

# CW3E Atmospheric River Summary

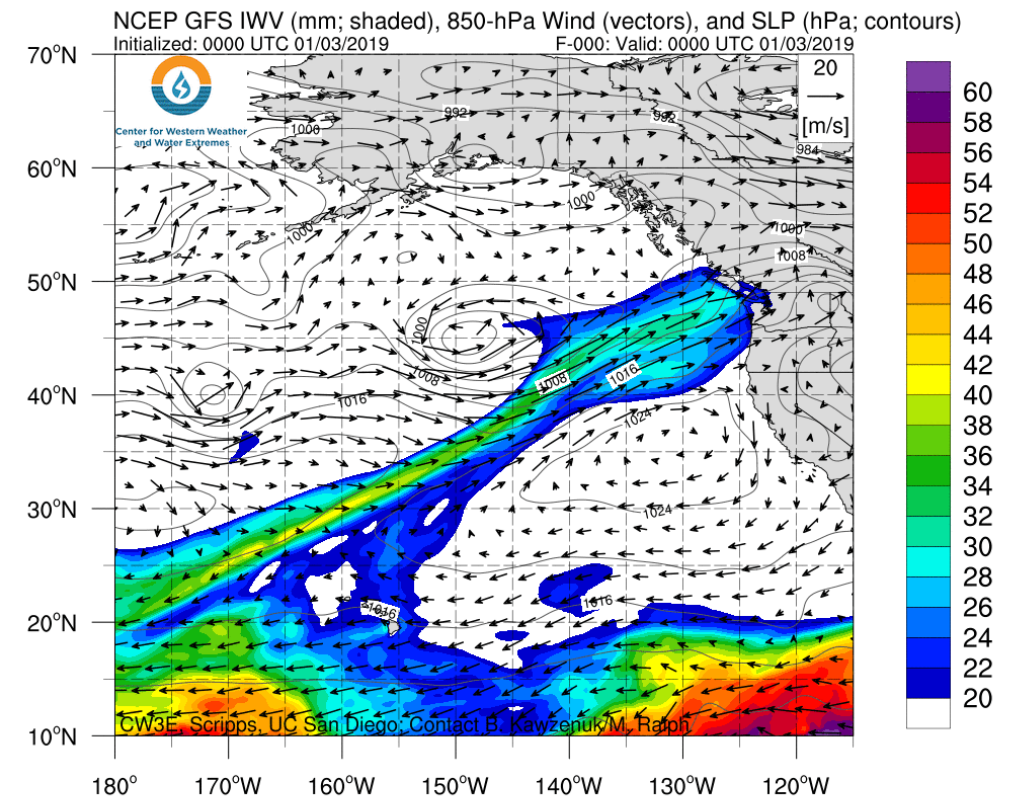
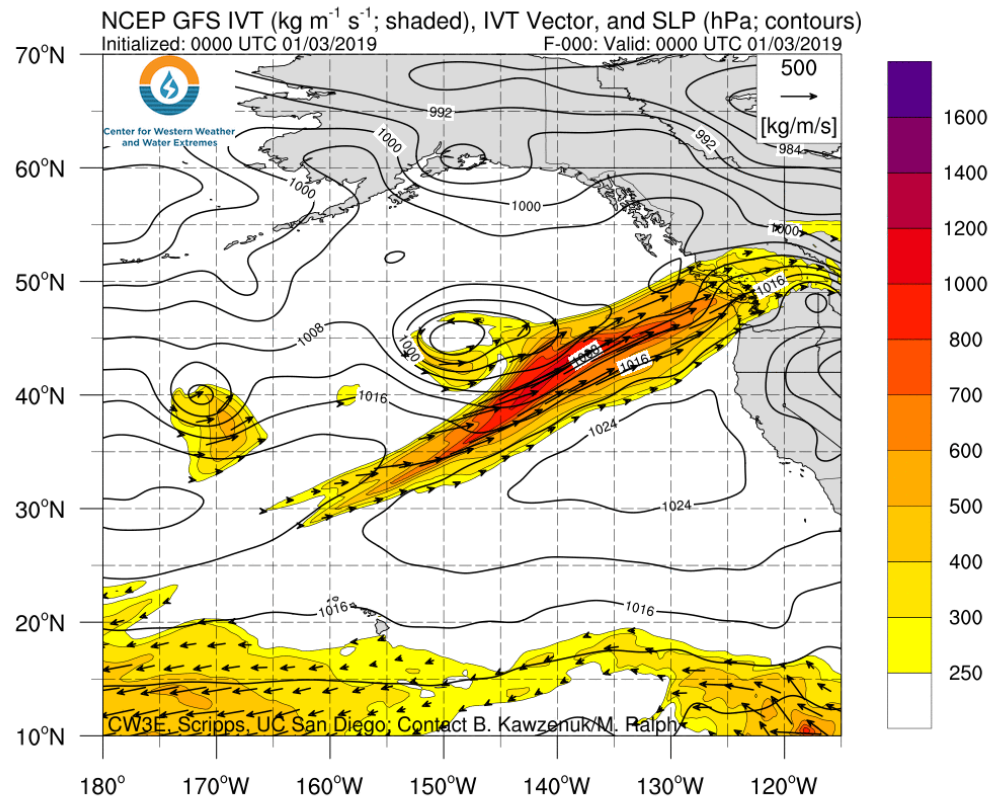
For California DWR's AR Program



Center for Western Weather and Water Extremes  
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## Several ARs have made landfall over the U.S. West Coast over the past week

- A strong AR made landfall over the PNW on 3-4 January, followed by a short lived moderate strength AR over much of the U.S. West Coast on 4-5 Jan, and a third AR made landfall on 8-9 January with moderate strength.
- The 7 day accumulated precipitation from the three systems was over 300 mm over the Olympic Mountains and over 200 mm over the Coastal and Sierra Nevada Mountains in CA.
- These short lived ARs are part of an active pattern over the North Pacific Ocean that will continue to produce ARs for the next several days.



Outlook and Summary provided by B. Kawzenuk, J. Kalansky, C. Hecht, and F.M. Ralph; 2 PM PT 10 January 2019

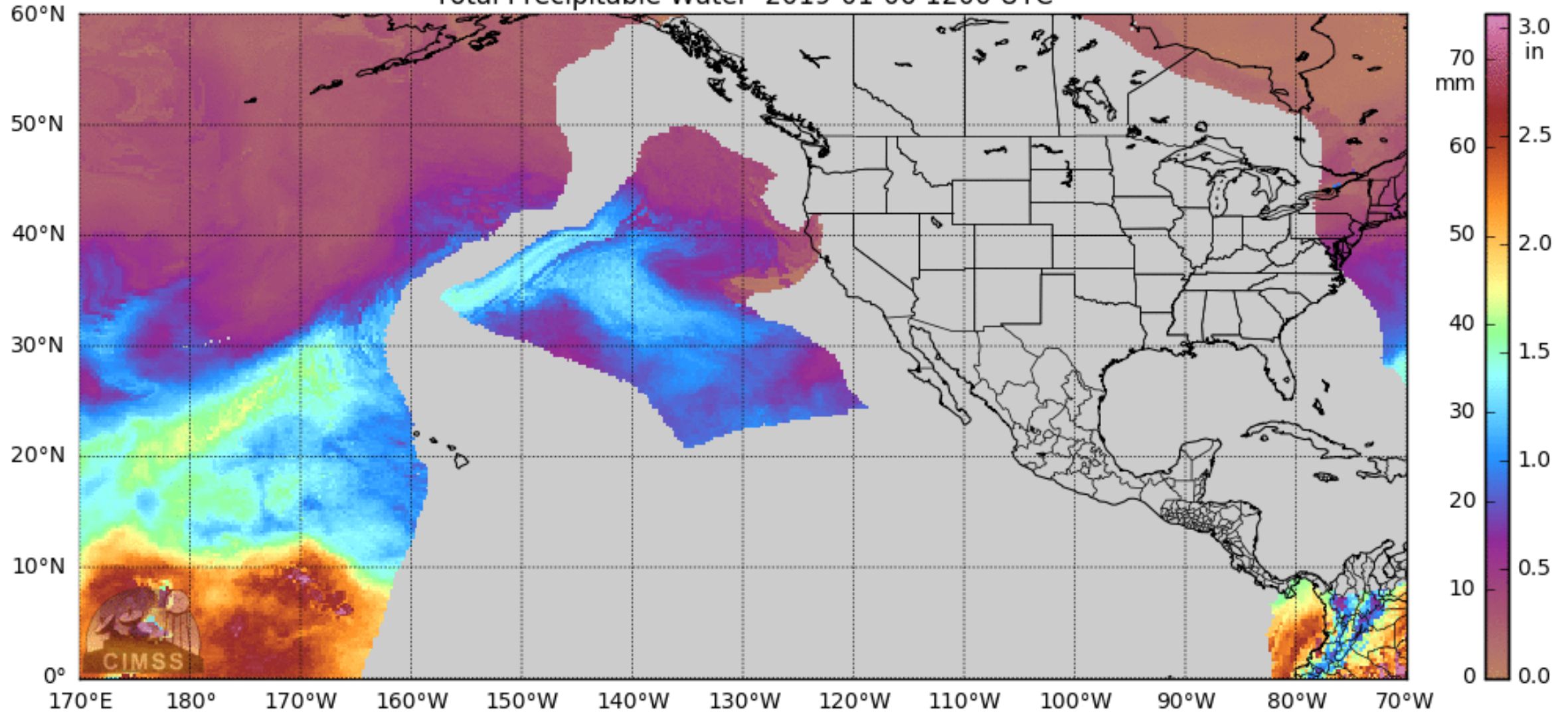
# AR Summary: 3-10 January 2019

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Total Precipitable Water 2019-01-06 1200 UTC





# AR Summary: 3-10 January 2019

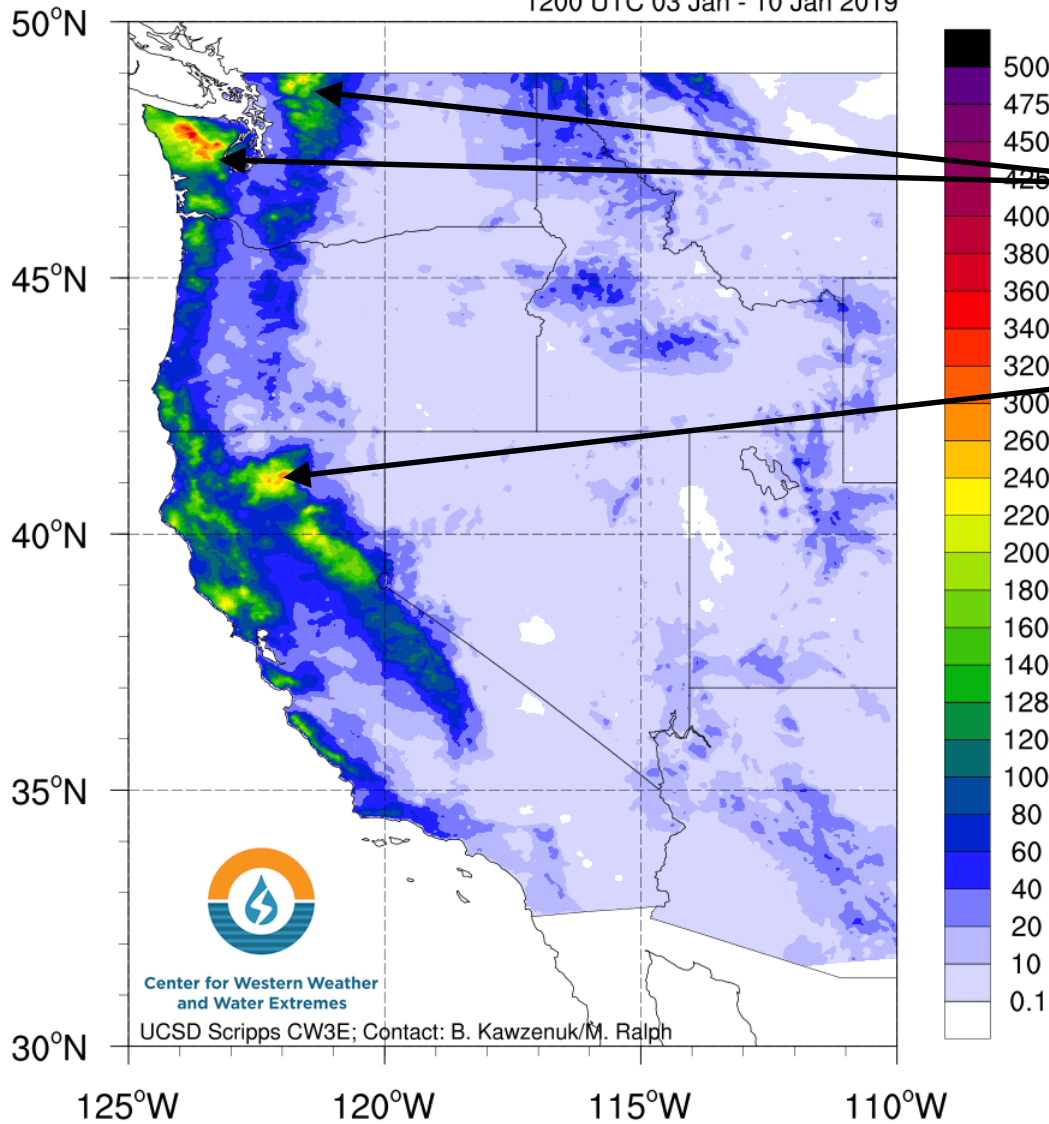
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## 7-day Accumulated Precipitation (mm)

1200 UTC 03 Jan - 10 Jan 2019



## NCEP Stage IV 7-day Accumulated Precipitation

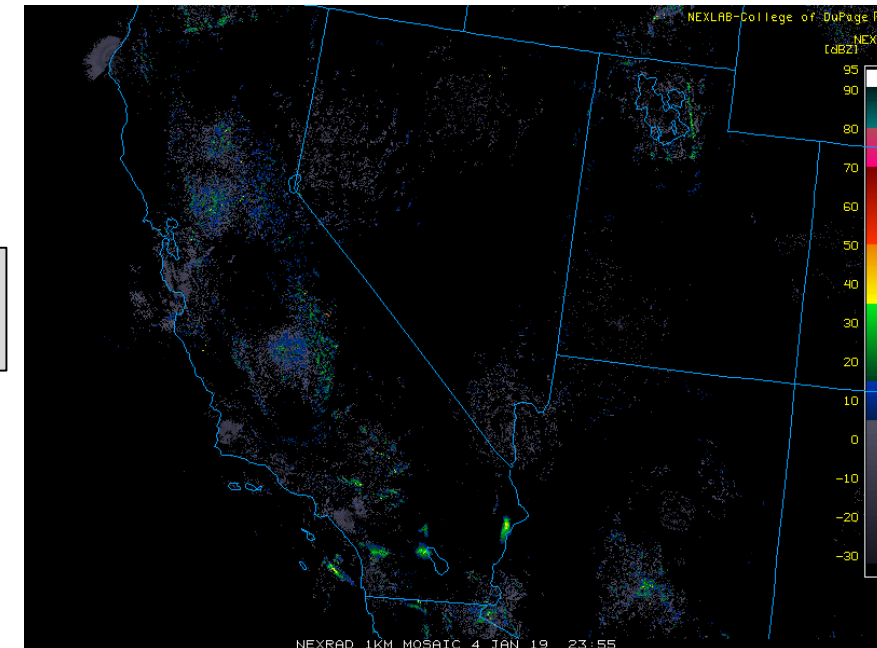
Valid 1200 UTC 3-10 January 2018

The Olympic Mountains in WA received greater than 300 mm of 7-day precipitation. Portions of the Cascade and Coastal Mountains in OR and WA also received greater than 200 mm.

The Coastal and Sierra Nevada Mountains in CA received greater than 200 mm of precipitation. Nearly all of CA, OR, and WA received measurable precipitation over the past 7 days.

## Radar Analysis

Valid 00Z 5 Jan – 12Z 10 Jan 2019



Center for Western Weather and Water Extremes

UCSD Scripps CW3E; Contact: B. Kawzenuk/M. Ralph

# CW3E Atmospheric River Outlook

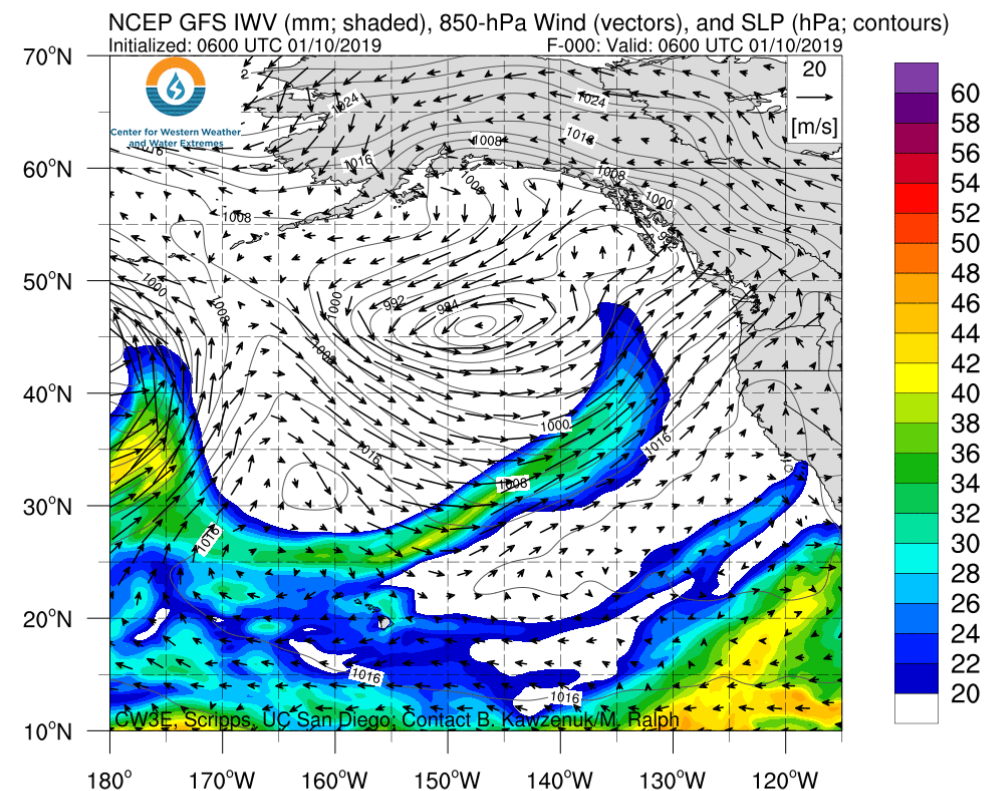
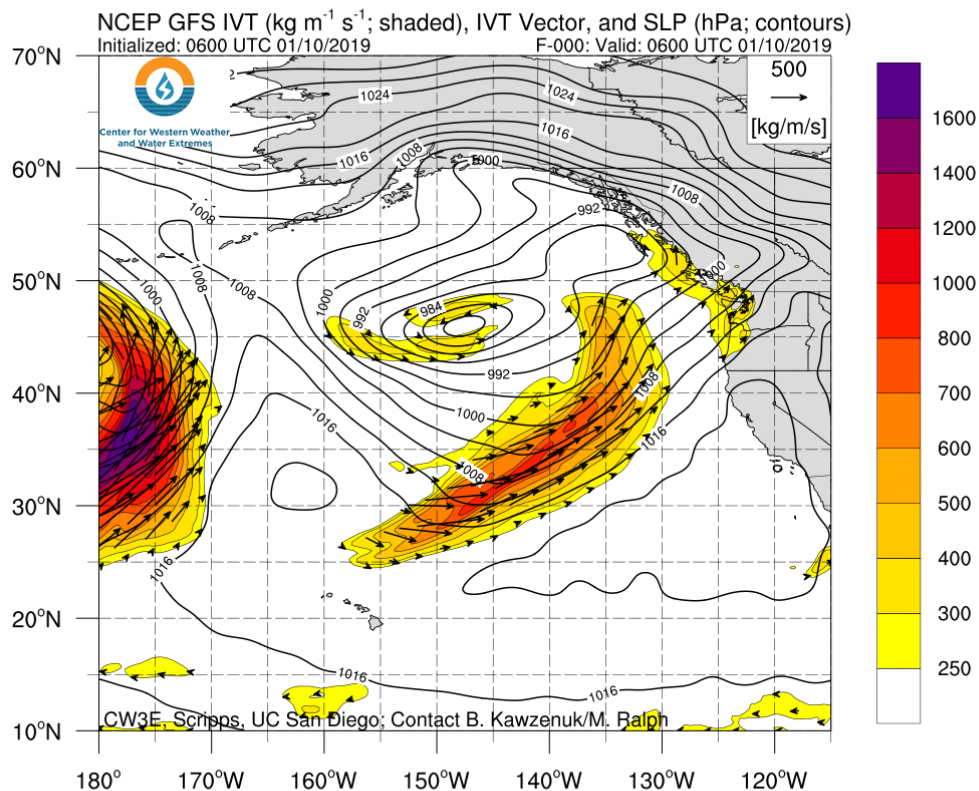
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## Multiple ARs forecast impact the US West Coast over the next several days

- A weak-to-moderate AR is expected to make landfall over the U.S. West coast over the next two days.
- This AR is expected to make landfall with a southerly orientation limiting precipitation accumulations.
- A closed low system followed by a second AR are expected to produce up to 5 inches of precipitation over CA during 14-17 January.
- Forecast confidence in the strength and timing of AR conditions during the second AR is currently low.
- The GEFS is suggested additional AR activity over the U.S. West Coast in the long range forecast (19-20 January).



Outlook provided by B. Kawzenuk, J. Kalansky, C. Hecht, and F.M. Ralph; 1 PM PT 10 January 2019



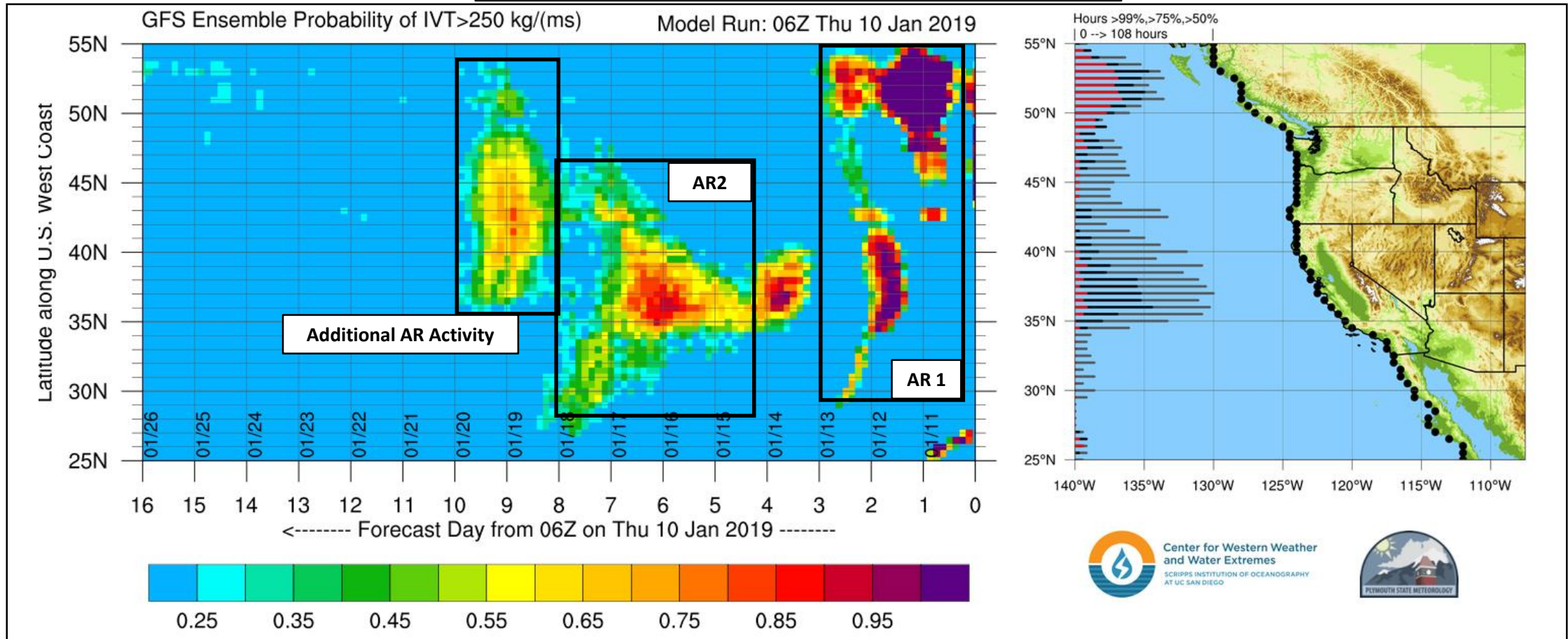
# AR Outlook: 10 January 2019

For California DWR's AR Program



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## Odds of AR Conditions Along U.S. West Coast



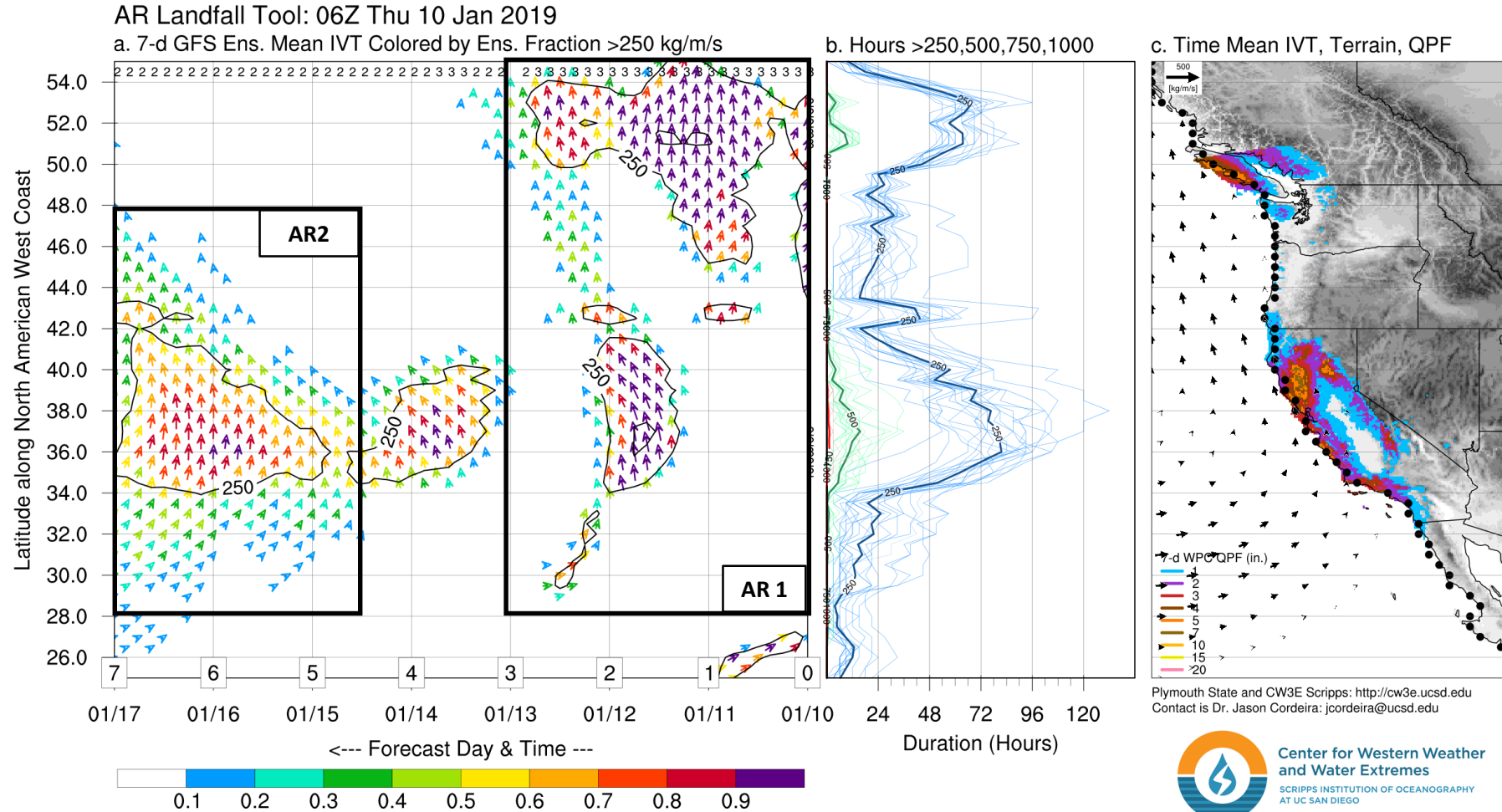
A southerly oriented AR is currently predicted to make landfall over the PNW and southern BC over the next two days. The southern edge of the AR will also likely bring AR conditions to central and northern CA.

There is high probability (60–90%) of a second AR, preceded by a closed low, to make landfall over CA during 15-17 January.

There is also high probability (55-85%) of additional AR activity during 18-20 January over the U.S. West Coast.



## Odds of AR Conditions Along U.S. West Coast



IVT orientation is expected to be southerly/south southeasterly during most of the AR conditions. This orientation is not ideal for geographic enhancement of precipitation over most of CA. Precipitation amounts during the first AR are expected to be low, but the presence of the closed low prior to and during the second AR could result in higher precipitation amounts (see WPC QPF below).



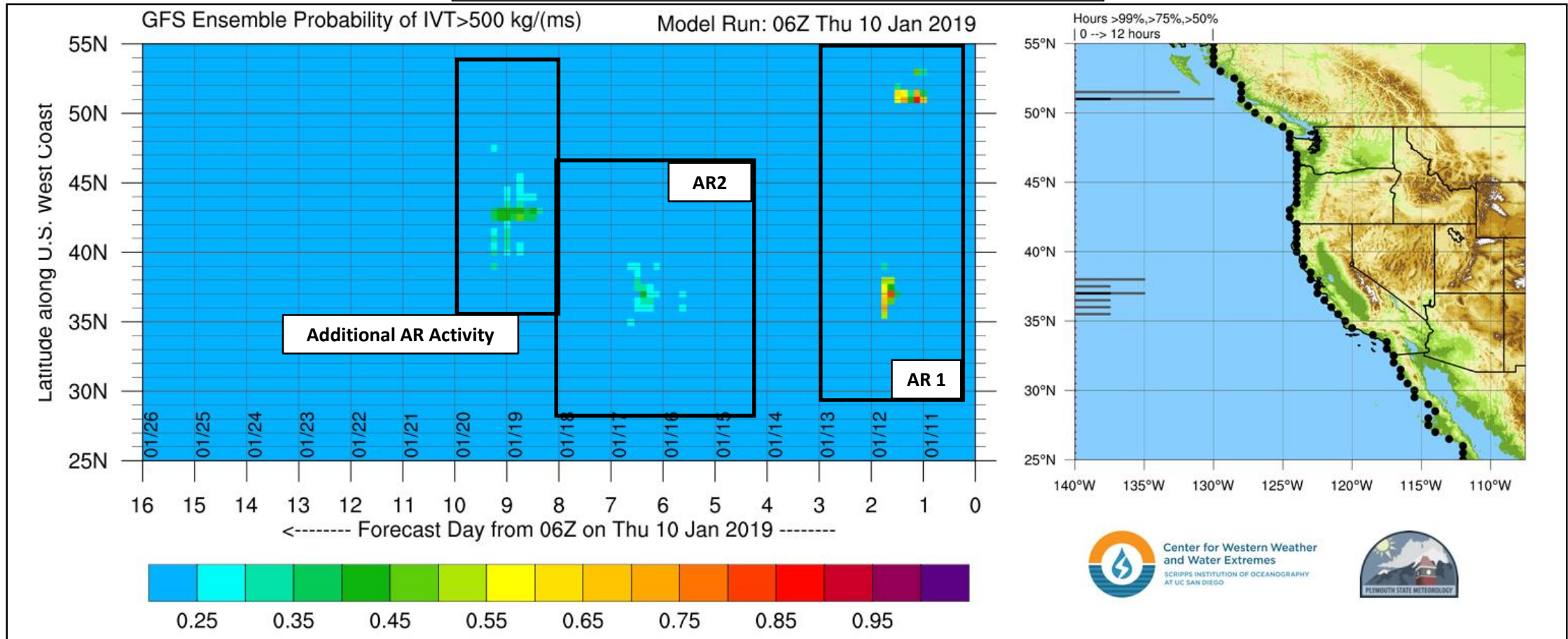
# AR Outlook: 10 January 2019

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## Odds of Moderate AR Conditions Along Coast



There is potential that the first AR (11-12 Jan) could bring moderate AR conditions ( $IVT > 500 \text{ km m}^{-1} \text{ s}^{-1}$ ) to portions of central CA and BC for a short period of time.

Forecast certainty of moderate AR conditions during the second and potentially third ARs is currently low ( $< 45\%$ ).

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The GEFS is currently forecasting potentially moderate AR conditions over central CA during AR 1 and potentially strong AR conditions in the extended forecast

## Magnitude of Potential AR 1 (11-12 January)

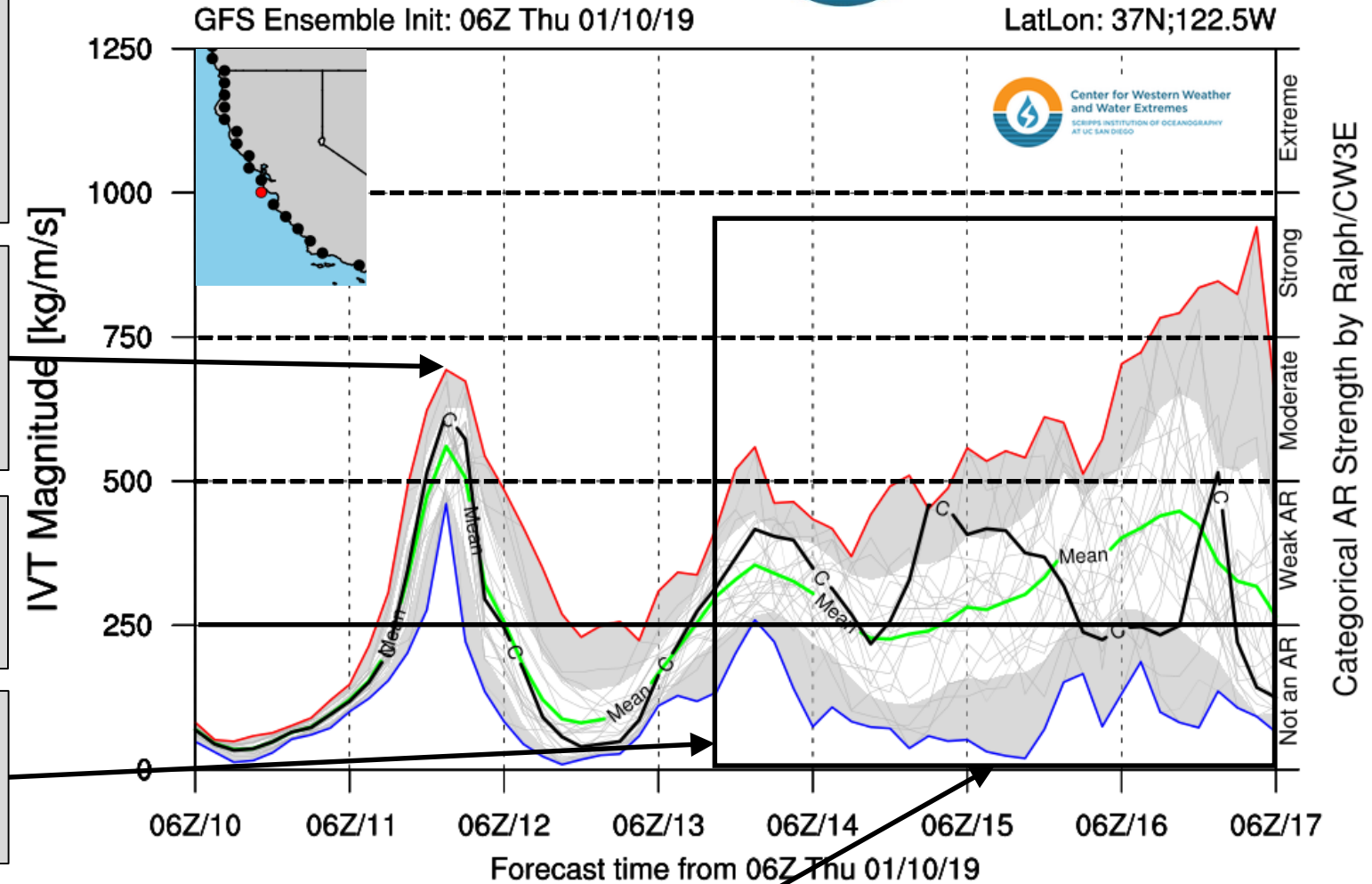
- Maximum predicted IVT  $\sim 700 \text{ kg m}^{-1} \text{ s}^{-1}$
- Mean IVT  $\sim 550 \text{ kg m}^{-1} \text{ s}^{-1}$
- Minimum IVT  $\sim 450 \text{ kg m}^{-1} \text{ s}^{-1}$

## Forecast Duration of AR Conditions during AR 1

- Weak 18 hours  $\pm 6$
- Moderate 6 hours  $\pm 6$

## Magnitude of Additional ARs (14-17 January)

- Maximum predicted IVT  $\sim 900 \text{ kg m}^{-1} \text{ s}^{-1}$
- Mean IVT  $\sim 400 \text{ kg m}^{-1} \text{ s}^{-1}$



Forecast certainty of AR conditions over central CA during 14-17 Jan is currently low.



# AR Outlook: 10 January 2019



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WPC 1-3 Day QPF  
Valid 00Z 11-14 Jan

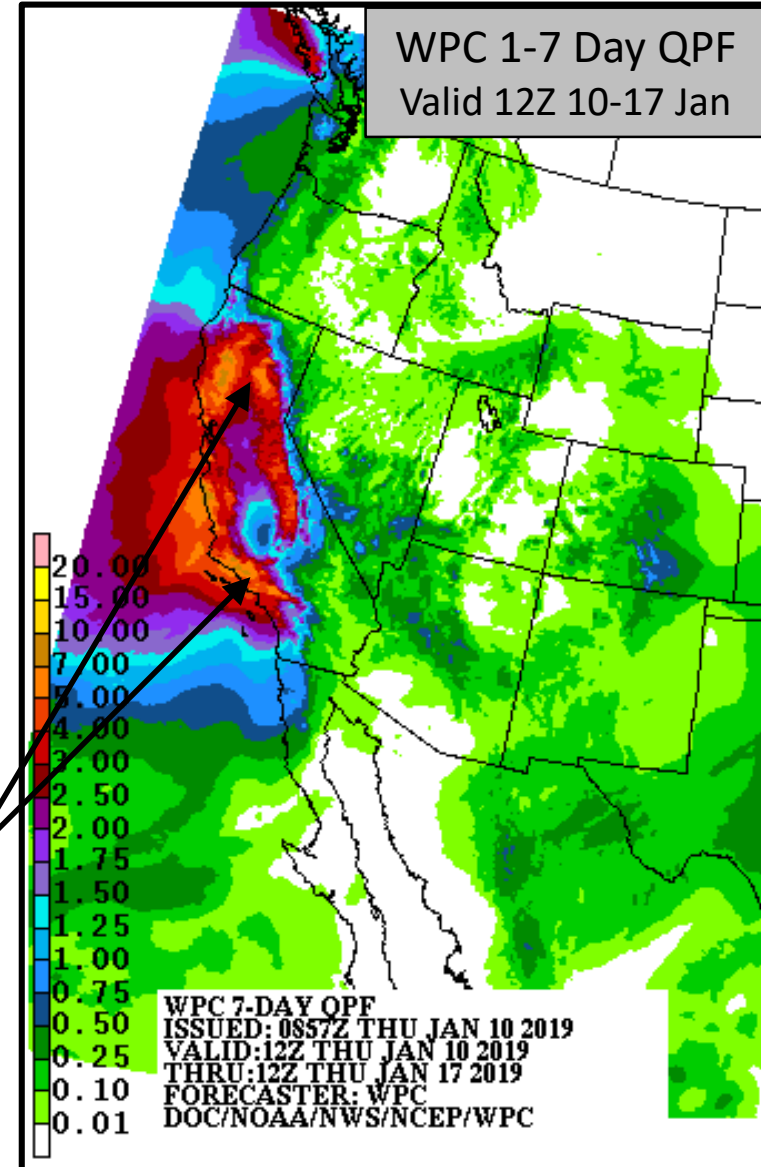
The first AR to make landfall along the U.S. West Coast has a southerly orientation, which will likely limit precipitation accumulations. The WPC is currently forecasting less than 1 inch of precipitation over most of CA for the next three days, with a few locations up to 1.5 inches.

On 13 Jan, a closed low is expected to develop off the CA coast, which will bring heavier precipitation to the U.S. West Coast starting on 14 Jan. An AR is expected to make landfall over southern CA on 15 Jan which will bring more precipitation to the region.

The closed low and second AR are currently forecasted to produce heavy precipitation over much of CA with locations in the Coastal and Sierra Nevada Mountains forecasted to receive up to 7 inches of total precipitation over the next 7 days.

NOAA Weather Prediction Center forecast products are located at [wpc.ncep.noaa.gov](http://wpc.ncep.noaa.gov)

WPC 1-7 Day QPF  
Valid 12Z 10-17 Jan



DAY 1-3 QPF  
VALID 00Z FRI JAN 11 2019  
THRU 00Z MON JAN 14 2019  
ISSUED: 1735Z THU JAN 10 2019  
FORECASTER: WPC/WPC  
NOAA/NWS/NCEP/WPC

WPC 7-DAY QPF  
ISSUED: 0857Z THU JAN 10 2019  
VALID: 12Z THU JAN 10 2019  
THRU: 12Z THU JAN 17 2019  
FORECASTER: WPC  
DOC/NOAA/NWS/NCEP/WPC