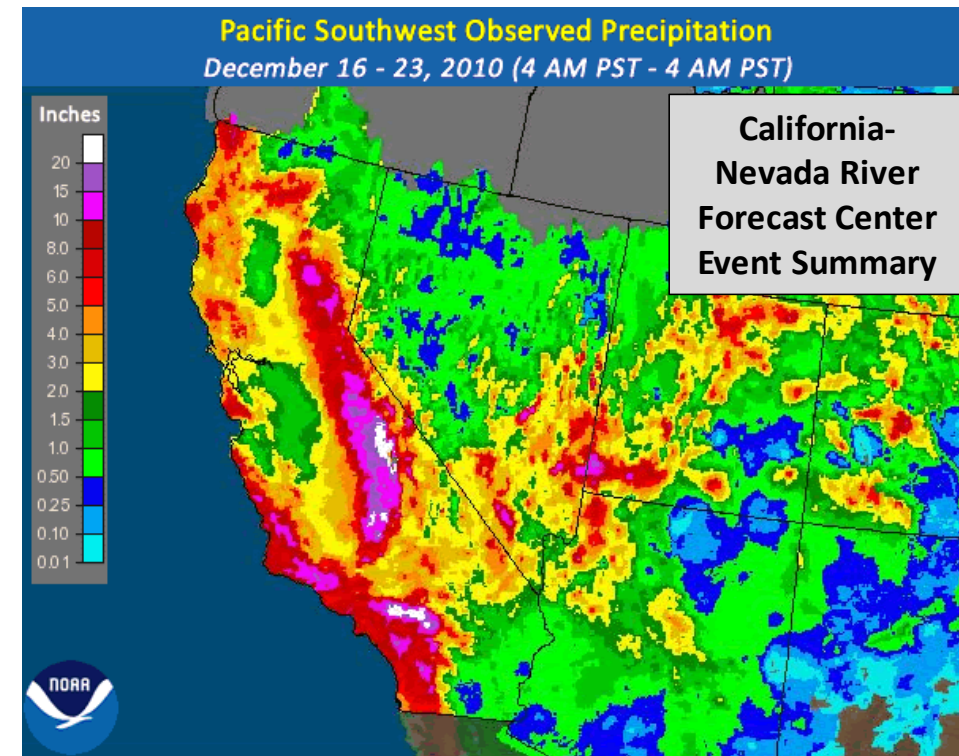
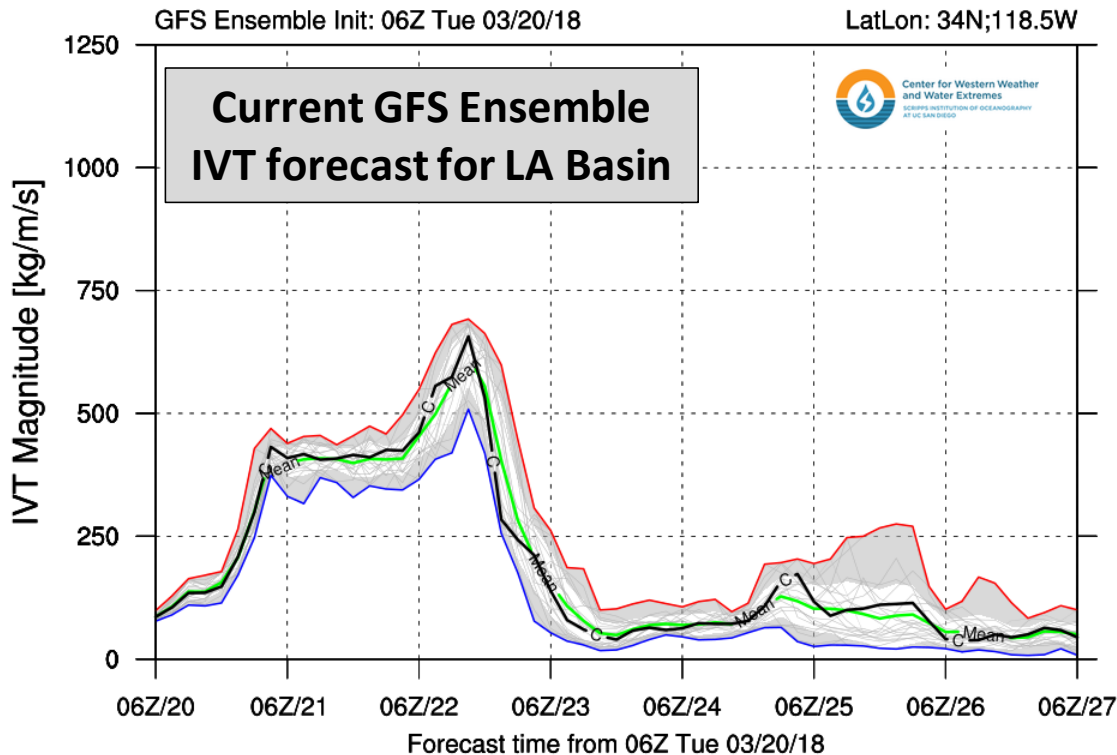


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Historical Reference:

During the period from 1980–2017, the highest IVT magnitude over the LA Basin (34N 118.125W) was $\sim 850 \text{ kg m}^{-1} \text{ s}^{-1}$. The current GFS ensemble is predicting $\sim 700 \text{ kg m}^{-1} \text{ s}^{-1}$ while the GFS deterministic is predicting 800–900 $\text{kg m}^{-1} \text{ s}^{-1}$. The longest duration event was ~ 99 hours on 17-21 Dec. 2010 (Pictured bottom right), which had a maximum IVT of $\sim 650 \text{ kg m}^{-1} \text{ s}^{-1}$. The current forecast has IVT lasting ~ 54 –60 hours.

Analysis provided by Dr. Jon Rutz from NWS Western Region Headquarters and based on MERRA v2 reanalysis data

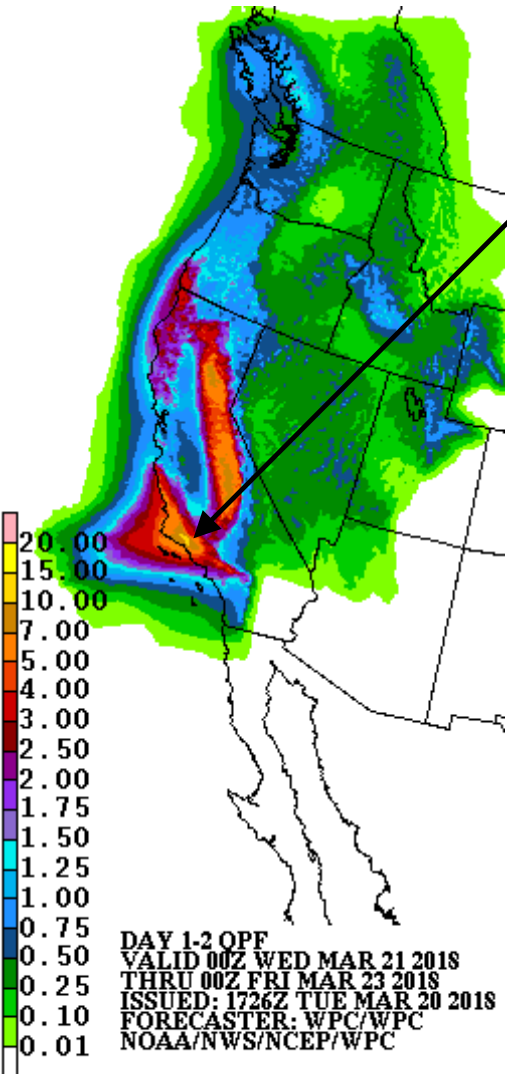


https://www.cnrfc.noaa.gov/storm_summaries/dec2010storms.php

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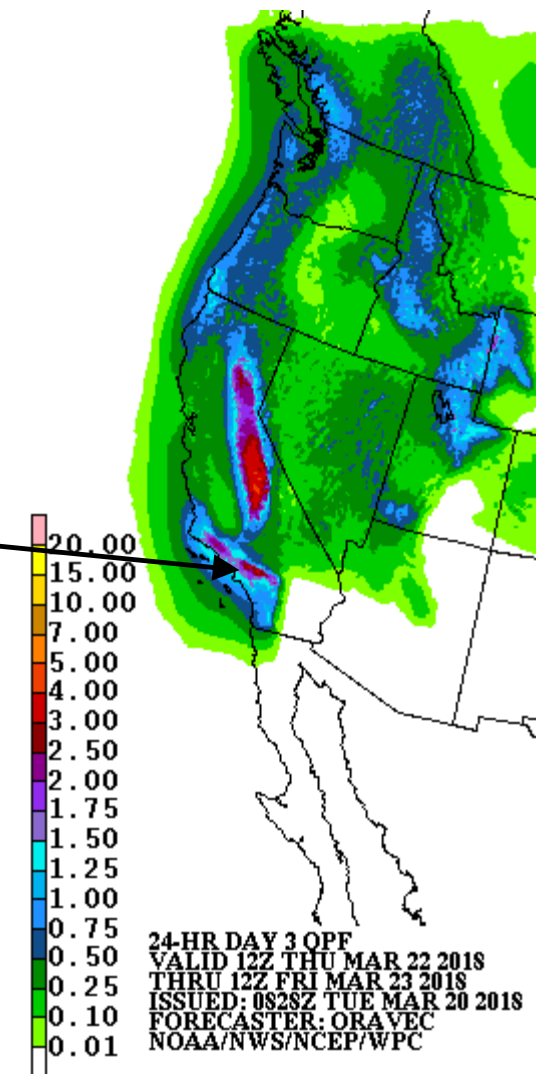
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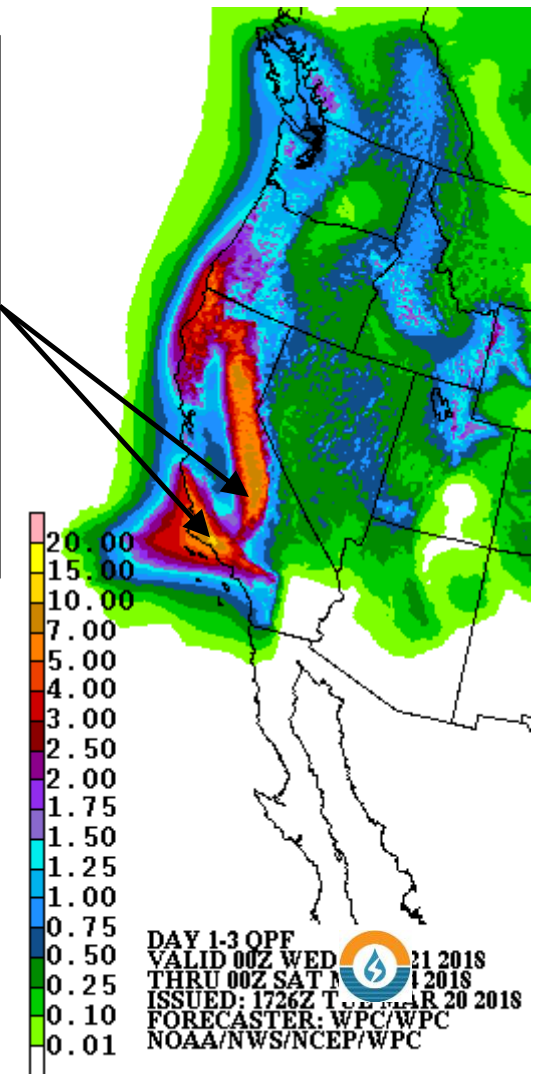
The NOAA WPC 1-2 day QPF is forecasting ~10 in. of precipitation over the higher elevations of Santa Barbara County

An additional 1.5–3 inches could fall on day 3 (valid 12 Z 22 March to 12 Z 24 March)

Higher precipitation accumulations are also forecast for the southern high Sierra



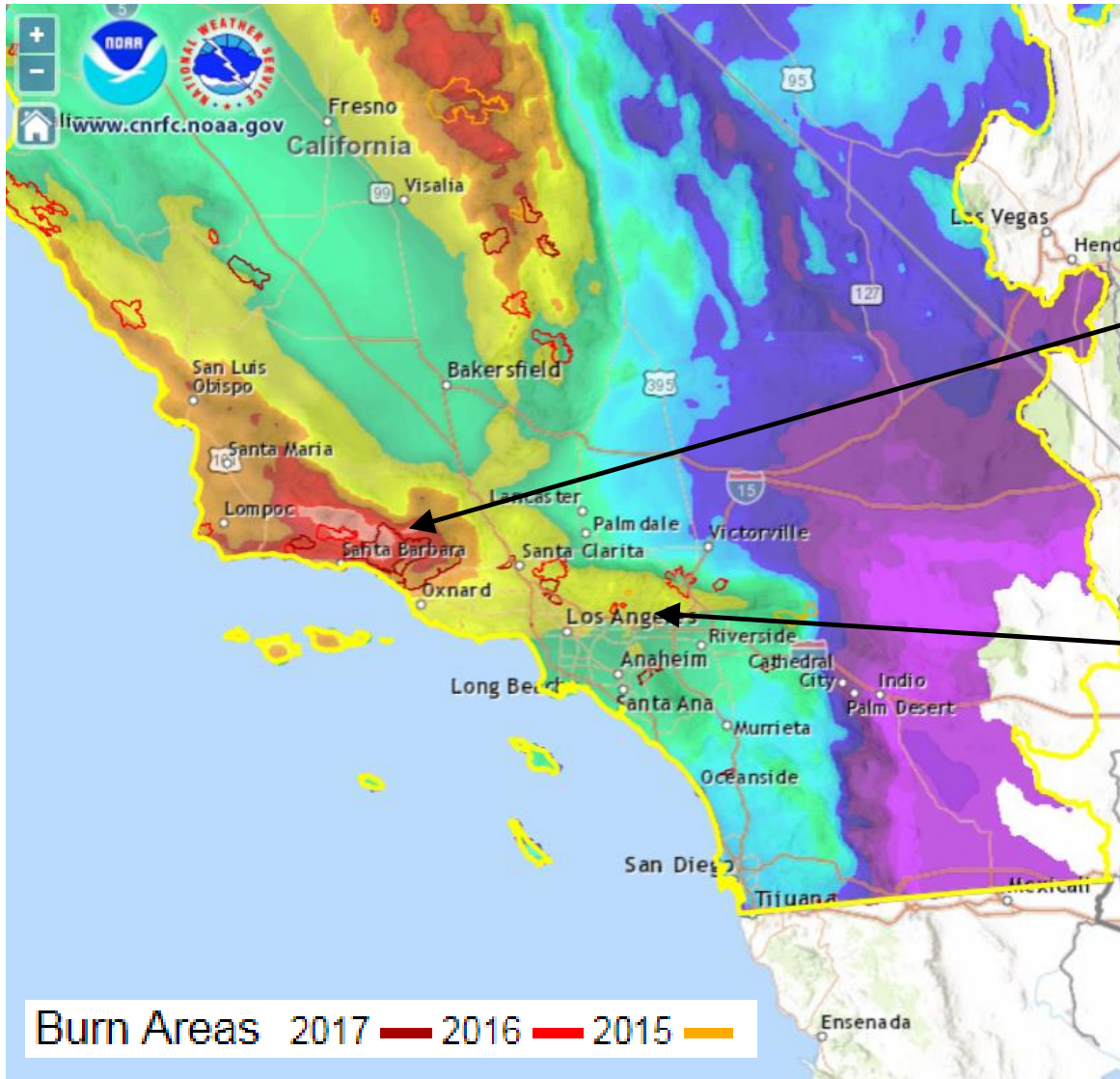
1–7 day precipitation accumulations could reach >10 inches in Santa Barbara County, Ventura County and the High Sierra



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~9 inches of precipitation is forecast by the CNRFC to fall over the recent Thomas Burn Area in Ventura and Santa Barbara Counties over the next 72 hours, raising concern for potential flash flooding and debris flows

2 – 3 inches of precipitation is forecast to fall over other high elevations of the Transverse Range north of Los Angeles

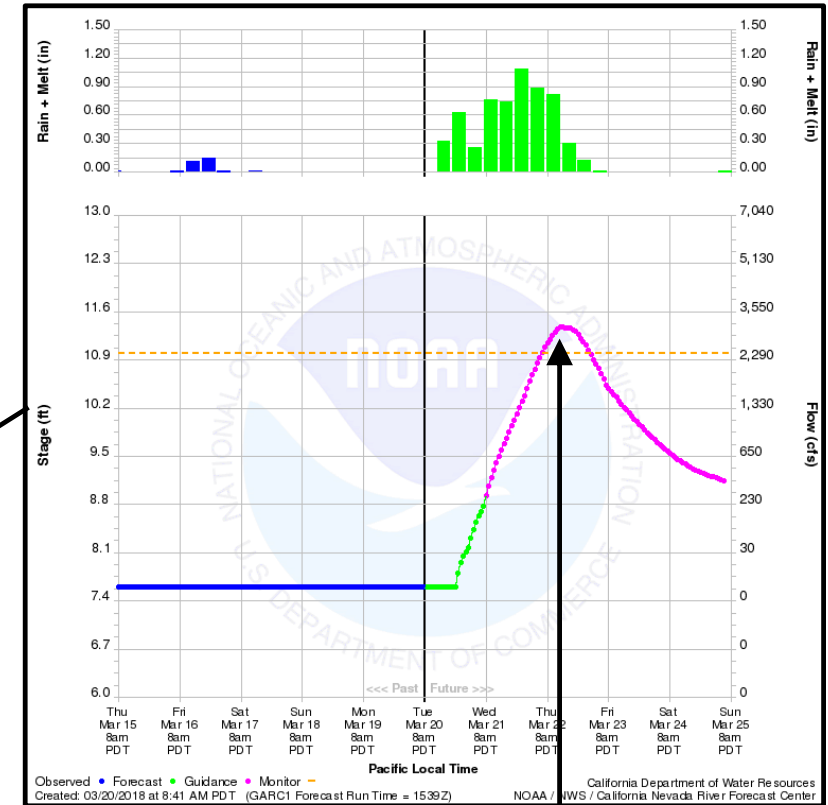
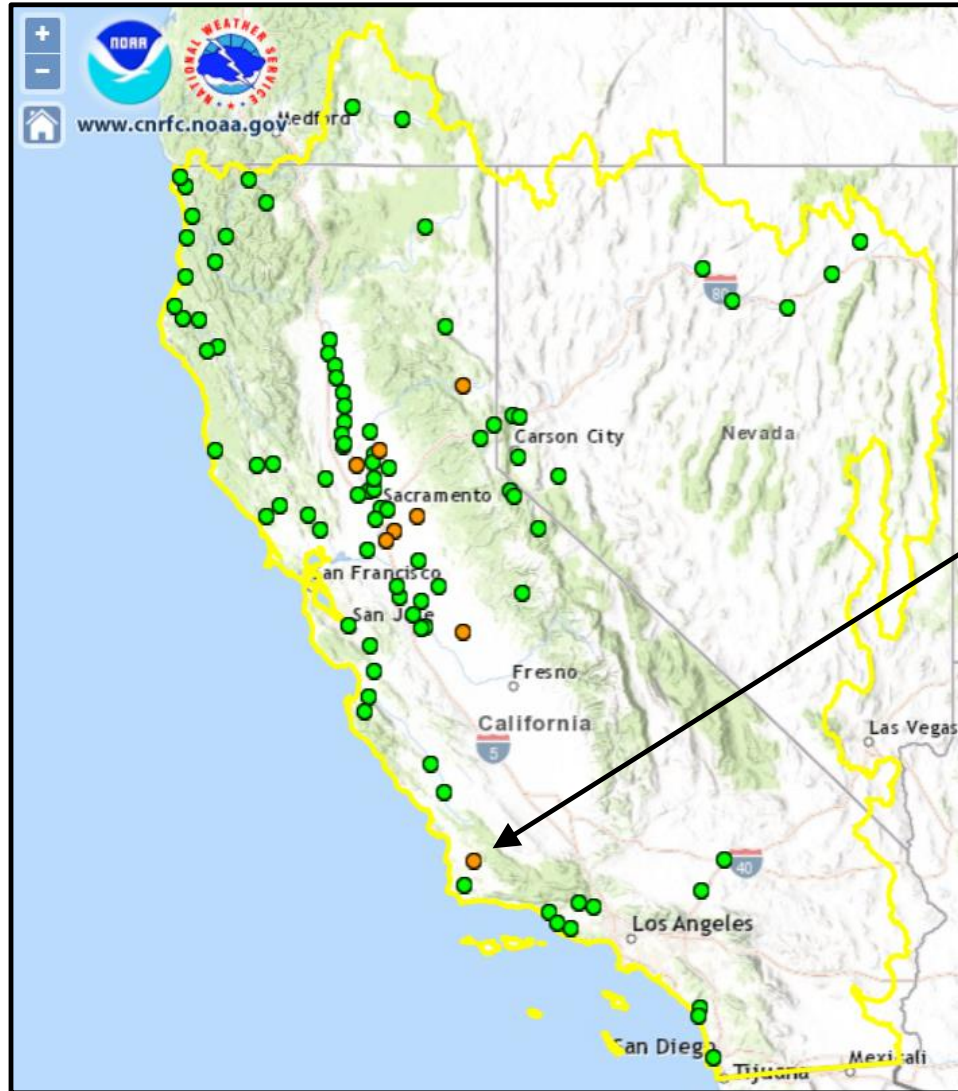
For official California-Nevada Forecast Center Products: cnrfc.noaa.gov

AR Outlook: 20 March 2018



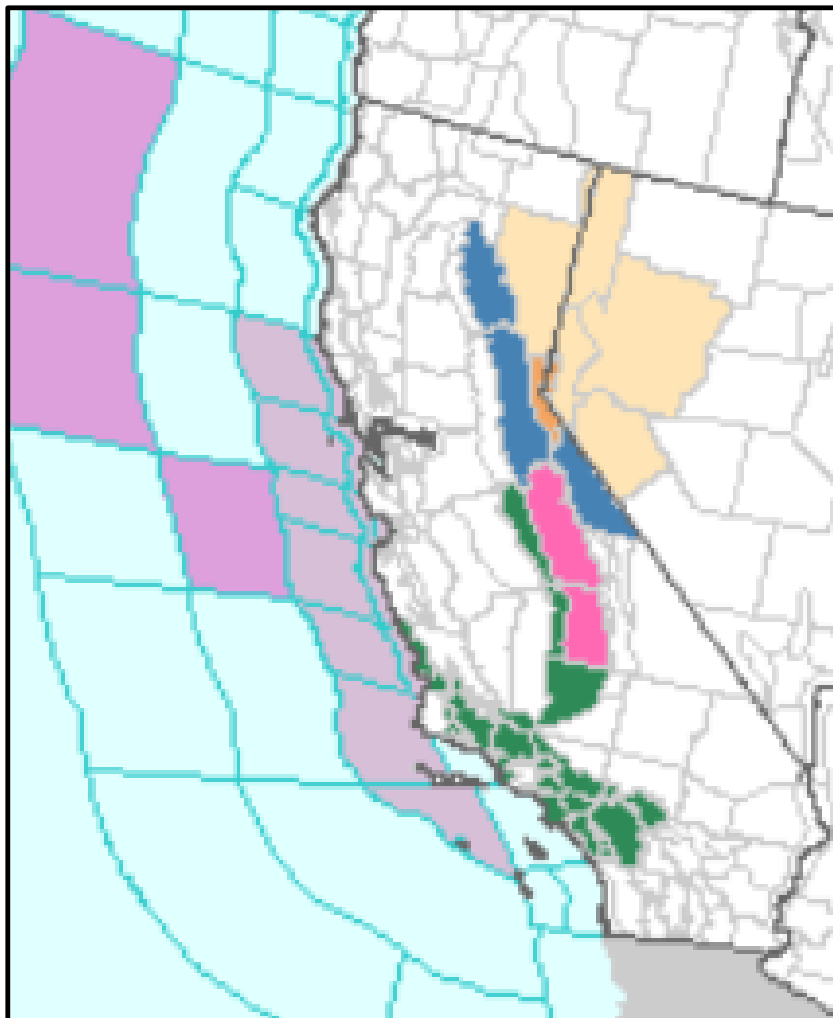
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- The California-Nevada River Forecast Center is currently forecasting 8 rivers in CA to rise above monitor Stage, 4 more than yesterday's forecast
- While several Southern California rivers are forecast to see a rise in stage height, only one is currently forecast to rise above monitor stage



The Sisquoc River near Santa Maria is forecast to rise to 11.4 feet at 1 pm PDT on 22 March, ~.4 feet above monitor stage

For official California-Nevada Forecast Center Products:
cnrfc.noaa.gov



As of 10:30 AM PDT, 20 March 2018, the National Weather Service has issued several flash flood watches for portions of Southern California and the Southern Sierra

A winter storm warning has also been issued for the central and southern Sierra

Flash Flood Watch Issued by NWS Los Angeles

...FLASH FLOOD WATCH REMAINS IN EFFECT FROM WEDNESDAY EVENING THROUGH LATE THURSDAY NIGHT...

The Flash Flood Watch continues for

- * The recent burn areas of Los Angeles county.
- * From Wednesday evening through late Thursday night
- * Rainfall rates up to 0.6 inches per hour are possible late Wednesday evening with rates possibly increasing to 0.75 inches per hour or higher at times Thursday.
- * Rainfall of this intensity can produce dangerous mud and debris flows near recent burn areas.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

Flash flooding and debris flows will be a particular threat in and below the recently burned areas.

A flash flood watch means that conditions may develop that lead to flash flooding. Flash flooding is a very dangerous situation.

Southern California residents, in or below the recently burned areas are urged to take the steps necessary to protect their property. Persons in the watch area should remain alert and follow directions of emergency preparedness officials.