

***Observations and Expectations of a Warming World:  
Water Year 2019 Outlook***

Dr. Michael Anderson, State Climatologist

CCSS Annual Meeting

November 14, 2018

# Talk Overview

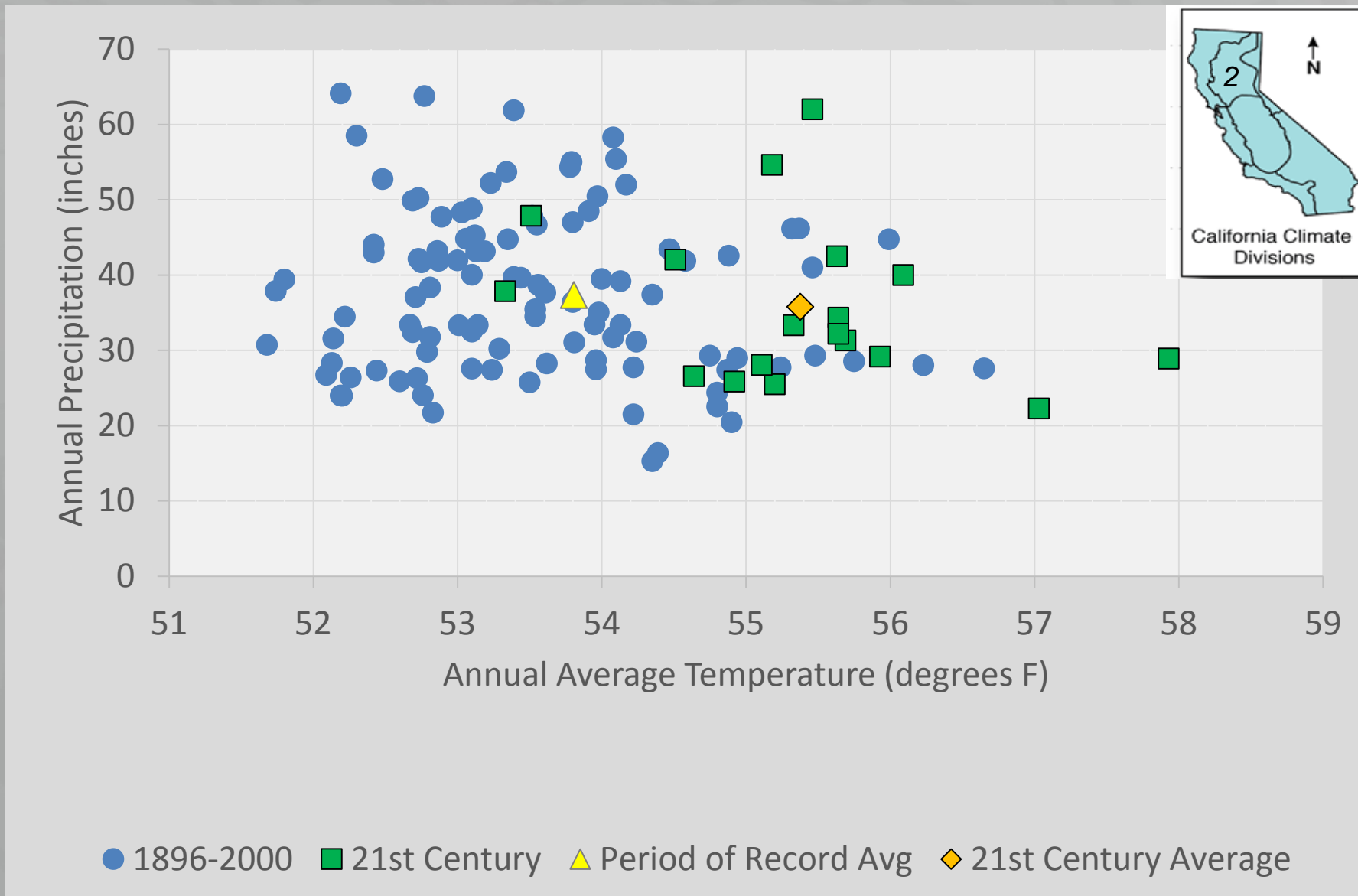
- Antecedent and Current Conditions
- Short-Term Forecasts
- Intel and Expectations for 2019



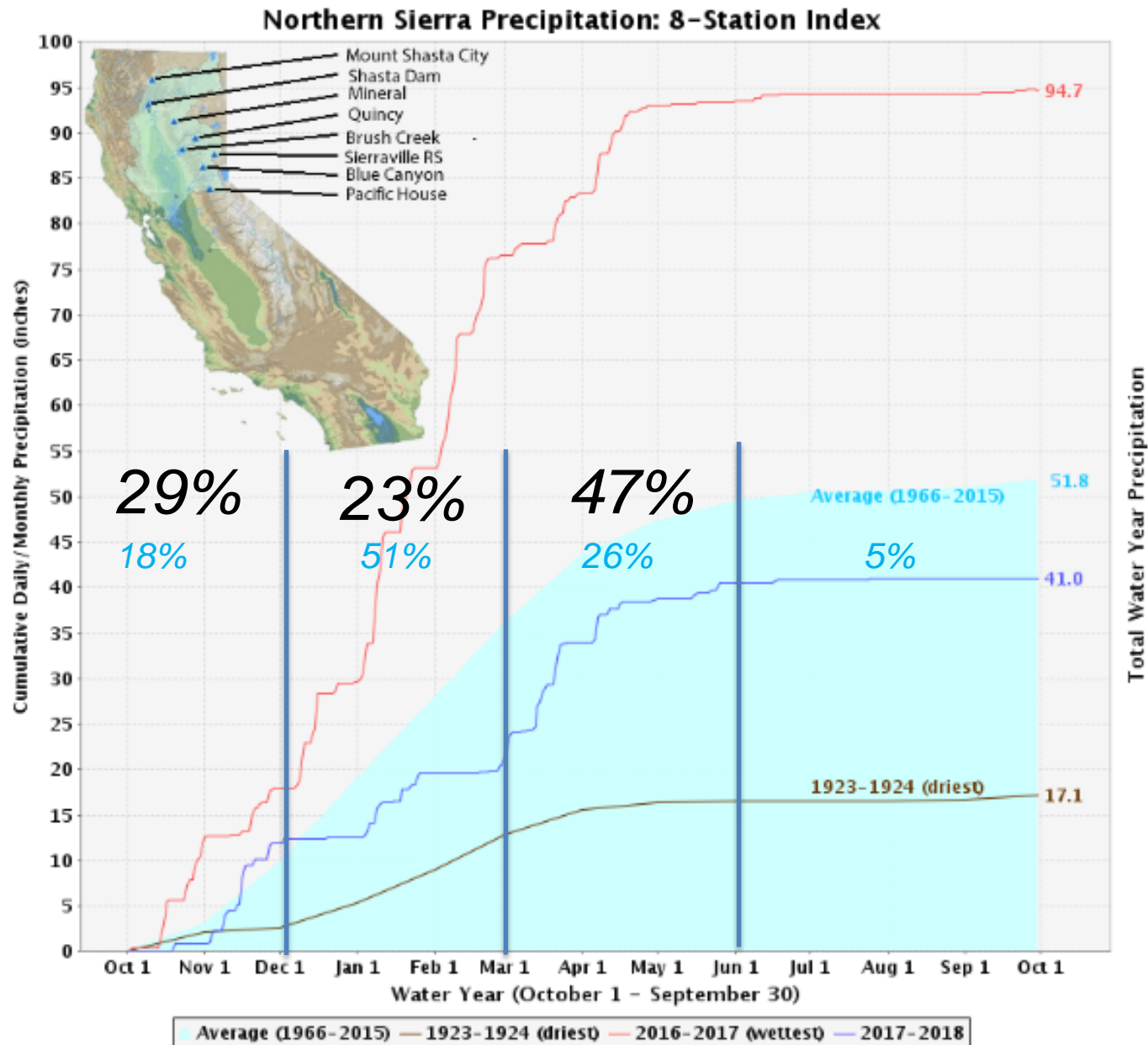
**California's topography  
affects our weather and climate**

*Seasonal precipitation and  
hydrologic outcomes vary  
significantly across CA*

# Climate Division 2 Water Year Data

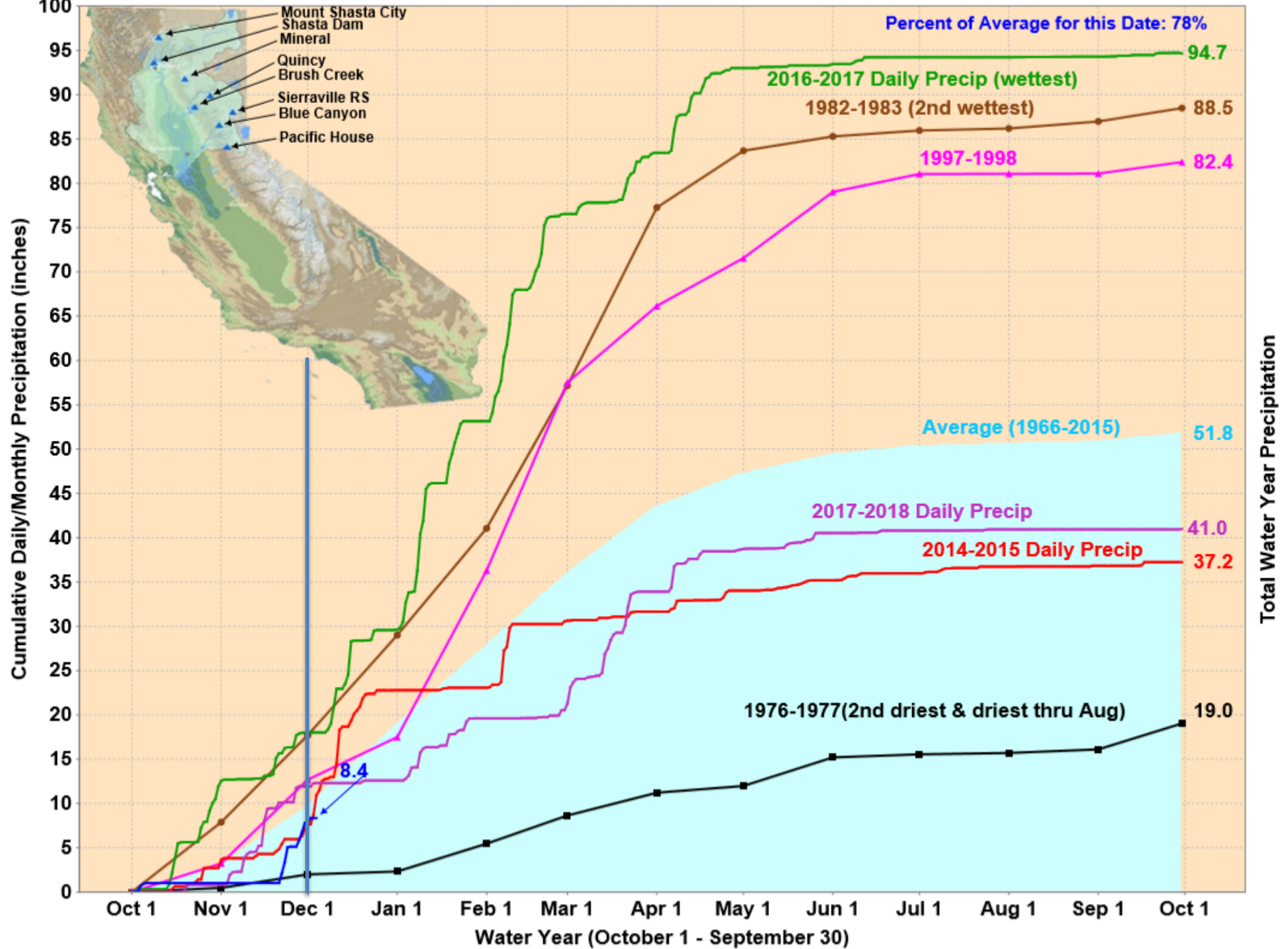


# Variability at multiple scales

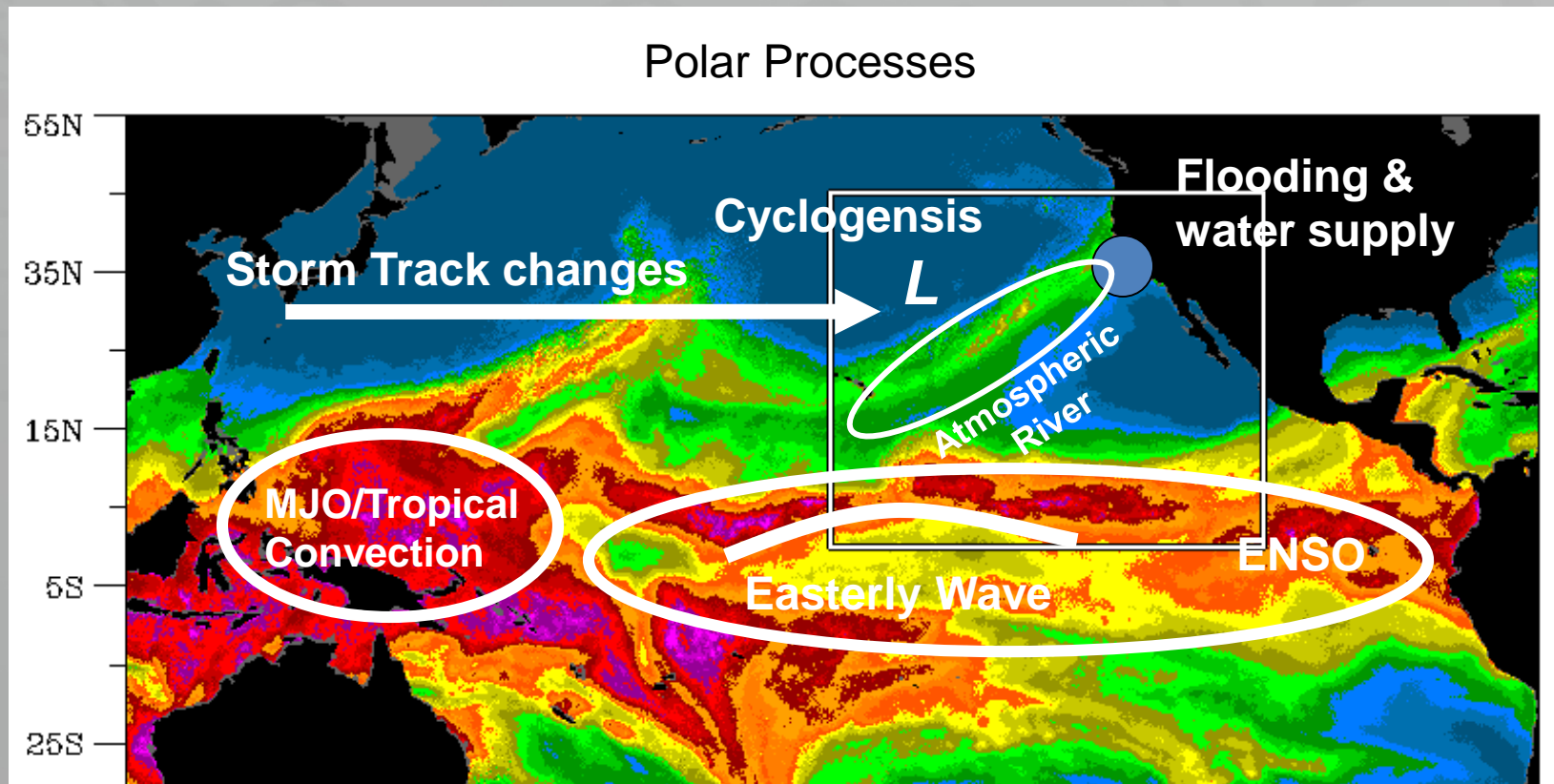




### Northern Sierra Precipitation: 8-Station Index, December 04, 2018



# Key Phenomena Affecting California Water Supply/Flooding:

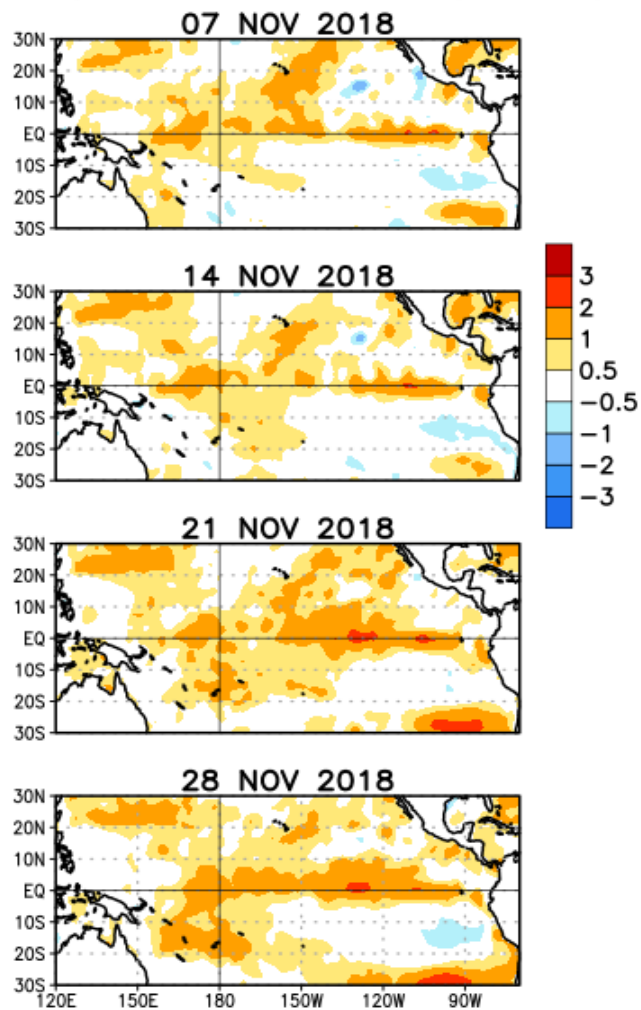


The size, number, and strength of atmospheric river events (ARs) result from the alignment of key physical processes operating on different space and time scales that will change with climate change

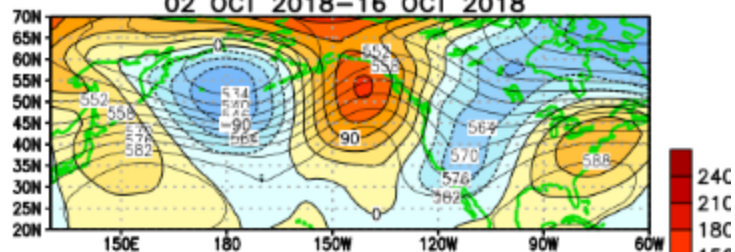


# Recent Ocean and Atmosphere Evolution

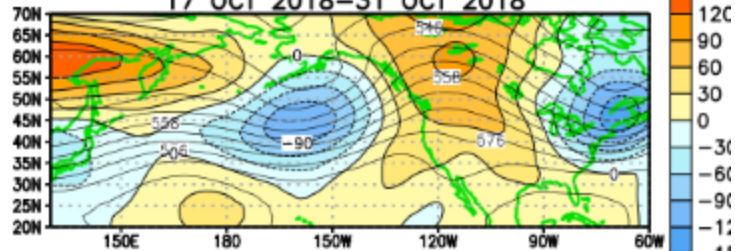
## Weekly SST Anomalies (DEG C)



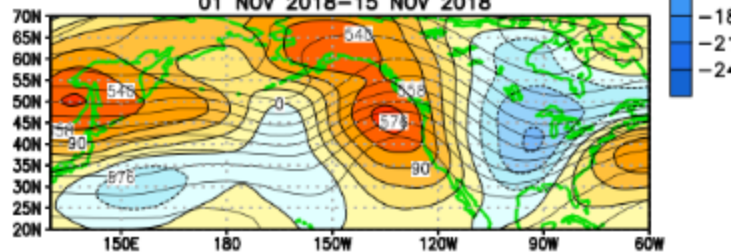
## CDAS 500-hPa HT & Anoms 02 OCT 2018-16 OCT 2018



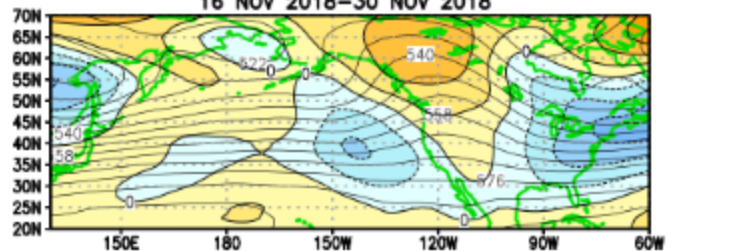
## 17 OCT 2018-31 OCT 2018



## 01 NOV 2018-15 NOV 2018

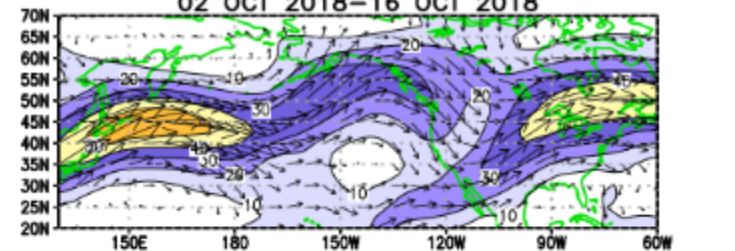


## 16 NOV 2018-30 NOV 2018

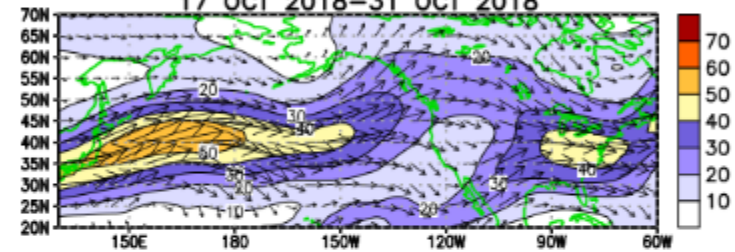


## CDAS 200-hPa Wind

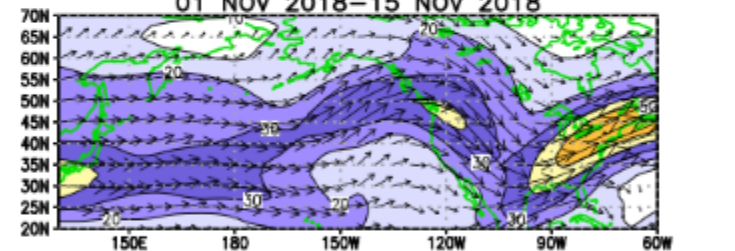
### 02 OCT 2018-16 OCT 2018



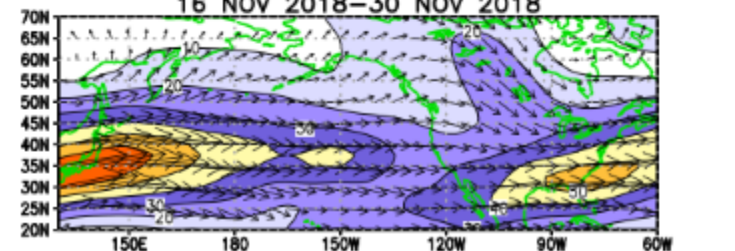
### 17 OCT 2018-31 OCT 2018



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### 16 NOV 2018-30 NOV 2018

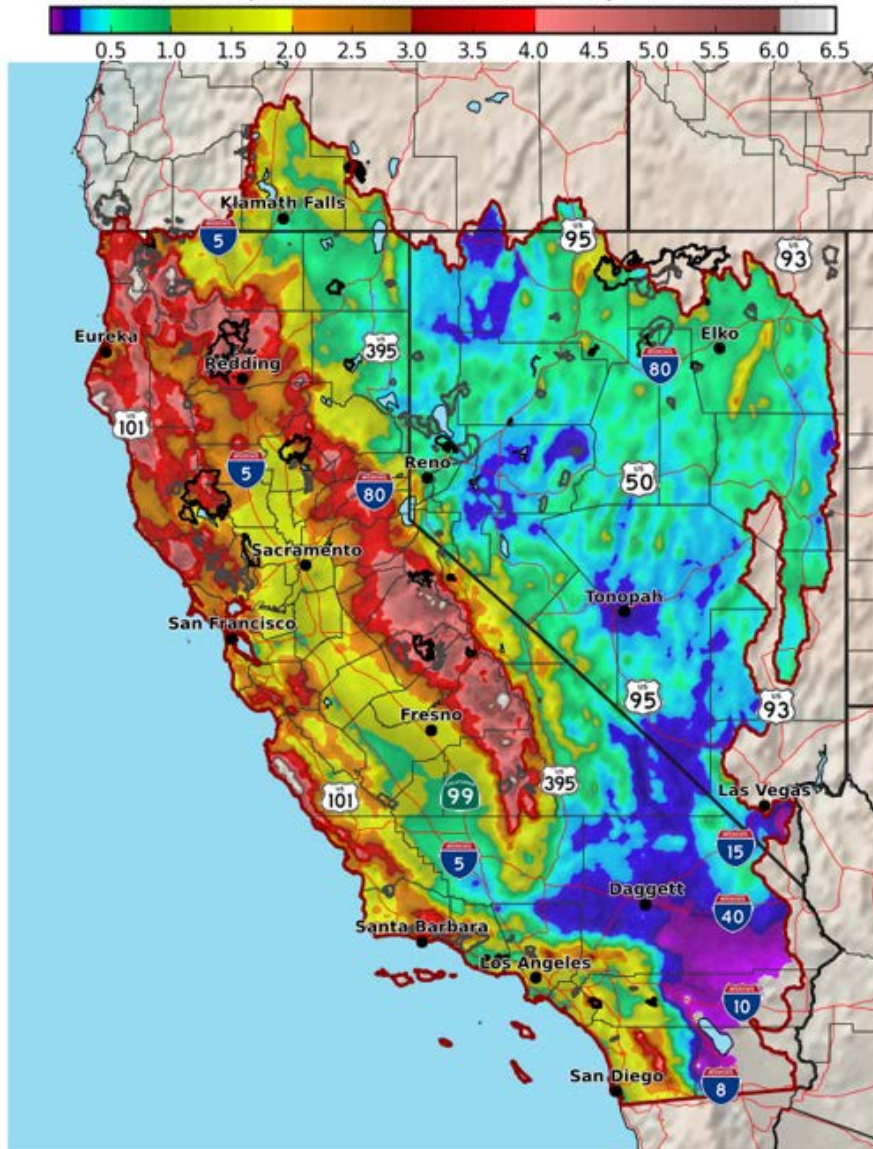




# CNRFC Area Observed Precipitation

Location: - CNRFC Area QPE  
Time Period: - Days 1-7 (4 AM - 4 AM PST)  
Map Legend  
Get Map

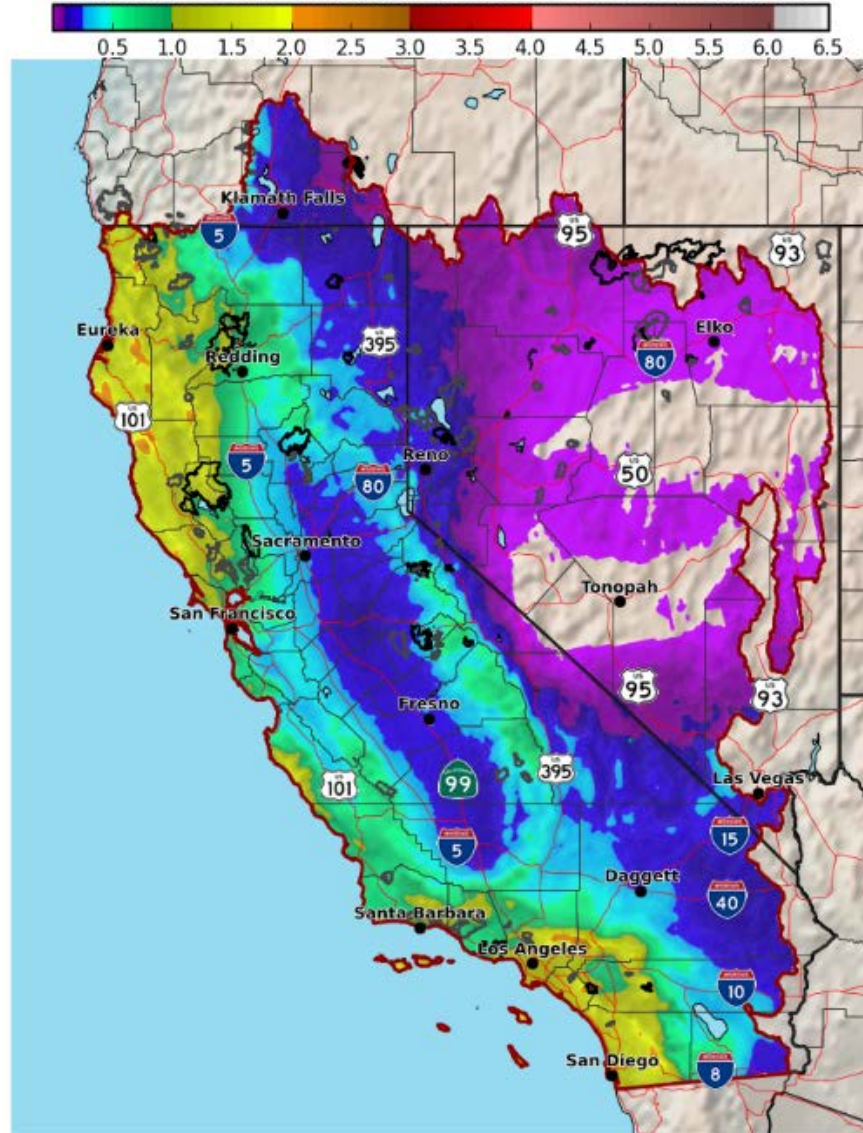
7-Day Observed Precipitation (Inches)  
Valid: Tue Nov 27, 2018 at 04 AM PST to Tue Dec 04, 2018 at 04 AM PST



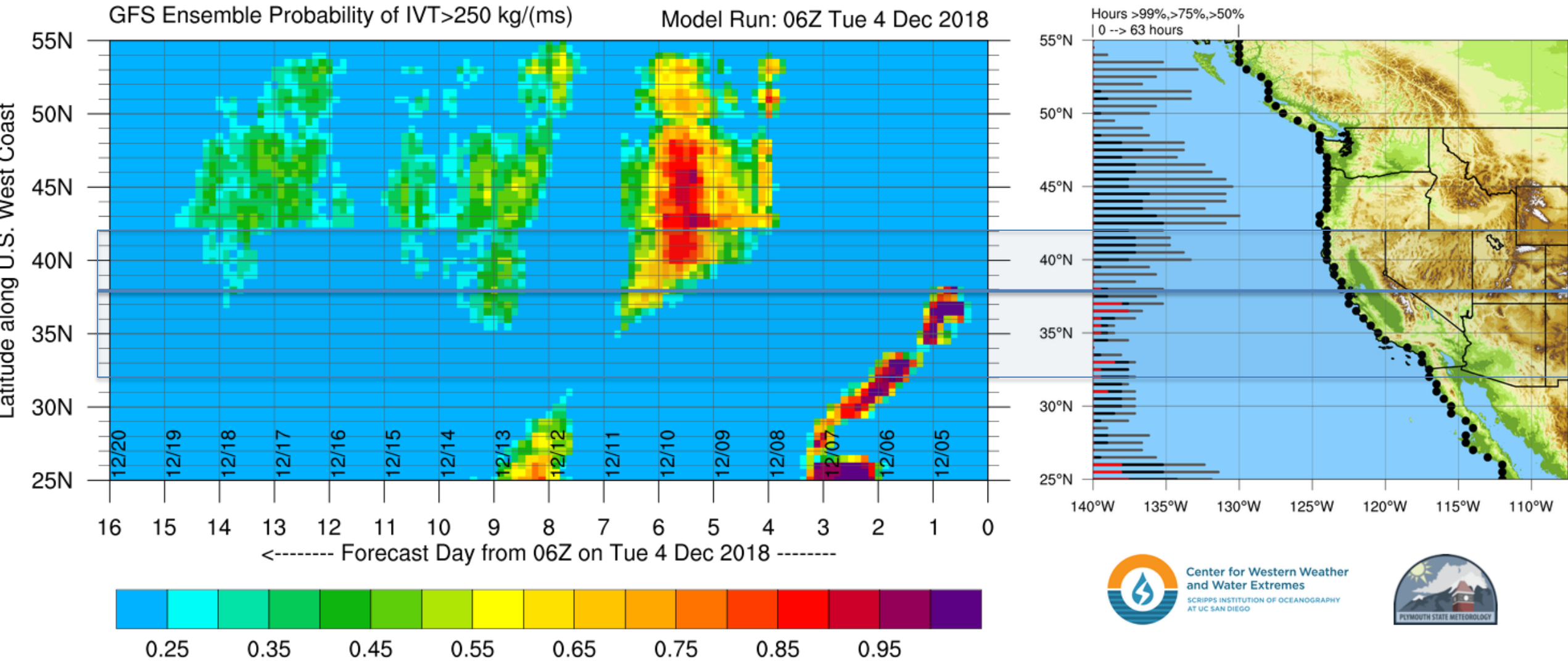
# CNRFC Area Precipitation Forecast

Location: - CNRFC Area QPF  
Time Period: - Days 1 to 6  
Map Legend  
Get Map

6-Day Forecast Precipitation (Inches)  
Valid: Tue Dec 04, 2018 at 04 AM PST to Mon Dec 10, 2018 at 04 AM PST

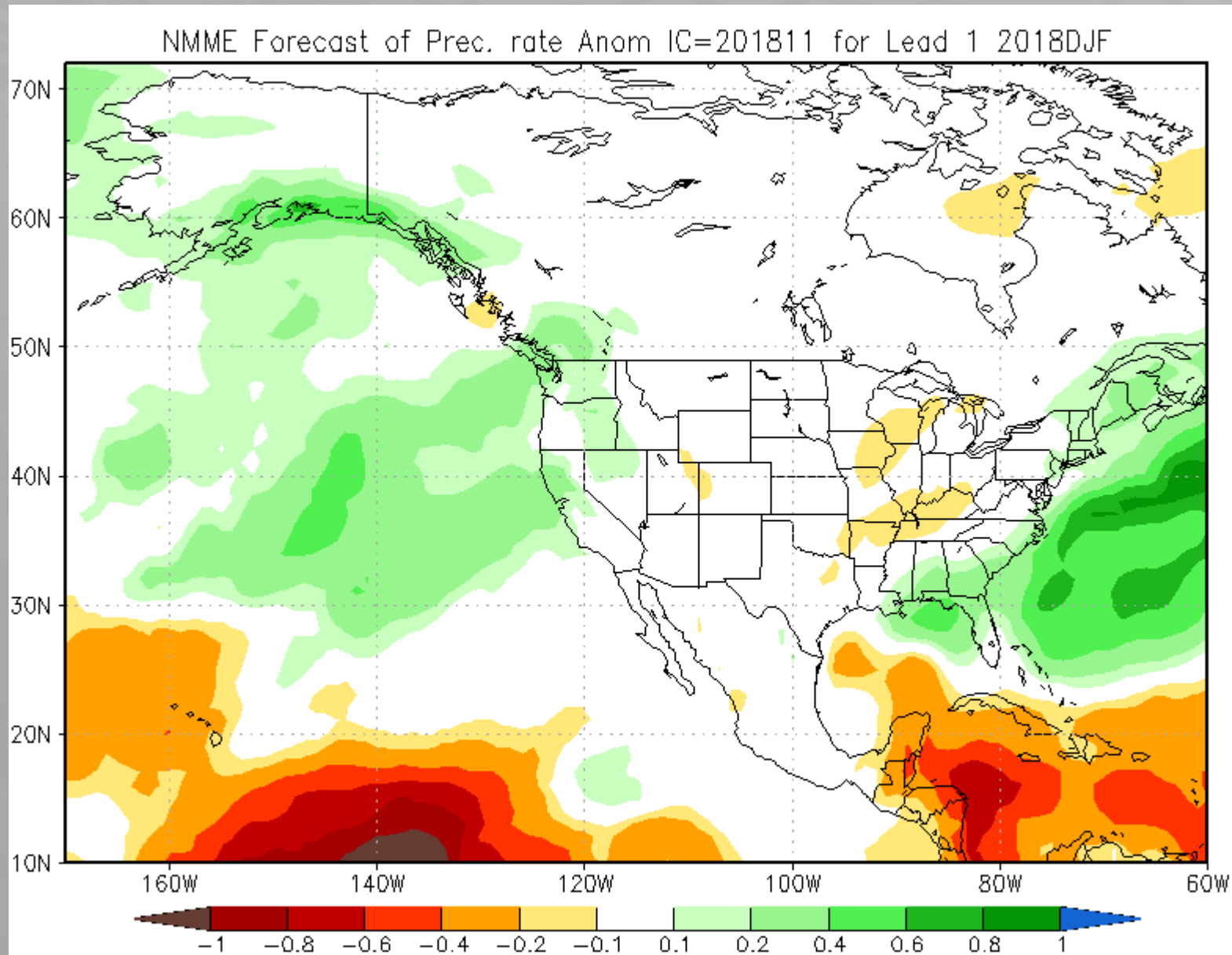


# AR Outlook Tool from CW3E





# National Multi-Model Ensemble Forecast of Winter (DJF) Precipitation Anomaly



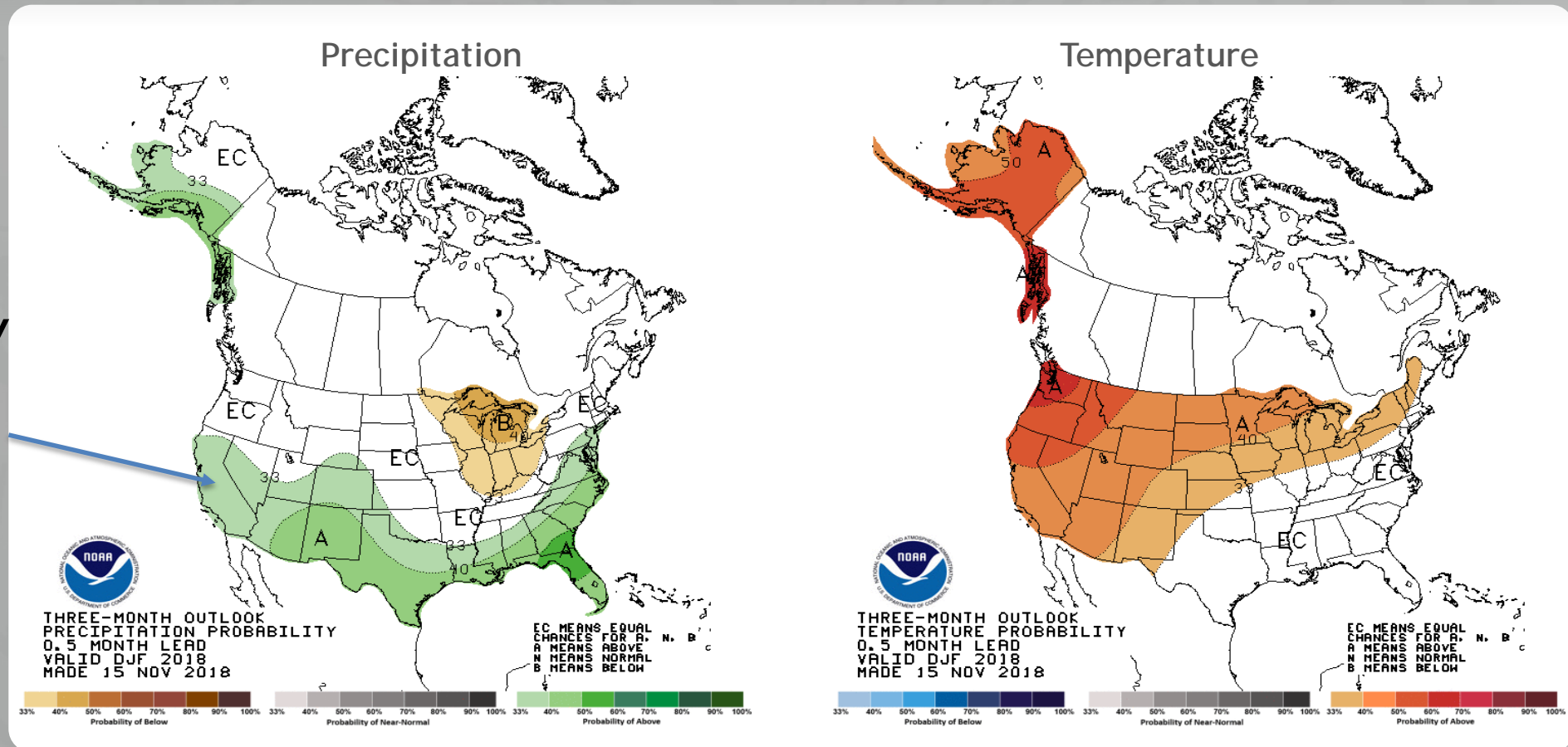


# U. S. Seasonal Outlooks

December 2018 - February 2019

The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.

37% W  
34% N  
29% D



# Summary

- *Slow start to the water year – first significant precipitation around Thanksgiving (aside from Hurricane Rosa remnants at very beginning of water year)*
- *Eastern Tropical Pacific SSTs warmer than average*
- *Jet stream more zonal (East-West) and accelerated*
- *Pattern suggests faster moving storms regularly impacting CA with precipitation totals dependent upon AR characteristics – pay attention to weather forecasts*
- *Dynamic seasonal forecast models ensemble indicates above average winter (DJF) – models have little verifiable skill right now*
- *CPC 3-month outlook suggests El Niño-ish pattern with improved chances of wet outcome in CA*

# Questions?

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